Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H04(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	13,5573	12,9588
Radiation Level	18,43	kW/m2	10,4577	9,66754
Radiation Level	35	kW/m2	6,19955	5,93481

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H04(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H04(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H04(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	19,5754	18,5121
Radiation Level	18,43	kW/m2	13,4322	12,496
Radiation Level	35	kW/m2	7,56665	7,27531

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H04(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H04(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	7,99098	2,09495
Furthest Extent	10500	ppm	7,99098	2,09495

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H04(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H05(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

User-Defined Data

Location			
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	3051	m2
	[Type of Bund Surface	User-Defined (Land)]	
	Bund Height	1,9	m
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	4,867	m/s
	Droplet Diameter(1)	7903	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,01	degC
	Release Rate(1)	27,33	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1,968E4	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			
	[Indoor Calculations	Unselected]	
	[Wind Dependent Exchange Rate	Case Specified]	
	[Building Exchange Rate	4	/hr]
	[Tail Time	1800	s]
	[Set averaging time equal to exposure time	Use a fixed averaging time]	
	[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Geometry			
	Shape	Point	
	Dimension	2D	

	System	Absolute
	East(1)	0 m
	North(1)	0 m
Material		
	Material Identifier	N-HEXANE
Scenario		
	Building Wake Effect	None
Vessel/Tank		
	Release Type	Continuous
Location		
	Elevation	0,5 m
	Use ERPG averaging time	ERPG not selected
	Use IDLH averaging time	IDLH not selected
	Use STEL averaging time	STEL not selected

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,982747	0,985198
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	260,822	252,81
Pool Vaporization Rate	kg/s	0,979154	0,690401
Total Vapor Flowrate	kg/s	1,45069	1,09494
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,508	115,83
Pool Vaporization Rate	kg/s	2,20299	1,50247
Total Vapor Flowrate	kg/s	2,67453	1,90701
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,3919	92,5356
Pool Vaporization Rate	kg/s	2,79514	1,89294
Total Vapor Flowrate	kg/s	3,26668	2,29749
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,8375	79,3869
Pool Vaporization Rate	kg/s	3,25154	2,1943
Total Vapor Flowrate	kg/s	3,72307	2,59884
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	136,262	138,04
Pool Vaporization Rate	kg/s	3,79689	2,55372
Total Vapor Flowrate	kg/s	4,26842	2,95826
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	170,278	174,037
Pool Vaporization Rate	kg/s	4,52766	3,03874
Total Vapor Flowrate	kg/s	4,99919	3,44328
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	45,8994	47,36
Pool Vaporization Rate	kg/s	5,01728	3,36619
Total Vapor Flowrate	kg/s	5,48882	3,77074
Maximum Pool Radius	m	18,6448	18,9483

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	4,75806	6,88817
LFL (10500)	18,75	s	20,936	24,062
LFL Frac (10500)	18,75	s	20,936	24,062

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	29,3083	29,5556
Radiation Level	18,43	kW/m2	26,1568	26,4438
Radiation Level	35	kW/m2	23,611	23,8398

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	25,1596	23,2104
Radiation Level	18,43	kW/m2	13,4699	13,048
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

		Radiation Level (kW/m2)
Dia		Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	28,4595	27,2827
Radiation Level	18,43	kW/m2	21,4741	21,792
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

		Radiation Level (kW/m2)
Dia		Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	20,936	24,062
Furthest Extent	10500	ppm	20,936	24,062

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	40,0368	40,606
Overpressure	0,2	bar	29,2324	29,5968
Overpressure	0,3	bar	24,9984	25,2827

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	23,8482	25,2298
Used Flammable Mass	kg	23,8482	25,2298
Overpressure Radius	m	30,0368	30,606
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	9,99999	10

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	23,8482	25,2298
Used Flammable Mass	kg	23,8482	25,2298
Overpressure Radius	m	19,2324	19,5968
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	9,99999	10

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	23,8482	25,2298
Used Flammable Mass	kg	23,8482	25,2298
Overpressure Radius	m	14,9984	15,2827
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	9,99999	10

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H05(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H06(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	3051	m2
	[Type of Bund Surface	User-Defined (Land)]	
	Bund Height	1,9	m
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	8,112	m/s
	Droplet Diameter(1)	2846	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,99	degC
	Release Rate(1)	0,27	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1,968E4	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,96014	0,960728
Maximum Pool Radius		m	1,77857	1,83727

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	No Hazard	No Hazard
LFL (10500)	18,75	s	1,85625	1,86117
LFL Frac (10500)	18,75	s	1,85625	1,86117

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	5,3671	5,75071
Radiation Level	18,43	kW/m2	4,79575	5,21515
Radiation Level	35	kW/m2	4,79575	5,21515

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	10,6474	10,2282
Radiation Level	18,43	kW/m2	8,49099	7,8582
Radiation Level	35	kW/m2	5,17796	4,92861

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,7593	15,0928
Radiation Level	18,43	kW/m2	11,6114	10,7968
Radiation Level	35	kW/m2	6,64845	6,37513

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	1,85625	1,86117
Furthest Extent	10500	ppm	1,85625	1,86117

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H06(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H07(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1520	m
North(1)	-1465	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	963,38	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	944,86	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,987991	0,988432
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	55,5025	115,563
Pool Vaporization Rate		kg/s	7,2029	8,89339
Total Vapor Flowrate		kg/s	21,5839	22,7463
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	844,497	784,438
Pool Vaporization Rate		kg/s	14,8301	11,7703
Total Vapor Flowrate		kg/s	29,2111	25,6233
Maximum Pool Radius		m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	26,9151	34,44
LFL (10500)	18,75	s	73,9014	86,8432
LFL Frac (10500)	18,75	s	73,9014	86,8432

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	128,897	135,72
Radiation Level	18,43	kW/m2	112,892	119,41
Radiation Level	35	kW/m2	100,217	106,323

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

				Radiation Level (kW/m2)
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	73,9014	86,8432
Furthest Extent	10500	ppm	73,9014	86,8432

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	107,137	142,98
Overpressure	0,2	bar	81,1885	105,937
Overpressure	0,3	bar	71,0203	91,4216

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	330,339	961,069
Used Flammable Mass	kg	330,339	961,069
Overpressure Radius	m	72,1366	102,98
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	40

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	330,339	961,069
Used Flammable Mass	kg	330,339	961,069
Overpressure Radius	m	46,1885	65,9375
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	40

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	330,339	961,069
Used Flammable Mass	kg	330,339	961,069
Overpressure Radius	m	36,0203	51,4216
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	40

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H07(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H08(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	347,19	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	340,52	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,828012	0,843156
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	290,703	283,923
Pool Vaporization Rate	kg/s	0,278756	0,184174
Total Vapor Flowrate	kg/s	2,33841	2,06247
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,328	117,078
Pool Vaporization Rate	kg/s	0,701451	0,449287
Total Vapor Flowrate	kg/s	2,76111	2,32758
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	89,145	89,6219
Pool Vaporization Rate	kg/s	0,913607	0,58279
Total Vapor Flowrate	kg/s	2,97326	2,46108
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	75,0344	77,0081
Pool Vaporization Rate	kg/s	1,07934	0,687996
Total Vapor Flowrate	kg/s	3,13899	2,56629
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	66,3525	67,4094
Pool Vaporization Rate	kg/s	1,21925	0,777429
Total Vapor Flowrate	kg/s	3,27891	2,65572
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	117,313	118,462
Pool Vaporization Rate	kg/s	1,39712	0,89009
Total Vapor Flowrate	kg/s	3,45677	2,76838
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	145,124	146,498
Pool Vaporization Rate	kg/s	1,6426	1,04656
Total Vapor Flowrate	kg/s	3,70225	2,92485
Maximum Pool Radius	m	11,3995	11,662

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	7,04715	6,99473
LFL (10500)	18,75	s	34,9233	37,5137
LFL Frac (10500)	18,75	s	34,9233	37,5137

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	53,9667	55,3061
Radiation Level	18,43	kW/m2	47,359	48,831
Radiation Level	35	kW/m2	42,0858	43,5885

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	30,9472	28,5665
Radiation Level	18,43	kW/m2	19,5804	18,583
Radiation Level	35	kW/m2	13,7256	13,7669

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	30,2609	28,5205
Radiation Level	18,43	kW/m2	19,5303	19,7051
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	34,9233	37,5137
Furthest Extent	10500	ppm	34,9233	37,5137

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	37,4048	43,0039
Overpressure	0,2	bar	29,3456	32,9307
Overpressure	0,3	bar	26,1875	28,9833

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	9,89731	19,3263
Used Flammable Mass	kg	9,89731	19,3263
Overpressure Radius	m	22,4048	28,0039
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	9,89731	19,3263
Used Flammable Mass	kg	9,89731	19,3263
Overpressure Radius	m	14,3456	17,9307
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	9,89731	19,3263
Used Flammable Mass	kg	9,89731	19,3263
Overpressure Radius	m	11,1875	13,9833
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H08(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H09(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

User-Defined Data

Material

Material Identifier	N-HEXANE	

Scenario

Building Wake Effect	None	

Vessel/Tank

Release Type	Continuous	

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Number of Release Segments	1	
Fluid Phase(1)	Liquid	
Discharge Velocity(1)	11,08	m/s
Droplet Diameter(1)	1525	um
Duration of Discharge(1)	900	s
Final Temperature(1)	25,05	degC
Release Rate(1)	191,3	kg/s
Pre-Dilution Air Rates(1)	0	kg/s
Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,433E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1459	m
North(1)	-1462	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,981342	0,983223
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	260,016	252,016
Pool Vaporization Rate	kg/s	6,03574	4,33315
Total Vapor Flowrate	kg/s	9,60562	7,54311
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,344	115,665
Pool Vaporization Rate	kg/s	13,5577	9,45701
Total Vapor Flowrate	kg/s	17,1276	12,667
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,2806	92,4219
Pool Vaporization Rate	kg/s	17,1827	11,9067
Total Vapor Flowrate	kg/s	20,7526	15,1166
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,75	79,2981
Pool Vaporization Rate	kg/s	19,9679	13,7847
Total Vapor Flowrate	kg/s	23,5378	16,9947
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	136,125	137,9
Pool Vaporization Rate	kg/s	23,2856	16,0084
Total Vapor Flowrate	kg/s	26,8554	19,2184
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	171,585	173,88
Pool Vaporization Rate	kg/s	27,7357	18,9833
Total Vapor Flowrate	kg/s	31,3056	22,1933
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	45,8994	48,8194
Pool Vaporization Rate	kg/s	30,7148	20,9899
Total Vapor Flowrate	kg/s	34,2847	24,1999
Maximum Pool Radius	m	49,618	50,2716

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	12,7676	20,2043
LFL (10500)	18,75	s	50,791	64,5282
LFL Frac (10500)	18,75	s	50,791	64,5282

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	70,2368	71,8426
Radiation Level	18,43	kW/m2	61,8632	63,5362
Radiation Level	35	kW/m2	55,1814	56,7701

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	36,4578	35,5065
Radiation Level	18,43	kW/m2	30,0122	30,3923
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	63,7997	62,1738
Radiation Level	18,43	kW/m2	55,2846	55,9579
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	50,791	64,5282
Furthest Extent	10500	ppm	50,791	64,5282

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	101,742	124,556
Overpressure	0,2	bar	74,1373	90,5432
Overpressure	0,3	bar	63,32	77,2149

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	397,733	743,967
Used Flammable Mass	kg	397,733	743,967
Overpressure Radius	m	76,742	94,5555
Distance to:			
- Ignition Source	m	50	60
- Cloud Front/Centre	m	50	60
- Explosion Centre	m	25	30

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	397,733	743,967
Used Flammable Mass	kg	397,733	743,967
Overpressure Radius	m	49,1373	60,5432
Distance to:			
- Ignition Source	m	50	60
- Cloud Front/Centre	m	50	60
- Explosion Centre	m	25	30

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	397,733	743,967
Used Flammable Mass	kg	397,733	743,967
Overpressure Radius	m	38,32	47,2149
Distance to:			
- Ignition Source	m	50	60
- Cloud Front/Centre	m	50	60
- Explosion Centre	m	25	30

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H09(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H10(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	1,91	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	3,433E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,840521	0,849484
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	290,703	286,456
Pool Vaporization Rate	kg/s	0,0573722	0,0361454
Total Vapor Flowrate	kg/s	0,361978	0,32363
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	114,313	116,55
Pool Vaporization Rate	kg/s	0,145892	0,0897281
Total Vapor Flowrate	kg/s	0,450498	0,377213
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	88,935	89,8344
Pool Vaporization Rate	kg/s	0,189167	0,116495
Total Vapor Flowrate	kg/s	0,493773	0,40398
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	74,8719	75,9825
Pool Vaporization Rate	kg/s	0,222847	0,137452
Total Vapor Flowrate	kg/s	0,527453	0,424938
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	128,137	67,4781
Pool Vaporization Rate	kg/s	0,263042	0,155198
Total Vapor Flowrate	kg/s	0,567648	0,442683
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	160,066	117,202
Pool Vaporization Rate	kg/s	0,317524	0,177511
Total Vapor Flowrate	kg/s	0,622129	0,464996
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	42,9744	146,498
Pool Vaporization Rate	kg/s	0,354346	0,208462
Total Vapor Flowrate	kg/s	0,658952	0,495947
Maximum Pool Radius	m	4,53394	4,64901

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	3,98398	4,02256
LFL (10500)	18,75	s	16,3342	17,0375
LFL Frac (10500)	18,75	s	16,3342	17,0375

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	23,3122	24,3353
Radiation Level	18,43	kW/m2	20,5894	21,5932
Radiation Level	35	kW/m2	18,3705	19,304

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	20,1556	19,1939
Radiation Level	18,43	kW/m2	14,9117	13,9654
Radiation Level	35	kW/m2	9,38155	9,07597

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	26,6349	24,7155
Radiation Level	18,43	kW/m2	16,6451	15,6488
Radiation Level	35	kW/m2	10,0498	9,86455

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	16,3342	17,0375
Furthest Extent	10500	ppm	16,3342	17,0375

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	12,0676	12,714
Overpressure	0,2	bar	9,52585	9,9392
Overpressure	0,3	bar	8,52982	8,85186

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	0,310488	0,40395
Used Flammable Mass	kg	0,310488	0,40395
Overpressure Radius	m	7,06617	7,71398
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00144	5

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	0,310488	0,40395
Used Flammable Mass	kg	0,310488	0,40395
Overpressure Radius	m	4,52442	4,9392
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00144	5

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	0,310488	0,40395
Used Flammable Mass	kg	0,310488	0,40395
Overpressure Radius	m	3,52839	3,85186
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00144	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H10(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H11(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	138	m2
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	11,08	m/s
	Droplet Diameter(1)	1525	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,05	degC
	Release Rate(1)	38,27	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	3,433E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,958447	0,963125
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	53,29	52,5625
Pool Vaporization Rate		kg/s	0,260588	0,203156
Total Vapor Flowrate		kg/s	1,8508	1,61435
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	846,71	22,6931
Pool Vaporization Rate		kg/s	0,64854	0,466983
Total Vapor Flowrate		kg/s	2,23876	1,87817
Release Segment 1	Cloud Segment 3			
Cloud Segment Duration		s		824,744
Pool Vaporization Rate		kg/s		0,51723
Total Vapor Flowrate		kg/s		1,92842
Maximum Pool Radius		m	6,62773	6,62773

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	8,04363	9,35894
LFL (10500)	18,75	s	26,957	28,3796
LFL Frac (10500)	18,75	s	26,957	28,3796

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	49,2114	50,0668
Radiation Level	18,43	kW/m2	43,4447	44,3743
Radiation Level	35	kW/m2	38,8087	39,6864

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	24,1453	21,8547
Radiation Level	18,43	kW/m2	12,2013	11,4326
Radiation Level	35	kW/m2	7,62773	7,62773

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	24,1453	21,8547
Radiation Level	18,43	kW/m2	12,2013	11,4326
Radiation Level	35	kW/m2	7,62773	7,62773

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

			Radiation Level (kW/m2)
		Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	26,957	28,3796
Furthest Extent	10500	ppm	26,957	28,3796

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	30,9396	35,7007
Overpressure	0,2	bar	23,4075	26,4559
Overpressure	0,3	bar	20,4559	22,8332

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	8,07973	14,9391
Used Flammable Mass	kg	8,07973	14,9391
Overpressure Radius	m	20,9396	25,7007
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	8,07973	14,9391
Used Flammable Mass	kg	8,07973	14,9391
Overpressure Radius	m	13,4075	16,4559
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	8,07973	14,9391
Used Flammable Mass	kg	8,07973	14,9391
Overpressure Radius	m	10,4559	12,8332
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H11(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H12(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	138	m2
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	0,38	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	3,433E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,818243	0,82665
Maximum Pool Radius		m	1,96459	2,0316

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	No Hazard	No Hazard
LFL (10500)	18,75	s	3,03565	3,07674
LFL Frac (10500)	18,75	s	3,03565	3,07674

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	12,0196	12,6177
Radiation Level	18,43	kW/m2	10,6417	11,2248
Radiation Level	35	kW/m2	9,49834	10,0216

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	12,4679	12,0331
Radiation Level	18,43	kW/m2	10,1234	9,45787
Radiation Level	35	kW/m2	6,57984	6,32111

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	17,8666	17,1227
Radiation Level	18,43	kW/m2	13,2946	12,3792
Radiation Level	35	kW/m2	8,05094	7,76665

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	3,03565	3,07674
Furthest Extent	10500	ppm	3,03565	3,07674

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H12(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H13(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

User-Defined Data

Material

Material Identifier	N-HEXANE	

Scenario

Building Wake Effect	None	

Vessel/Tank

Release Type	Continuous	

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Number of Release Segments	1	
Fluid Phase(1)	Liquid	
Discharge Velocity(1)	11,08	m/s
Droplet Diameter(1)	1525	um
Duration of Discharge(1)	900	s
Final Temperature(1)	25,05	degC
Release Rate(1)	164	kg/s
Pre-Dilution Air Rates(1)	0	kg/s
Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,709E5	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,999999	0,999999
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	255,201	248,063
Pool Vaporization Rate	kg/s	5,69898	4,08602
Total Vapor Flowrate	kg/s	5,6991	4,08615
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	115,362	115,793
Pool Vaporization Rate	kg/s	12,584	8,79765
Total Vapor Flowrate	kg/s	12,5841	8,79777
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,6875	91,9669
Pool Vaporization Rate	kg/s	15,8696	11,0244
Total Vapor Flowrate	kg/s	15,8697	11,0245
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	79,4756	80,1
Pool Vaporization Rate	kg/s	18,3983	12,7251
Total Vapor Flowrate	kg/s	18,3984	12,7252
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	136,877	138,778
Pool Vaporization Rate	kg/s	21,3927	14,7388
Total Vapor Flowrate	kg/s	21,3928	14,7389
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	174,037	176,48
Pool Vaporization Rate	kg/s	25,4008	17,427
Total Vapor Flowrate	kg/s	25,401	17,4271
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	47,36	48,8194
Pool Vaporization Rate	kg/s	28,0931	19,2343
Total Vapor Flowrate	kg/s	28,0932	19,2344
Maximum Pool Radius	m	46,2537	46,8636

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	1,56349	1,62896
Radiation Level	18,43	kW/m2	1,56349	1,62896
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	30,3272	29,2074
Radiation Level	18,43	kW/m2	23,7531	24,0678
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	55,5054	53,9365
Radiation Level	18,43	kW/m2	47,2537	47,8636
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H13(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H14(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

User-Defined Data

Material

Material Identifier	N-HEXANE	

Scenario

Building Wake Effect	None	

Vessel/Tank

Release Type	Continuous	

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Number of Release Segments	1	
Fluid Phase(1)	Liquid	
Discharge Velocity(1)	18,46	m/s
Droplet Diameter(1)	549,3	um
Duration of Discharge(1)	900	s
Final Temperature(1)	24,97	degC
Release Rate(1)	1,64	kg/s
Pre-Dilution Air Rates(1)	0	kg/s
Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,709E5	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,999999	0,999999
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	261,631	255,201
Pool Vaporization Rate	kg/s	0,0789415	0,0511834
Total Vapor Flowrate	kg/s	0,0789427	0,0511846
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,672	117,289
Pool Vaporization Rate	kg/s	0,177654	0,111375
Total Vapor Flowrate	kg/s	0,177655	0,111376
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,5031	92,9906
Pool Vaporization Rate	kg/s	0,225731	0,141233
Total Vapor Flowrate	kg/s	0,225732	0,141234
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,925	79,7419
Pool Vaporization Rate	kg/s	0,262944	0,164596
Total Vapor Flowrate	kg/s	0,262945	0,164598
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	135,092	135,987
Pool Vaporization Rate	kg/s	0,30728	0,192555
Total Vapor Flowrate	kg/s	0,307281	0,192556
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	170,278	172,891
Pool Vaporization Rate	kg/s	0,366867	0,230772
Total Vapor Flowrate	kg/s	0,366868	0,230773
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	45,8994	45,8994
Pool Vaporization Rate	kg/s	0,406944	0,256823
Total Vapor Flowrate	kg/s	0,406945	0,256825
Maximum Pool Radius	m	4,52962	4,64028

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	1,07112	1,07938
Radiation Level	18,43	kW/m2	Not Reached	Not Reached
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	16,0705	15,0288
Radiation Level	18,43	kW/m2	10,7738	9,77766
Radiation Level	35	kW/m2	5,18654	4,87787

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	22,4424	20,4941
Radiation Level	18,43	kW/m2	12,4574	11,4346
Radiation Level	35	kW/m2	5,86236	5,64939

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H14(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H15(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

User-Defined Data

Material

Material Identifier	N-HEXANE	

Scenario

Building Wake Effect	None	

Vessel/Tank

Release Type	Continuous	

Location

Elevation	3	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Number of Release Segments	1	
Fluid Phase(1)	Liquid	
Discharge Velocity(1)	11,08	m/s
Droplet Diameter(1)	1525	um
Duration of Discharge(1)	900	s
Final Temperature(1)	25,05	degC
Release Rate(1)	164	kg/s
Pre-Dilution Air Rates(1)	0	kg/s
Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,709E5	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1619	m
North(1)	-1397	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,933411	0,945431
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	271,426	261,631
Pool Vaporization Rate	kg/s	4,1532	3,07488
Total Vapor Flowrate	kg/s	15,0737	12,0242
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,664	116,672
Pool Vaporization Rate	kg/s	9,71923	6,92207
Total Vapor Flowrate	kg/s	20,6398	15,8714
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	90,4256	91,5031
Pool Vaporization Rate	kg/s	12,4633	8,79423
Total Vapor Flowrate	kg/s	23,3838	17,7436
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	77,265	78,925
Pool Vaporization Rate	kg/s	14,5885	10,2423
Total Vapor Flowrate	kg/s	25,5091	19,1916
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	131,97	135,092
Pool Vaporization Rate	kg/s	17,1263	11,968
Total Vapor Flowrate	kg/s	28,0469	20,9173
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	166,35	170,278
Pool Vaporization Rate	kg/s	20,564	14,2926
Total Vapor Flowrate	kg/s	31,4845	23,242
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	45,8994	45,8994
Pool Vaporization Rate	kg/s	22,9039	15,8619
Total Vapor Flowrate	kg/s	33,8244	24,8112
Maximum Pool Radius	m	44,9988	45,7477

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	21,8032	29,906
LFL (10500)	18,75	s	72,0705	80,0315
LFL Frac (10500)	18,75	s	72,0705	80,0315

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	114,585	112,465
Radiation Level	18,43	kW/m2	100,539	99,1274
Radiation Level	35	kW/m2	89,3857	88,3566

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	38,2188	37,3112
Radiation Level	18,43	kW/m2	31,6597	32,162
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	62,8248	61,5185
Radiation Level	18,43	kW/m2	54,676	55,4801
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	72,0705	80,0315
Furthest Extent	10500	ppm	72,0705	80,0315

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	114,106	145,36
Overpressure	0,2	bar	85,6508	114,285
Overpressure	0,3	bar	74,5003	102,108

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	435,628	567,391
Used Flammable Mass	kg	435,628	567,391
Overpressure Radius	m	79,1057	86,3899
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	58,9703

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	435,628	567,391
Used Flammable Mass	kg	435,628	567,391
Overpressure Radius	m	50,6508	55,3148
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	58,9703

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	435,628	567,391
Used Flammable Mass	kg	435,628	567,391
Overpressure Radius	m	39,5003	43,1375
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	58,9703

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H15(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H16(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	3	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	1,64	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	2,709E5	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,63768	0,682679
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	299,29	297,563
Pool Vaporization Rate	kg/s	0,0365116	0,0234462
Total Vapor Flowrate	kg/s	0,630717	0,543853
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	113,816	114,528
Pool Vaporization Rate	kg/s	0,0961847	0,0606883
Total Vapor Flowrate	kg/s	0,69039	0,581095
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	87,535	88,5506
Pool Vaporization Rate	kg/s	0,125081	0,0791084
Total Vapor Flowrate	kg/s	0,719287	0,599515
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	74,16	75,3594
Pool Vaporization Rate	kg/s	0,147593	0,0936838
Total Vapor Flowrate	kg/s	0,741799	0,61409
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	66,555	66,6225
Pool Vaporization Rate	kg/s	0,166674	0,106084
Total Vapor Flowrate	kg/s	0,760879	0,626491
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	114,894	115,003
Pool Vaporization Rate	kg/s	0,190575	0,121625
Total Vapor Flowrate	kg/s	0,78478	0,642032
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	143,75	142,374
Pool Vaporization Rate	kg/s	0,223537	0,143089
Total Vapor Flowrate	kg/s	0,817743	0,663496
Maximum Pool Radius	m	3,65864	3,86461

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	No Hazard	No Hazard
LFL (10500)	18,75	s	No Hazard	No Hazard
LFL Frac (10500)	18,75	s	No Hazard	No Hazard

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	29,5559	30,9927
Radiation Level	18,43	kW/m2	25,762	27,1816
Radiation Level	35	kW/m2	22,6209	24,0198

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	23,0385	22,0052
Radiation Level	18,43	kW/m2	18,8116	17,557
Radiation Level	35	kW/m2	13,7783	13,087

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	29,6169	27,7964
Radiation Level	18,43	kW/m2	21,2692	19,8026
Radiation Level	35	kW/m2	14,8373	14,1008

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H16(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H17(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	963,38	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	944,86	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,987991	0,988432
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	55,5025	115,563
Pool Vaporization Rate		kg/s	7,2029	8,89339
Total Vapor Flowrate		kg/s	21,5839	22,7463
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	844,497	784,438
Pool Vaporization Rate		kg/s	14,8301	11,7703
Total Vapor Flowrate		kg/s	29,2111	25,6233
Maximum Pool Radius		m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	26,9151	34,44
LFL (10500)	18,75	s	73,9014	86,8432
LFL Frac (10500)	18,75	s	73,9014	86,8432

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	128,897	135,72
Radiation Level	18,43	kW/m2	112,892	119,41
Radiation Level	35	kW/m2	100,217	106,323

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

			Radiation Level (kW/m2)
		Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	73,9014	86,8432
Furthest Extent	10500	ppm	73,9014	86,8432

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	107,137	142,98
Overpressure	0,2	bar	81,1885	105,937
Overpressure	0,3	bar	71,0203	91,4216

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	330,339	961,069
Used Flammable Mass	kg	330,339	961,069
Overpressure Radius	m	72,1366	102,98
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	40

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	330,339	961,069
Used Flammable Mass	kg	330,339	961,069
Overpressure Radius	m	46,1885	65,9375
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	40

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	330,339	961,069
Used Flammable Mass	kg	330,339	961,069
Overpressure Radius	m	36,0203	51,4216
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	40

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H17(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H18(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	347,19	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	340,52	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,828012	0,843156
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	290,703	283,923
Pool Vaporization Rate	kg/s	0,278756	0,184174
Total Vapor Flowrate	kg/s	2,33841	2,06247
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,328	117,078
Pool Vaporization Rate	kg/s	0,701451	0,449287
Total Vapor Flowrate	kg/s	2,76111	2,32758
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	89,145	89,6219
Pool Vaporization Rate	kg/s	0,913607	0,58279
Total Vapor Flowrate	kg/s	2,97326	2,46108
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	75,0344	77,0081
Pool Vaporization Rate	kg/s	1,07934	0,687996
Total Vapor Flowrate	kg/s	3,13899	2,56629
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	66,3525	67,4094
Pool Vaporization Rate	kg/s	1,21925	0,777429
Total Vapor Flowrate	kg/s	3,27891	2,65572
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	117,313	118,462
Pool Vaporization Rate	kg/s	1,39712	0,89009
Total Vapor Flowrate	kg/s	3,45677	2,76838
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	145,124	146,498
Pool Vaporization Rate	kg/s	1,6426	1,04656
Total Vapor Flowrate	kg/s	3,70225	2,92485
Maximum Pool Radius	m	11,3995	11,662

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	7,04715	6,99473
LFL (10500)	18,75	s	34,9233	37,5137
LFL Frac (10500)	18,75	s	34,9233	37,5137

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	53,9667	55,3061
Radiation Level	18,43	kW/m2	47,359	48,831
Radiation Level	35	kW/m2	42,0858	43,5885

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	30,9472	28,5665
Radiation Level	18,43	kW/m2	19,5804	18,583
Radiation Level	35	kW/m2	13,7256	13,7669

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	30,2609	28,5205
Radiation Level	18,43	kW/m2	19,5303	19,7051
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	34,9233	37,5137
Furthest Extent	10500	ppm	34,9233	37,5137

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	37,4048	43,0039
Overpressure	0,2	bar	29,3456	32,9307
Overpressure	0,3	bar	26,1875	28,9833

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	9,89731	19,3263
Used Flammable Mass	kg	9,89731	19,3263
Overpressure Radius	m	22,4048	28,0039
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	9,89731	19,3263
Used Flammable Mass	kg	9,89731	19,3263
Overpressure Radius	m	14,3456	17,9307
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	9,89731	19,3263
Used Flammable Mass	kg	9,89731	19,3263
Overpressure Radius	m	11,1875	13,9833
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H18(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H19(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	11,08	m/s
	Droplet Diameter(1)	1525	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,05	degC
	Release Rate(1)	164	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	3,433E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1449	m
North(1)	-1398	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,979803	0,981914
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	260,016	252,81
Pool Vaporization Rate	kg/s	5,17381	3,72337
Total Vapor Flowrate	kg/s	8,48612	6,6894
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,344	115,83
Pool Vaporization Rate	kg/s	11,6384	8,13086
Total Vapor Flowrate	kg/s	14,9507	11,0969
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,2806	92,5356
Pool Vaporization Rate	kg/s	14,7594	10,2389
Total Vapor Flowrate	kg/s	18,0717	13,2049
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,75	79,3869
Pool Vaporization Rate	kg/s	17,1589	11,856
Total Vapor Flowrate	kg/s	20,4712	14,8221
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	136,125	138,04
Pool Vaporization Rate	kg/s	20,0183	13,7719
Total Vapor Flowrate	kg/s	23,3306	16,7379
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	171,585	174,037
Pool Vaporization Rate	kg/s	23,8555	16,3367
Total Vapor Flowrate	kg/s	27,1678	19,3027
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	45,8994	47,36
Pool Vaporization Rate	kg/s	26,425	18,0563
Total Vapor Flowrate	kg/s	29,7373	21,0223
Maximum Pool Radius	m	45,8901	46,5042

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	12,0947	18,6336
LFL (10500)	18,75	s	47,9605	60,4613
LFL Frac (10500)	18,75	s	47,9605	60,4613

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	67,9616	69,3924
Radiation Level	18,43	kW/m2	59,8734	61,3864
Radiation Level	35	kW/m2	53,4142	54,8507

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

		Radiation Level (kW/m2)
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	34,6585	33,5804
Radiation Level	18,43	kW/m2	28,0872	28,439
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	59,6772	58,1423
Radiation Level	18,43	kW/m2	51,4551	52,0849
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	47,9605	60,4613
Furthest Extent	10500	ppm	47,9605	60,4613

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	74,2334	124,375
Overpressure	0,2	bar	54,7252	93,6569
Overpressure	0,3	bar	47,0806	81,6193

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	140,376	548,078
Used Flammable Mass	kg	140,376	548,078
Overpressure Radius	m	54,2334	85,3984
Distance to:			
- Ignition Source	m	40	60
- Cloud Front/Centre	m	40	60
- Explosion Centre	m	20	38,9769

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	140,376	548,078
Used Flammable Mass	kg	140,376	548,078
Overpressure Radius	m	34,7252	54,68
Distance to:			
- Ignition Source	m	40	60
- Cloud Front/Centre	m	40	60
- Explosion Centre	m	20	38,9769

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	140,376	548,078
Used Flammable Mass	kg	140,376	548,078
Overpressure Radius	m	27,0806	42,6424
Distance to:			
- Ignition Source	m	40	60
- Cloud Front/Centre	m	40	60
- Explosion Centre	m	20	38,9769

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H19(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H20(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

User-Defined Data

Material

Material Identifier	N-HEXANE	

Scenario

Building Wake Effect	None	

Vessel/Tank

Release Type	Continuous	

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Number of Release Segments	1	
Fluid Phase(1)	Liquid	
Discharge Velocity(1)	18,46	m/s
Droplet Diameter(1)	549,3	um
Duration of Discharge(1)	900	s
Final Temperature(1)	24,97	degC
Release Rate(1)	1,64	kg/s
Pre-Dilution Air Rates(1)	0	kg/s
Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,433E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,838091	0,846987
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	290,703	287,302
Pool Vaporization Rate	kg/s	0,0500944	0,0314781
Total Vapor Flowrate	kg/s	0,315626	0,282419
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	114,313	115,703
Pool Vaporization Rate	kg/s	0,127372	0,0780881
Total Vapor Flowrate	kg/s	0,392903	0,329029
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	88,935	89,8344
Pool Vaporization Rate	kg/s	0,165073	0,10126
Total Vapor Flowrate	kg/s	0,430605	0,352201
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	74,8719	75,9825
Pool Vaporization Rate	kg/s	0,194406	0,119476
Total Vapor Flowrate	kg/s	0,459938	0,370417
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	128,137	67,4781
Pool Vaporization Rate	kg/s	0,229417	0,134899
Total Vapor Flowrate	kg/s	0,494948	0,38584
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	160,066	117,202
Pool Vaporization Rate	kg/s	0,276915	0,154291
Total Vapor Flowrate	kg/s	0,542447	0,405232
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	42,9744	146,498
Pool Vaporization Rate	kg/s	0,309078	0,181194
Total Vapor Flowrate	kg/s	0,57461	0,432135
Maximum Pool Radius	m	4,19074	4,29952

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	3,95708	3,98104
LFL (10500)	18,75	s	15,365	16,0399
LFL Frac (10500)	18,75	s	15,365	16,0399

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	21,9314	22,9092
Radiation Level	18,43	kW/m2	19,3759	20,3339
Radiation Level	35	kW/m2	17,2856	18,1781

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	19,327	18,444
Radiation Level	18,43	kW/m2	14,4944	13,5336
Radiation Level	35	kW/m2	9,13375	8,8309

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	25,8863	24,1121
Radiation Level	18,43	kW/m2	16,4932	15,5422
Radiation Level	35	kW/m2	9,94487	9,76643

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	15,365	16,0399
Furthest Extent	10500	ppm	15,365	16,0399

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	11,6663	12,3535
Overpressure	0,2	bar	9,26888	9,70839
Overpressure	0,3	bar	8,32941	8,67186

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,260542	0,349924
Used Flammable Mass	kg	0,260542	0,349924
Overpressure Radius	m	6,66492	7,35349
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00138	5

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,260542	0,349924
Used Flammable Mass	kg	0,260542	0,349924
Overpressure Radius	m	4,2675	4,70839
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00138	5

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,260542	0,349924
Used Flammable Mass	kg	0,260542	0,349924
Overpressure Radius	m	3,32803	3,67186
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00138	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H20(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H21(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	11,08	m/s
	Droplet Diameter(1)	1525	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,05	degC
	Release Rate(1)	164	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	3,433E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1618	m
North(1)	-1397	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,979803	0,981914
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	260,016	252,81
Pool Vaporization Rate	kg/s	5,17381	3,72337
Total Vapor Flowrate	kg/s	8,48612	6,6894
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,344	115,83
Pool Vaporization Rate	kg/s	11,6384	8,13086
Total Vapor Flowrate	kg/s	14,9507	11,0969
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,2806	92,5356
Pool Vaporization Rate	kg/s	14,7594	10,2389
Total Vapor Flowrate	kg/s	18,0717	13,2049
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,75	79,3869
Pool Vaporization Rate	kg/s	17,1589	11,856
Total Vapor Flowrate	kg/s	20,4712	14,8221
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	136,125	138,04
Pool Vaporization Rate	kg/s	20,0183	13,7719
Total Vapor Flowrate	kg/s	23,3306	16,7379
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	171,585	174,037
Pool Vaporization Rate	kg/s	23,8555	16,3367
Total Vapor Flowrate	kg/s	27,1678	19,3027
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	45,8994	47,36
Pool Vaporization Rate	kg/s	26,425	18,0563
Total Vapor Flowrate	kg/s	29,7373	21,0223
Maximum Pool Radius	m	45,8901	46,5042

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	12,0947	18,6336
LFL (10500)	18,75	s	47,9605	60,4613
LFL Frac (10500)	18,75	s	47,9605	60,4613

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	67,9616	69,3924
Radiation Level	18,43	kW/m2	59,8734	61,3864
Radiation Level	35	kW/m2	53,4142	54,8507

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	34,6585	33,5804
Radiation Level	18,43	kW/m2	28,0872	28,439
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

	Radiation Level (kW/m2)
Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	59,6772	58,1423
Radiation Level	18,43	kW/m2	51,4551	52,0849
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

	Radiation Level (kW/m2)
Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	47,9605	60,4613
Furthest Extent	10500	ppm	47,9605	60,4613

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	74,2334	124,375
Overpressure	0,2	bar	54,7252	93,6569
Overpressure	0,3	bar	47,0806	81,6193

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	140,376	548,078
Used Flammable Mass	kg	140,376	548,078
Overpressure Radius	m	54,2334	85,3984
Distance to:			
- Ignition Source	m	40	60
- Cloud Front/Centre	m	40	60
- Explosion Centre	m	20	38,9769

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	140,376	548,078
Used Flammable Mass	kg	140,376	548,078
Overpressure Radius	m	34,7252	54,68
Distance to:			
- Ignition Source	m	40	60
- Cloud Front/Centre	m	40	60
- Explosion Centre	m	20	38,9769

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	140,376	548,078
Used Flammable Mass	kg	140,376	548,078
Overpressure Radius	m	27,0806	42,6424
Distance to:			
- Ignition Source	m	40	60
- Cloud Front/Centre	m	40	60
- Explosion Centre	m	20	38,9769

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H21(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H22(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

User-Defined Data

Material

Material Identifier	N-HEXANE	

Scenario

Building Wake Effect	None	

Vessel/Tank

Release Type	Continuous	

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Number of Release Segments	1	
Fluid Phase(1)	Liquid	
Discharge Velocity(1)	18,46	m/s
Droplet Diameter(1)	549,3	um
Duration of Discharge(1)	900	s
Final Temperature(1)	24,97	degC
Release Rate(1)	1,64	kg/s
Pre-Dilution Air Rates(1)	0	kg/s
Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,433E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,838091	0,846987
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	290,703	287,302
Pool Vaporization Rate	kg/s	0,0500944	0,0314781
Total Vapor Flowrate	kg/s	0,315626	0,282419
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	114,313	115,703
Pool Vaporization Rate	kg/s	0,127372	0,0780881
Total Vapor Flowrate	kg/s	0,392903	0,329029
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	88,935	89,8344
Pool Vaporization Rate	kg/s	0,165073	0,10126
Total Vapor Flowrate	kg/s	0,430605	0,352201
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	74,8719	75,9825
Pool Vaporization Rate	kg/s	0,194406	0,119476
Total Vapor Flowrate	kg/s	0,459938	0,370417
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	128,137	67,4781
Pool Vaporization Rate	kg/s	0,229417	0,134899
Total Vapor Flowrate	kg/s	0,494948	0,38584
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	160,066	117,202
Pool Vaporization Rate	kg/s	0,276915	0,154291
Total Vapor Flowrate	kg/s	0,542447	0,405232
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	42,9744	146,498
Pool Vaporization Rate	kg/s	0,309078	0,181194
Total Vapor Flowrate	kg/s	0,57461	0,432135
Maximum Pool Radius	m	4,19074	4,29952

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	3,95708	3,98104
LFL (10500)	18,75	s	15,365	16,0399
LFL Frac (10500)	18,75	s	15,365	16,0399

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	21,9314	22,9092
Radiation Level	18,43	kW/m2	19,3759	20,3339
Radiation Level	35	kW/m2	17,2856	18,1781

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	19,327	18,444
Radiation Level	18,43	kW/m2	14,4944	13,5336
Radiation Level	35	kW/m2	9,13375	8,8309

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	25,8863	24,1121
Radiation Level	18,43	kW/m2	16,4932	15,5422
Radiation Level	35	kW/m2	9,94487	9,76643

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	15,365	16,0399
Furthest Extent	10500	ppm	15,365	16,0399

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	11,6663	12,3535
Overpressure	0,2	bar	9,26888	9,70839
Overpressure	0,3	bar	8,32941	8,67186

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,260542	0,349924
Used Flammable Mass	kg	0,260542	0,349924
Overpressure Radius	m	6,66492	7,35349
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00138	5

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,260542	0,349924
Used Flammable Mass	kg	0,260542	0,349924
Overpressure Radius	m	4,2675	4,70839
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00138	5

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,260542	0,349924
Used Flammable Mass	kg	0,260542	0,349924
Overpressure Radius	m	3,32803	3,67186
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00138	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H22(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H23(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	900,00	s

Orifice or pipe exit data (before atmospheric expansion):

- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	

Final data (after atmospheric expansion):

- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	963,38	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	944,86	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,987991	0,988432
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	55,5025	115,563
Pool Vaporization Rate		kg/s	7,2029	8,89339
Total Vapor Flowrate		kg/s	21,5839	22,7463
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	844,497	784,438
Pool Vaporization Rate		kg/s	14,8301	11,7703
Total Vapor Flowrate		kg/s	29,2111	25,6233
Maximum Pool Radius		m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	26,9151	34,44
LFL (10500)	18,75	s	73,9014	86,8432
LFL Frac (10500)	18,75	s	73,9014	86,8432

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	128,897	135,72
Radiation Level	18,43	kW/m2	112,892	119,41
Radiation Level	35	kW/m2	100,217	106,323

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	73,9014	86,8432
Furthest Extent	10500	ppm	73,9014	86,8432

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	107,137	142,98
Overpressure	0,2	bar	81,1885	105,937
Overpressure	0,3	bar	71,0203	91,4216

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	330,339	961,069
Used Flammable Mass	kg	330,339	961,069
Overpressure Radius	m	72,1366	102,98
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	40

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	330,339	961,069
Used Flammable Mass	kg	330,339	961,069
Overpressure Radius	m	46,1885	65,9375
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	40

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	330,339	961,069
Used Flammable Mass	kg	330,339	961,069
Overpressure Radius	m	36,0203	51,4216
Distance to:			
- Ignition Source	m	70	80
- Cloud Front/Centre	m	70	80
- Explosion Centre	m	35	40

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H23(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H24(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
	Type of Vessel	Unpressurized (at atmospheric pressure)	
	Pressure Specification	Pressure not used	
	Temperature	25	degC
	Volume Inventory	5234	m3
Scenario			
	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	40,64	mm
	Building Wake Effect	None	
	Tank Head	25,08	m
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	3051	m2
	[Type of Bund Surface	User-Defined (Land)]	
	Bund Height	1,9	m
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	3,434E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			
	[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1525	m
North(1)	-1419	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	347,19	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	340,52	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,828012	0,843156
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	290,703	283,923
Pool Vaporization Rate	kg/s	0,278756	0,184174
Total Vapor Flowrate	kg/s	2,33841	2,06247
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,328	117,078
Pool Vaporization Rate	kg/s	0,701451	0,449287
Total Vapor Flowrate	kg/s	2,76111	2,32758
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	89,145	89,6219
Pool Vaporization Rate	kg/s	0,913607	0,58279
Total Vapor Flowrate	kg/s	2,97326	2,46108
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	75,0344	77,0081
Pool Vaporization Rate	kg/s	1,07934	0,687996
Total Vapor Flowrate	kg/s	3,13899	2,56629
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	66,3525	67,4094
Pool Vaporization Rate	kg/s	1,21925	0,777429
Total Vapor Flowrate	kg/s	3,27891	2,65572
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	117,313	118,462
Pool Vaporization Rate	kg/s	1,39712	0,89009
Total Vapor Flowrate	kg/s	3,45677	2,76838
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	145,124	146,498
Pool Vaporization Rate	kg/s	1,6426	1,04656
Total Vapor Flowrate	kg/s	3,70225	2,92485
Maximum Pool Radius	m	11,3995	11,662

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	7,04715	6,99473
LFL (10500)	18,75	s	34,9233	37,5137
LFL Frac (10500)	18,75	s	34,9233	37,5137

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	53,9667	55,3061
Radiation Level	18,43	kW/m2	47,359	48,831
Radiation Level	35	kW/m2	42,0858	43,5885

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	30,9472	28,5665
Radiation Level	18,43	kW/m2	19,5804	18,583
Radiation Level	35	kW/m2	13,7256	13,7669

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	30,2609	28,5205
Radiation Level	18,43	kW/m2	19,5303	19,7051
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	34,9233	37,5137
Furthest Extent	10500	ppm	34,9233	37,5137

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	37,4048	43,0039
Overpressure	0,2	bar	29,3456	32,9307
Overpressure	0,3	bar	26,1875	28,9833

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	9,89731	19,3263
Used Flammable Mass	kg	9,89731	19,3263
Overpressure Radius	m	22,4048	28,0039
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	9,89731	19,3263
Used Flammable Mass	kg	9,89731	19,3263
Overpressure Radius	m	14,3456	17,9307
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	9,89731	19,3263
Used Flammable Mass	kg	9,89731	19,3263
Overpressure Radius	m	11,1875	13,9833
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H24(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H25(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	3051	m2
	[Type of Bund Surface	User-Defined (Land)]	
	Bund Height	1,9	m
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	11,08	m/s
	Droplet Diameter(1)	1525	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,05	degC
	Release Rate(1)	164	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	3,433E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1449	m
North(1)	-1398	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,979803	0,981914
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	124,323	119,902
Pool Vaporization Rate	kg/s	2,64064	1,94693
Total Vapor Flowrate	kg/s	5,95294	4,91296
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	53,9	53,6781
Pool Vaporization Rate	kg/s	6,07003	4,36539
Total Vapor Flowrate	kg/s	9,38233	7,33142
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	42,3	42,5094
Pool Vaporization Rate	kg/s	7,76653	5,54934
Total Vapor Flowrate	kg/s	11,0788	8,51537
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	36,2781	35,9256
Pool Vaporization Rate	kg/s	9,09493	6,46268
Total Vapor Flowrate	kg/s	12,4072	9,42871
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	61,8219	62,16
Pool Vaporization Rate	kg/s	10,6877	7,54824
Total Vapor Flowrate	kg/s	14	10,5143
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	581,377	585,824
Pool Vaporization Rate	kg/s	12,9244	9,21261
Total Vapor Flowrate	kg/s	16,2367	12,1786
Maximum Pool Radius	m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	11,4844	15,5256
LFL (10500)	18,75	s	41,3668	50,3394
LFL Frac (10500)	18,75	s	41,3668	50,3394

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	67,9616	69,3924
Radiation Level	18,43	kW/m2	59,8734	61,3864
Radiation Level	35	kW/m2	53,4142	54,8507

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	34,6585	33,5804
Radiation Level	18,43	kW/m2	28,0872	28,439
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

	Radiation Level (kW/m2)
Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

	Radiation Level (kW/m2)
Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	41,3668	50,3394
Furthest Extent	10500	ppm	41,3668	50,3394

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	70,4521	97,5614
Overpressure	0,2	bar	52,3041	71,4605
Overpressure	0,3	bar	45,1925	61,2324

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	113,014	336,209
Used Flammable Mass	kg	113,014	336,209
Overpressure Radius	m	50,4521	72,5614
Distance to:			
- Ignition Source	m	40	50
- Cloud Front/Centre	m	40	50
- Explosion Centre	m	20	25

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	113,014	336,209
Used Flammable Mass	kg	113,014	336,209
Overpressure Radius	m	32,3041	46,4605
Distance to:			
- Ignition Source	m	40	50
- Cloud Front/Centre	m	40	50
- Explosion Centre	m	20	25

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	113,014	336,209
Used Flammable Mass	kg	113,014	336,209
Overpressure Radius	m	25,1925	36,2324
Distance to:			
- Ignition Source	m	40	50
- Cloud Front/Centre	m	40	50
- Explosion Centre	m	20	25

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H25(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H26(G)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

User-Defined Data

Material			
	Material Identifier	N-HEXANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	3051	m2
	[Type of Bund Surface	User-Defined (Land)]	
	Bund Height	1,9	m
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	1,64	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	3,433E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,838091	0,846987
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	290,703	287,302
Pool Vaporization Rate	kg/s	0,0500944	0,0314781
Total Vapor Flowrate	kg/s	0,315626	0,282419
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	114,313	115,703
Pool Vaporization Rate	kg/s	0,127372	0,0780881
Total Vapor Flowrate	kg/s	0,392903	0,329029
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	88,935	89,8344
Pool Vaporization Rate	kg/s	0,165073	0,10126
Total Vapor Flowrate	kg/s	0,430605	0,352201
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	74,8719	75,9825
Pool Vaporization Rate	kg/s	0,194406	0,119476
Total Vapor Flowrate	kg/s	0,459938	0,370417
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	128,137	67,4781
Pool Vaporization Rate	kg/s	0,229417	0,134899
Total Vapor Flowrate	kg/s	0,494948	0,38584
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	160,066	117,202
Pool Vaporization Rate	kg/s	0,276915	0,154291
Total Vapor Flowrate	kg/s	0,542447	0,405232
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	42,9744	146,498
Pool Vaporization Rate	kg/s	0,309078	0,181194
Total Vapor Flowrate	kg/s	0,57461	0,432135
Maximum Pool Radius	m	4,19074	4,29952

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	3,95708	3,98104
LFL (10500)	18,75	s	15,365	16,0399
LFL Frac (10500)	18,75	s	15,365	16,0399

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	21,9314	22,9092
Radiation Level	18,43	kW/m2	19,3759	20,3339
Radiation Level	35	kW/m2	17,2856	18,1781

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	19,327	18,444
Radiation Level	18,43	kW/m2	14,4944	13,5336
Radiation Level	35	kW/m2	9,13375	8,8309

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	25,8863	24,1121
Radiation Level	18,43	kW/m2	16,4932	15,5422
Radiation Level	35	kW/m2	9,94487	9,76643

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	15,365	16,0399
Furthest Extent	10500	ppm	15,365	16,0399

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	11,6663	12,3535
Overpressure	0,2	bar	9,26888	9,70839
Overpressure	0,3	bar	8,32941	8,67186

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	0,260542	0,349924
Used Flammable Mass	kg	0,260542	0,349924
Overpressure Radius	m	6,66492	7,35349
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00138	5

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	0,260542	0,349924
Used Flammable Mass	kg	0,260542	0,349924
Overpressure Radius	m	4,2675	4,70839
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00138	5

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	0,260542	0,349924
Used Flammable Mass	kg	0,260542	0,349924
Overpressure Radius	m	3,32803	3,67186
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00138	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H26(G)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H27(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1525	m
North(1)	-1419	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	0,999999	0,999999
Initial Vapor Cloud	kg	2,57975	2,57331
Time Pool Left Behind	s	42,4377	105,751
Cloud Segment 1			
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	16,5282	13,5695
Maximum Pool Radius	m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	12,6529	12,6711
LFL (10500)	18,75	s	40,6476	41,8681
LFL Frac (10500)	18,75	s	40,6476	41,8681

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	40,6476	41,8681
Furthest Extent	10500	ppm	40,6476	41,8681

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	3,43364e+006	3,43364e+006

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	52,2292	57,9741
Overpressure	0,2	bar	43,8425	43,4181
Overpressure	0,3	bar	40,556	37,714

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	11,1537	58,3144
Used Flammable Mass	kg	11,1537	58,3144
Overpressure Radius	m	23,3154	40,4664
Distance to:			
- Ignition Source	m	40	40
- Cloud Front/Centre	m	28,9138	17,5077
- Explosion Centre	m	28,9138	17,5077

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	11,1537	58,3144
Used Flammable Mass	kg	11,1537	58,3144
Overpressure Radius	m	14,9287	25,9103
Distance to:			
- Ignition Source	m	40	40
- Cloud Front/Centre	m	28,9138	17,5077
- Explosion Centre	m	28,9138	17,5077

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	11,1537	58,3144
Used Flammable Mass	kg	11,1537	58,3144
Overpressure Radius	m	11,6422	20,2063
Distance to:			
- Ignition Source	m	40	40
- Cloud Front/Centre	m	28,9138	17,5077
- Explosion Centre	m	28,9138	17,5077

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H27(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H28(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	3972	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	2312	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,606E6	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1520	m
North(1)	-1465	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	2.605.736,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	2.605.736,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	0,999999	0,999999
Initial Vapor Cloud	kg	1,95773	1,95284
Time Pool Left Behind	s	38,1716	95,2038
Cloud Segment 1			
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	12,7163	10,4404
Maximum Pool Radius	m	27,1257	27,1257

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	11,5424	11,5581
LFL (10500)	18,75	s	36,7876	36,9627
LFL Frac (10500)	18,75	s	36,7876	36,9627

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	34,7823	33,2982
Radiation Level	18,43	kW/m2	28,1257	28,1257
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	36,7876	36,9627
Furthest Extent	10500	ppm	36,7876	36,9627

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	2,60574e+006	2,60574e+006

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	45,5033	46,9679
Overpressure	0,2	bar	34,691	33,5663
Overpressure	0,3	bar	30,454	28,3146

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	23,9002	45,5113
Used Flammable Mass	kg	23,9002	45,5113
Overpressure Radius	m	30,0586	37,2571
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	15,4447	9,71084
- Explosion Centre	m	15,4447	9,71084

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	23,9002	45,5113
Used Flammable Mass	kg	23,9002	45,5113
Overpressure Radius	m	19,2463	23,8554
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	15,4447	9,71084
- Explosion Centre	m	15,4447	9,71084

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	23,9002	45,5113
Used Flammable Mass	kg	23,9002	45,5113
Overpressure Radius	m	15,0093	18,6038
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	15,4447	9,71084
- Explosion Centre	m	15,4447	9,71084

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H28(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H29(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	2451	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,608E6	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1525	m
North(1)	-1419	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	1.607.920,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	1.607.920,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	0,999999	0,999999
Initial Vapor Cloud	kg	1,20806	1,20504
Time Pool Left Behind	s	40,5454	101,916
Cloud Segment 1			
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	16,3447	13,3157
Maximum Pool Radius	m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	9,82839	9,84041
LFL (10500)	18,75	s	37,5165	38,7364
LFL Frac (10500)	18,75	s	37,5165	38,7364

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	37,5165	38,7364
Furthest Extent	10500	ppm	37,5165	38,7364

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	1,60792e+006	1,60792e+006

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	45,2152	46,4597
Overpressure	0,2	bar	34,0909	32,8252
Overpressure	0,3	bar	29,7316	27,4822

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	26,0295	47,9256
Used Flammable Mass	kg	26,0295	47,9256
Overpressure Radius	m	30,926	37,9046
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	14,2892	8,55514
- Explosion Centre	m	14,2892	8,55514

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	26,0295	47,9256
Used Flammable Mass	kg	26,0295	47,9256
Overpressure Radius	m	19,8017	24,27
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	14,2892	8,55514
- Explosion Centre	m	14,2892	8,55514

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	26,0295	47,9256
Used Flammable Mass	kg	26,0295	47,9256
Overpressure Radius	m	15,4425	18,9271
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	14,2892	8,55514
- Explosion Centre	m	14,2892	8,55514

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H29(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H30(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	1743	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	2312	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,143E6	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1520	m
North(1)	-1465	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	1.143.453,63	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	1.143.453,63	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	0,999999	0,999999
Initial Vapor Cloud	kg	0,859095	0,856951
Time Pool Left Behind	s	36,2258	91,1435
Cloud Segment 1			
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	12,5576	10,2217
Maximum Pool Radius	m	27,1281	27,1281

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	8,7737	8,78364
LFL (10500)	18,75	s	34,2226	34,1024
LFL Frac (10500)	18,75	s	34,2226	34,1024

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	34,7848	33,3007
Radiation Level	18,43	kW/m2	28,1281	28,1281
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	34,2226	34,1024
Furthest Extent	10500	ppm	34,2226	34,1024

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	1,14345e+006	1,14345e+006

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	43,4395	45,6383
Overpressure	0,2	bar	34,009	33,2994
Overpressure	0,3	bar	30,3135	28,4642

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	15,858	35,5203
Used Flammable Mass	kg	15,858	35,5203
Overpressure Radius	m	26,2171	34,3027
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	17,2223	11,3356
- Explosion Centre	m	17,2223	11,3356

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	15,858	35,5203
Used Flammable Mass	kg	15,858	35,5203
Overpressure Radius	m	16,7866	21,9638
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	17,2223	11,3356
- Explosion Centre	m	17,2223	11,3356

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	15,858	35,5203
Used Flammable Mass	kg	15,858	35,5203
Overpressure Radius	m	13,0911	17,1285
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	17,2223	11,3356
- Explosion Centre	m	17,2223	11,3356

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H30(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H31(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	50	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,28E4	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	32.801,31	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	32.801,31	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	0,999999	0,999999
Initial Vapor Cloud	kg	0,0246441	0,0245826
Time Pool Left Behind	s	25,5403	61,0819
Cloud Segment 1			
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	6,39952	4,4099
Maximum Pool Radius	m	22,99	22,9783

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	2,68764	2,68904
LFL (10500)	18,75	s	18,6806	14,9837
LFL Frac (10500)	18,75	s	18,6806	14,9837

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	30,5642	29,1181
Radiation Level	18,43	kW/m2	23,99	23,9783
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	18,6806	14,9837
Furthest Extent	10500	ppm	18,6806	14,9837

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	32801,3	32801,3

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	6,55428	5,92824
Overpressure	0,2	bar	4,25126	3,81768
Overpressure	0,3	bar	3,34879	2,99062

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	0,230959	0,177762
Used Flammable Mass	kg	0,230959	0,177762
Overpressure Radius	m	6,40247	5,86744
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0,151813	0,0608032
- Explosion Centre	m	0,151813	0,0608032

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	0,230959	0,177762
Used Flammable Mass	kg	0,230959	0,177762
Overpressure Radius	m	4,09945	3,75688
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0,151813	0,0608032
- Explosion Centre	m	0,151813	0,0608032

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	0,230959	0,177762
Used Flammable Mass	kg	0,230959	0,177762
Overpressure Radius	m	3,19698	2,92982
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0,151813	0,0608032
- Explosion Centre	m	0,151813	0,0608032

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H31(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H32(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	206	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,351E5	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	135.141,39	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	135.141,39	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	0,999999	0,999999
Initial Vapor Cloud	kg	0,101534	0,10128
Time Pool Left Behind	s	35,4912	86
Cloud Segment 1			
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	13,9304	10,1412
Maximum Pool Radius	m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	4,30782	4,31083
LFL (10500)	18,75	s	26,8708	25,6203
LFL Frac (10500)	18,75	s	26,8708	25,6203

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	39,1539	37,5902
Radiation Level	18,43	kW/m2	32,1615	32,1615
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	26,8708	25,6203
Furthest Extent	10500	ppm	26,8708	25,6203

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	135141	135141

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	28,5876	28,5756
Overpressure	0,2	bar	20,8603	19,8651
Overpressure	0,3	bar	17,8322	16,4517

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	8,72408	12,4962
Used Flammable Mass	kg	8,72408	12,4962
Overpressure Radius	m	21,482	24,2156
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	7,10551	4,36004
- Explosion Centre	m	7,10551	4,36004

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	8,72408	12,4962
Used Flammable Mass	kg	8,72408	12,4962
Overpressure Radius	m	13,7548	15,5051
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	7,10551	4,36004
- Explosion Centre	m	7,10551	4,36004

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	8,72408	12,4962
Used Flammable Mass	kg	8,72408	12,4962
Overpressure Radius	m	10,7267	12,0917
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	7,10551	4,36004
- Explosion Centre	m	7,10551	4,36004

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H32(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H33(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	138	m2
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,968E4	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Catastrophic rupture	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	0,999999	0,999999
Initial Vapor Cloud	kg	0,0147865	0,0147496
Time Pool Left Behind	s	9,72203	27,1139
Cloud Segment 1			
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	0,820275	0,647374
Maximum Pool Radius	m	6,62773	6,62773

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	2,26695	2,26802
LFL (10500)	18,75	s	12,5597	9,63138
LFL Frac (10500)	18,75	s	12,5597	9,63138

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	24,1453	21,8547
Radiation Level	18,43	kW/m2	12,2013	11,4326
Radiation Level	35	kW/m2	7,62773	7,62773

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	12,5597	9,63138
Furthest Extent	10500	ppm	12,5597	9,63138

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	19680,8	19680,8

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia
Overpressure	0,1	bar	14,6385
Overpressure	0,2	bar	11,7837
Overpressure	0,3	bar	10,665

		Supplementary Data at 0,1 bar Dia
Supplied Flammable Mass	kg	0,439935
Used Flammable Mass	kg	0,439935
Overpressure Radius	m	7,93655
Distance to:		
- Ignition Source	m	10
- Cloud Front/Centre	m	6,70198
- Explosion Centre	m	6,70198

		Supplementary Data at 0,2 bar Dia
Supplied Flammable Mass	kg	0,439935
Used Flammable Mass	kg	0,439935
Overpressure Radius	m	5,08172
Distance to:		
- Ignition Source	m	10
- Cloud Front/Centre	m	6,70198
- Explosion Centre	m	6,70198

		Supplementary Data at 0,3 bar Dia
Supplied Flammable Mass	kg	0,439935
Used Flammable Mass	kg	0,439935
Overpressure Radius	m	3,963
Distance to:		
- Ignition Source	m	10
- Cloud Front/Centre	m	6,70198
- Explosion Centre	m	6,70198

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Gasolina\H33(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

Vopak Área 06 - Consequência-final

Etanol

H01(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	3	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	101,6	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	138	m2
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,358E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.21155E+001	kg/s
Release Duration	734,13	s

Orifice or pipe exit data (before atmospheric expansion):

- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	5,04	m/s
- Discharge Coefficient	1,00	

Final data (after atmospheric expansion):

- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	9.269,77	um
- Expanded Radius	0,05	m
- Velocity	5,04	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.21155E+001	kg/s
Release Duration	734,13	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	5,04	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	9.091,59	um
- Expanded Radius	0,05	m
- Velocity	5,04	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	734,127	734,127
Liquid Rainout		fraction	0,996848	0,997308
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	58,5225	123,766
Pool Vaporization Rate		kg/s	0,0679428	0,0996106
Total Vapor Flowrate		kg/s	0,169172	0,186069
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	25,2	776,234
Pool Vaporization Rate		kg/s	0,159324	0,160835
Total Vapor Flowrate		kg/s	0,260552	0,247293
Release Segment 1	Cloud Segment 3			
Cloud Segment Duration		s	816,278	
Pool Vaporization Rate		kg/s	0,209532	
Total Vapor Flowrate		kg/s	0,310761	0,160835
Maximum Pool Radius		m	6,62773	6,62773

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (190000)	18,75	s	1,89697	1,92349
LFL (43000)	18,75	s	5,52339	6,27066
LFL Frac (43000)	18,75	s	5,52339	6,27066

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	16,3659	16,4657
Radiation Level	18,43	kW/m2	14,8369	14,852
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	20,7108	19,905
Radiation Level	18,43	kW/m2	15,5685	14,4245
Radiation Level	35	kW/m2	7,76871	7,62773

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	20,7108	19,905
Radiation Level	18,43	kW/m2	15,5685	14,4245
Radiation Level	35	kW/m2	7,76871	7,62773

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

	Radiation Level (kW/m2)
Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	5,52339	6,27066
Furthest Extent	43000	ppm	5,52339	6,27066

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H01(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H02(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	10,16	mm
Building Wake Effect	None	
Tank Head	3	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	138	m2
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,358E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.21155E-001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,40	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	3.337,34	um
- Expanded Radius	0,00	m
- Velocity	8,40	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.21155E-001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,40	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	3.273,19	um
- Expanded Radius	0,00	m
- Velocity	8,40	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,992644	0,992652
Maximum Pool Radius		m	1,92975	1,94009

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	No Hazard
LFL (43000)	18,75	s	1,94134	1,95684
LFL Frac (43000)	18,75	s	1,94134	1,95684

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	3,69578	4,0108
Radiation Level	18,43	kW/m2	Not Reached	Not Reached
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	8,84639	8,4749
Radiation Level	18,43	kW/m2	5,92003	5,72906
Radiation Level	35	kW/m2	4,9475	4,9694

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	8,84639	8,4749
Radiation Level	18,43	kW/m2	5,92003	5,72906
Radiation Level	35	kW/m2	4,9475	4,9694

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	1,94134	1,95684
Furthest Extent	43000	ppm	1,94134	1,95684

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H02(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H03(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	3	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	152,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,358E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.22598E+001	kg/s
Release Duration	326,28	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	5,04	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	9.269,77	um
- Expanded Radius	0,08	m
- Velocity	5,04	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.22598E+001	kg/s
Release Duration	326,28	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	5,04	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	9.091,59	um
- Expanded Radius	0,08	m
- Velocity	5,04	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

		Dia	Noite
Release Segment 1			
Release Duration	s	326,279	326,279
Liquid Rainout	fraction	0,997611	0,998331
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	105,063	101,003
Pool Vaporization Rate	kg/s	0,256915	0,187585
Total Vapor Flowrate	kg/s	0,429514	0,308216
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	45	44,8031
Pool Vaporization Rate	kg/s	0,597904	0,422585
Total Vapor Flowrate	kg/s	0,770504	0,543216
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	34,8975	35,0969
Pool Vaporization Rate	kg/s	0,770096	0,538291
Total Vapor Flowrate	kg/s	0,942696	0,658922
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	29,6625	30,0731
Pool Vaporization Rate	kg/s	0,905954	0,628369
Total Vapor Flowrate	kg/s	1,07855	0,748999
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	26,4031	51,4644
Pool Vaporization Rate	kg/s	1,02184	0,736417
Total Vapor Flowrate	kg/s	1,19444	0,857048
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	46,2769	63,8388
Pool Vaporization Rate	kg/s	1,16932	0,882426
Total Vapor Flowrate	kg/s	1,34192	1,00306
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	612,697	573,721
Pool Vaporization Rate	kg/s	1,29574	0,783566
Total Vapor Flowrate	kg/s	1,46834	0,783566
Maximum Pool Radius	m	17,7213	17,7206

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (190000)	18,75	s	1,96151	1,97901
LFL (43000)	18,75	s	6,68867	7,06642
LFL Frac (43000)	18,75	s	6,68867	7,06642

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	20,6446	19,0455
Radiation Level	18,43	kW/m2	18,7271	16,9029
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	52,1218	50,7597
Radiation Level	18,43	kW/m2	41,0143	38,9212
Radiation Level	35	kW/m2	25,8433	24,8185

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	52,1218	50,7597
Radiation Level	18,43	kW/m2	41,0143	38,9212
Radiation Level	35	kW/m2	25,8433	24,8185

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	6,68867	7,06642
Furthest Extent	43000	ppm	6,68867	7,06642

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H03(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H04(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	15,24	mm
Building Wake Effect	None	
Tank Head	3	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,358E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	23.576,85	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.22598E-001	kg/s
Release Duration	900,00	s

Orifice or pipe exit data (before atmospheric expansion):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,40	m/s
- Discharge Coefficient	0,60	

Final data (after atmospheric expansion):

- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	3.337,34	um
- Expanded Radius	0,01	m
- Velocity	8,40	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	23.576,85	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.22598E-001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,40	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	3.273,19	um
- Expanded Radius	0,01	m
- Velocity	8,40	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,992932	0,993017
Maximum Pool Radius		m	2,89892	2,91189

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	2,1978
LFL (43000)	18,75	s	2,20086	2,22368
LFL Frac (43000)	18,75	s	2,20086	2,22368

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	4,71696	5,13255
Radiation Level	18,43	kW/m2	Not Reached	Not Reached
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	12,0856	11,6355
Radiation Level	18,43	kW/m2	8,61603	8,24486
Radiation Level	35	kW/m2	6,13198	6,17151

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	12,0856	11,6355
Radiation Level	18,43	kW/m2	8,61603	8,24486
Radiation Level	35	kW/m2	6,13198	6,17151

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	2,20086	2,22368
Furthest Extent	43000	ppm	2,20086	2,22368

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H04(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H05(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	3051	m2
	[Type of Bund Surface	User-Defined (Land)]	
	Bund Height	1,9	m
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	4,867	m/s
	Droplet Diameter(1)	7903	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,01	degC
	Release Rate(1)	33	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1,968E4	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,996819	0,997349
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	268,96	256
Pool Vaporization Rate	kg/s	0,29297	0,198009
Total Vapor Flowrate	kg/s	0,397949	0,285505
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	117,162	116,49
Pool Vaporization Rate	kg/s	0,674835	0,435262
Total Vapor Flowrate	kg/s	0,779814	0,522758
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,3	91,9125
Pool Vaporization Rate	kg/s	0,865419	0,550408
Total Vapor Flowrate	kg/s	0,970398	0,637904
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,3581	79,6531
Pool Vaporization Rate	kg/s	1,0151	0,639896
Total Vapor Flowrate	kg/s	1,12008	0,727392
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	133,282	135,85
Pool Vaporization Rate	kg/s	1,19587	0,746892
Total Vapor Flowrate	kg/s	1,30085	0,834387
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	166,5	172,734
Pool Vaporization Rate	kg/s	1,44311	0,892515
Total Vapor Flowrate	kg/s	1,54808	0,980011
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	44,4375	47,36
Pool Vaporization Rate	kg/s	1,61218	0,992335
Total Vapor Flowrate	kg/s	1,71715	1,07983
Maximum Pool Radius	m	19,7073	19,752

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	1,83826	2,43537
LFL (43000)	18,75	s	5,72422	6,27318
LFL Frac (43000)	18,75	s	5,72422	6,27318

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	16,6493	16,58
Radiation Level	18,43	kW/m2	15,1022	14,9472
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	57,0226	55,6922
Radiation Level	18,43	kW/m2	44,8997	42,7572
Radiation Level	35	kW/m2	28,8152	27,5719

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	57,0226	55,6922
Radiation Level	18,43	kW/m2	44,8997	42,7572
Radiation Level	35	kW/m2	28,8152	27,5719

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	5,72422	6,27318
Furthest Extent	43000	ppm	5,72422	6,27318

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H05(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H06(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	3051	m2
	[Type of Bund Surface	User-Defined (Land)]	
	Bund Height	1,9	m
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	8,112	m/s
	Droplet Diameter(1)	2846	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,99	degC
	Release Rate(1)	0,33	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1,968E4	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,991485	0,991682
Maximum Pool Radius		m	1,95517	1,96572

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	No Hazard
LFL (43000)	18,75	s	1,92909	1,92543
LFL Frac (43000)	18,75	s	1,92909	1,92543

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	3,90655	4,21618
Radiation Level	18,43	kW/m2	Not Reached	Not Reached
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

			Radiation Level (kW/m2)
		Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	8,89681	8,52169
Radiation Level	18,43	kW/m2	5,97683	5,75226
Radiation Level	35	kW/m2	4,94203	4,96289

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

			Radiation Level (kW/m2)
		Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	8,89681	8,52169
Radiation Level	18,43	kW/m2	5,97683	5,75226
Radiation Level	35	kW/m2	4,94203	4,96289

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

			Radiation Level (kW/m2)
		Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	1,92909	1,92543
Furthest Extent	43000	ppm	1,92909	1,92543

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H06(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H07(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1525	m
North(1)	-1419	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.108,28	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.086,98	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,998007	0,998079
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	54,0225	116,101
Pool Vaporization Rate		kg/s	1,96101	2,44925
Total Vapor Flowrate		kg/s	4,92189	5,30383
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	845,977	783,899
Pool Vaporization Rate		kg/s	4,09826	3,24648
Total Vapor Flowrate		kg/s	7,05914	6,10106
Maximum Pool Radius		m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	8,54435	8,51828
LFL (43000)	18,75	s	25,5318	31,5318
LFL Frac (43000)	18,75	s	25,5318	31,5318

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	67,9892	72,1445
Radiation Level	18,43	kW/m2	61,1369	64,7634
Radiation Level	35	kW/m2	54,1005	55,9079

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	25,5318	31,5318
Furthest Extent	43000	ppm	25,5318	31,5318

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	24,8153	37,6269
Overpressure	0,2	bar	19,4861	29,4879
Overpressure	0,3	bar	17,3978	26,2984

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4,77539	17,012
Used Flammable Mass	kg	4,77539	17,012
Overpressure Radius	m	14,8153	22,6269
Distance to:			
- Ignition Source	m	20	30
- Cloud Front/Centre	m	20	30
- Explosion Centre	m	10	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4,77539	17,012
Used Flammable Mass	kg	4,77539	17,012
Overpressure Radius	m	9,48612	14,4879
Distance to:			
- Ignition Source	m	20	30
- Cloud Front/Centre	m	20	30
- Explosion Centre	m	10	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4,77539	17,012
Used Flammable Mass	kg	4,77539	17,012
Overpressure Radius	m	7,39779	11,2984
Distance to:			
- Ignition Source	m	20	30
- Cloud Front/Centre	m	20	30
- Explosion Centre	m	10	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H07(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H08(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	399,20	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	391,53	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,958193	0,961172
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	289,851	276,391
Pool Vaporization Rate	kg/s	0,100667	0,0639668
Total Vapor Flowrate	kg/s	0,721851	0,640883
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	117,18	117,632
Pool Vaporization Rate	kg/s	0,249602	0,150846
Total Vapor Flowrate	kg/s	0,870786	0,727762
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	90,2594	91,0781
Pool Vaporization Rate	kg/s	0,326454	0,194965
Total Vapor Flowrate	kg/s	0,947637	0,771881
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	76,3125	77,775
Pool Vaporization Rate	kg/s	0,387761	0,2299
Total Vapor Flowrate	kg/s	1,00894	0,806816
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	66,4875	68,39
Pool Vaporization Rate	kg/s	0,439909	0,259646
Total Vapor Flowrate	kg/s	1,06109	0,836562
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	116,16	120,865
Pool Vaporization Rate	kg/s	0,505936	0,297503
Total Vapor Flowrate	kg/s	1,12712	0,874419
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	143,75	147,869
Pool Vaporization Rate	kg/s	0,598608	0,35019
Total Vapor Flowrate	kg/s	1,21979	0,927106
Maximum Pool Radius	m	12,973	13,0099

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	6,95902	6,97082
LFL (43000)	18,75	s	7,22271	7,16878
LFL Frac (43000)	18,75	s	7,22271	7,16878

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	33,4958	34,9811
Radiation Level	18,43	kW/m2	30,0474	31,3832
Radiation Level	35	kW/m2	26,1515	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	45,1382	44,0095
Radiation Level	18,43	kW/m2	36,5254	34,783
Radiation Level	35	kW/m2	24,2167	23,4538

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

			Radiation Level (kW/m2)
		Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	45,1382	44,0095
Radiation Level	18,43	kW/m2	36,5254	34,783
Radiation Level	35	kW/m2	24,2167	23,4538

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

			Radiation Level (kW/m2)
		Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	7,22271	7,16878
Furthest Extent	43000	ppm	7,22271	7,16878

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H08(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H09(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	11,08	m/s
	Droplet Diameter(1)	1525	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,05	degC
	Release Rate(1)	229	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	4,137E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,996913	0,997253
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	268,141	256
Pool Vaporization Rate	kg/s	1,81079	1,25435
Total Vapor Flowrate	kg/s	2,51771	1,88334
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	117	116,49
Pool Vaporization Rate	kg/s	4,15713	2,76847
Total Vapor Flowrate	kg/s	4,86406	3,39746
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,19	91,9125
Pool Vaporization Rate	kg/s	5,32252	3,50135
Total Vapor Flowrate	kg/s	6,02945	4,13034
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,2719	79,6531
Pool Vaporization Rate	kg/s	6,23517	4,06823
Total Vapor Flowrate	kg/s	6,9421	4,69722
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	133,148	135,85
Pool Vaporization Rate	kg/s	7,33422	4,74205
Total Vapor Flowrate	kg/s	8,04114	5,37104
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	166,35	172,734
Pool Vaporization Rate	kg/s	8,83231	5,65203
Total Vapor Flowrate	kg/s	9,53924	6,28102
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	45,8994	47,36
Pool Vaporization Rate	kg/s	9,86095	6,27133
Total Vapor Flowrate	kg/s	10,5679	6,90033
Maximum Pool Radius	m	51,9865	52,0738

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (190000)	18,75	s	4,66324	4,69807
LFL (43000)	18,75	s	12,7962	15,1118
LFL Frac (43000)	18,75	s	12,7962	15,1118

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	36,8792	37,7509
Radiation Level	18,43	kW/m2	33,2101	33,7
Radiation Level	35	kW/m2	29,1081	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	107,419	106,302
Radiation Level	18,43	kW/m2	83,3432	82,6591
Radiation Level	35	kW/m2	65,4063	63,4128

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	107,419	106,302
Radiation Level	18,43	kW/m2	83,3432	82,6591
Radiation Level	35	kW/m2	65,4063	63,4128

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	12,7962	15,1118
Furthest Extent	43000	ppm	12,7962	15,1118

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	15,8399	16,1611
Overpressure	0,2	bar	11,9408	12,1464
Overpressure	0,3	bar	10,4128	10,5731

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	1,8704	2,04173
Used Flammable Mass	kg	1,8704	2,04173
Overpressure Radius	m	10,8397	11,1611
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00015	5

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	1,8704	2,04173
Used Flammable Mass	kg	1,8704	2,04173
Overpressure Radius	m	6,94061	7,14636
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00015	5

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	1,8704	2,04173
Used Flammable Mass	kg	1,8704	2,04173
Overpressure Radius	m	5,41266	5,57312
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00015	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H09(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H10(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	2,29	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	4,137E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

			Dia	Noite
Release Segment 1				
Release Duration		s	900	900
Liquid Rainout		fraction	0,956681	0,959685
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	294,981	
Pool Vaporization Rate		kg/s	0,0190045	
Total Vapor Flowrate		kg/s	0,118205	0,0923208
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	116,095	
Pool Vaporization Rate		kg/s	0,0482708	
Total Vapor Flowrate		kg/s	0,147472	
Release Segment 1	Cloud Segment 3			
Cloud Segment Duration		s	89,565	
Pool Vaporization Rate		kg/s	0,0631689	
Total Vapor Flowrate		kg/s	0,16237	
Release Segment 1	Cloud Segment 4			
Cloud Segment Duration		s	75,3594	
Pool Vaporization Rate		kg/s	0,0750055	
Total Vapor Flowrate		kg/s	0,174206	
Release Segment 1	Cloud Segment 5			
Cloud Segment Duration		s	66,6225	
Pool Vaporization Rate		kg/s	0,0850955	
Total Vapor Flowrate		kg/s	0,184296	
Release Segment 1	Cloud Segment 6			
Cloud Segment Duration		s	115,003	
Pool Vaporization Rate		kg/s	0,0978503	
Total Vapor Flowrate		kg/s	0,197051	
Release Segment 1	Cloud Segment 7			
Cloud Segment Duration		s	142,374	
Pool Vaporization Rate		kg/s	0,115649	
Total Vapor Flowrate		kg/s	0,21485	
Maximum Pool Radius		m	5,08059	5,10078

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	No Hazard
LFL (43000)	18,75	s	4,24608	4,26918
LFL Frac (43000)	18,75	s	4,24608	4,26918

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,1635	15,8316
Radiation Level	18,43	kW/m2	13,5465	13,9903
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	20,6424	20,0307
Radiation Level	18,43	kW/m2	16,3276	15,4713
Radiation Level	35	kW/m2	10,4135	10,4614

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	20,6424	20,0307
Radiation Level	18,43	kW/m2	16,3276	15,4713
Radiation Level	35	kW/m2	10,4135	10,4614

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	4,24608	4,26918
Furthest Extent	43000	ppm	4,24608	4,26918

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H10(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H11(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	138	m2
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	11,08	m/s
	Droplet Diameter(1)	1525	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,05	degC
	Release Rate(1)	45,8	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	4,137E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,992118	0,993186
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	50,7656	120,451
Pool Vaporization Rate		kg/s	0,0770513	0,112448
Total Vapor Flowrate		kg/s	0,438034	0,42453
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	849,234	779,549
Pool Vaporization Rate		kg/s	0,197798	0,155827
Total Vapor Flowrate		kg/s	0,558781	0,467909
Maximum Pool Radius		m	6,62773	6,62773

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	3,81718	3,95279
LFL (43000)	18,75	s	8,38284	9,75556
LFL Frac (43000)	18,75	s	8,38284	9,75556
Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	27,5085	27,7884
Radiation Level	18,43	kW/m2	24,7573	24,6777
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	20,7108	19,905
Radiation Level	18,43	kW/m2	15,5685	14,4245
Radiation Level	35	kW/m2	7,76871	7,62773

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	20,7108	19,905
Radiation Level	18,43	kW/m2	15,5685	14,4245
Radiation Level	35	kW/m2	7,76871	7,62773

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

			Radiation Level (kW/m2)
		Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	8,38284	9,75556
Furthest Extent	43000	ppm	8,38284	9,75556

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H11(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H12(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	138	m2
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	0,458	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	4,137E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,949019	0,952085
Maximum Pool Radius	m	2,25758	2,27052

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	No Hazard
LFL (43000)	18,75	s	3,16735	3,16556
LFL Frac (43000)	18,75	s	3,16735	3,16556

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	7,94501	8,32828
Radiation Level	18,43	kW/m2	7,54147	Not Reached
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	11,1252	10,7231
Radiation Level	18,43	kW/m2	8,00756	7,7506
Radiation Level	35	kW/m2	6,51864	6,5383

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	11,1252	10,7231
Radiation Level	18,43	kW/m2	8,00756	7,7506
Radiation Level	35	kW/m2	6,51864	6,5383

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	3,16735	3,16556
Furthest Extent	43000	ppm	3,16735	3,16556

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H12(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H13(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

User-Defined Data

Material

Material Identifier	ETHANOL	

Scenario

Building Wake Effect	None	

Vessel/Tank

Release Type	Continuous	

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Number of Release Segments	1	
Fluid Phase(1)	Liquid	
Discharge Velocity(1)	11,08	m/s
Droplet Diameter(1)	1525	um
Duration of Discharge(1)	900	s
Final Temperature(1)	25,05	degC
Release Rate(1)	196,5	kg/s
Pre-Dilution Air Rates(1)	0	kg/s
Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,709E5	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	1	1
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	266,506	254,402
Pool Vaporization Rate	kg/s	1,62104	1,12088
Total Vapor Flowrate	kg/s	1,62107	1,12091
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,675	116,16
Pool Vaporization Rate	kg/s	3,69996	2,46156
Total Vapor Flowrate	kg/s	3,69999	2,46159
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	92,0594	92,7631
Pool Vaporization Rate	kg/s	4,73198	3,11054
Total Vapor Flowrate	kg/s	4,73201	3,11057
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,1856	79,5644
Pool Vaporization Rate	kg/s	5,53928	3,61201
Total Vapor Flowrate	kg/s	5,53931	3,61204
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	134,325	137,016
Pool Vaporization Rate	kg/s	6,50944	4,20689
Total Vapor Flowrate	kg/s	6,50947	4,20692
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	167,812	172,734
Pool Vaporization Rate	kg/s	7,8334	5,00757
Total Vapor Flowrate	kg/s	7,83343	5,0076
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	44,4375	47,36
Pool Vaporization Rate	kg/s	8,73302	5,54959
Total Vapor Flowrate	kg/s	8,73305	5,54962
Maximum Pool Radius	m	48,2157	48,295

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	Not Reached	Not Reached
Radiation Level	18,43	kW/m2	Not Reached	Not Reached
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	123,347	121,185
Radiation Level	18,43	kW/m2	97,6571	94,0932
Radiation Level	35	kW/m2	70,06	66,3792

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	123,347	121,185
Radiation Level	18,43	kW/m2	97,6571	94,0932
Radiation Level	35	kW/m2	70,06	66,3792

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H13(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H14(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	1,96	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	2,709E5	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

			Dia	Noite
Release Segment 1				
Release Duration		s	900	900
Liquid Rainout		fraction	1	1
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	272,25	
Pool Vaporization Rate		kg/s	0,0225139	
Total Vapor Flowrate		kg/s	0,0225142	2,65971e-007
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	117,813	
Pool Vaporization Rate		kg/s	0,0522948	
Total Vapor Flowrate		kg/s	0,052295	
Release Segment 1	Cloud Segment 3			
Cloud Segment Duration		s	91,74	
Pool Vaporization Rate		kg/s	0,0672848	
Total Vapor Flowrate		kg/s	0,0672851	
Release Segment 1	Cloud Segment 4			
Cloud Segment Duration		s	77,52	
Pool Vaporization Rate		kg/s	0,0790517	
Total Vapor Flowrate		kg/s	0,0790519	
Release Segment 1	Cloud Segment 5			
Cloud Segment Duration		s	132,368	
Pool Vaporization Rate		kg/s	0,0932771	
Total Vapor Flowrate		kg/s	0,0932774	
Release Segment 1	Cloud Segment 6			
Cloud Segment Duration		s	163,872	
Pool Vaporization Rate		kg/s	0,112825	
Total Vapor Flowrate		kg/s	0,112825	
Release Segment 1	Cloud Segment 7			
Cloud Segment Duration		s	44,4375	
Pool Vaporization Rate		kg/s	0,126281	
Total Vapor Flowrate		kg/s	0,126282	
Maximum Pool Radius		m	4,7966	4,81413

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0,00359676
LFL Frac (43000)	18,75	s	0	0,00359676

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	No Hazard	No Hazard
Flame Direction	Horizontal	Horizontal

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,4922	14,8629
Radiation Level	18,43	kW/m2	11,2996	10,4722
Radiation Level	35	kW/m2	5,7966	5,81413

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,4922	14,8629
Radiation Level	18,43	kW/m2	11,2996	10,4722
Radiation Level	35	kW/m2	5,7966	5,81413

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Noite	
Furthest Extent	43000	ppm	0,00359676	
Furthest Extent	43000	ppm	0,00359676	

			Heights (m) for above distances	
			Noite	
Furthest Extent	43000	ppm	0	
Furthest Extent	43000	ppm	0	

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H14(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H15(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

User-Defined Data

Bund			
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	11,08	m/s
	Droplet Diameter(1)	1525	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,05	degC
	Release Rate(1)	196,5	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	2,709E5	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			
	[Indoor Calculations	Unselected]	
	[Wind Dependent Exchange Rate	Case Specified]	
	[Building Exchange Rate	4	/hr]
	[Tail Time	1800	s]
	[Set averaging time equal to exposure time	Use a fixed averaging time]	
	[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	1618	m
	North(1)	-1397	m
Material			
	Material Identifier	ETHANOL	

Scenario		
	Building Wake Effect	None
Vessel/Tank		
	Release Type	Continuous
Location		
	Elevation	3 m
	Use ERPG averaging time	ERPG not selected
	Use IDLH averaging time	IDLH not selected
	Use STEL averaging time	STEL not selected
	Supply a user defined averaging time	Not supplied
Bund		
	Status of Bund	No bund present
	[Type of Bund Surface	User-Defined (Land)]

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,986115	0,989165
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	273,903	260,016
Pool Vaporization Rate	kg/s	1,38553	0,97774
Total Vapor Flowrate	kg/s	4,11333	3,1064
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	117,148	116,344
Pool Vaporization Rate	kg/s	3,24314	2,18556
Total Vapor Flowrate	kg/s	5,97094	4,31422
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	90,7519	92,3625
Pool Vaporization Rate	kg/s	4,17718	2,77788
Total Vapor Flowrate	kg/s	6,90498	4,90654
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	77,52	78,8375
Pool Vaporization Rate	kg/s	4,91239	3,23851
Total Vapor Flowrate	kg/s	7,64019	5,36717
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	69,4331	136,262
Pool Vaporization Rate	kg/s	5,54085	3,79017
Total Vapor Flowrate	kg/s	8,26865	5,91883
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	120,635	170,278
Pool Vaporization Rate	kg/s	6,33574	4,53723
Total Vapor Flowrate	kg/s	9,06355	6,66589
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	150,609	45,8994
Pool Vaporization Rate	kg/s	7,44082	5,04282
Total Vapor Flowrate	kg/s	10,1686	7,17148
Maximum Pool Radius	m	47,9021	48,0334

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	8,69464	8,74858
LFL (43000)	18,75	s	25,754	29,9018
LFL Frac (43000)	18,75	s	25,754	29,9018

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	65,9872	63,8189
Radiation Level	18,43	kW/m2	59,3855	57,2319
Radiation Level	35	kW/m2	52,9565	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	105,408	103,415
Radiation Level	18,43	kW/m2	74,8593	73,4459
Radiation Level	35	kW/m2	63,3731	60,8379

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	105,408	103,415
Radiation Level	18,43	kW/m2	74,8593	73,4459
Radiation Level	35	kW/m2	63,3731	60,8379

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	25,754	29,9018
Furthest Extent	43000	ppm	25,754	29,9018

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	21,3502	22,1425
Overpressure	0,2	bar	17,2675	17,7748
Overpressure	0,3	bar	15,6676	16,0632

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	2,14728	2,62909
Used Flammable Mass	kg	2,14728	2,62909
Overpressure Radius	m	11,3502	12,1425
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	2,14728	2,62909
Used Flammable Mass	kg	2,14728	2,62909
Overpressure Radius	m	7,26745	7,77477
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	2,14728	2,62909
Used Flammable Mass	kg	2,14728	2,62909
Overpressure Radius	m	5,66756	6,06319
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H15(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H16(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	3	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	1,96	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	2,709E5	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,891425	0,906791
Maximum Pool Radius		m	4,53945	4,58765

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	No Hazard
LFL (43000)	18,75	s	No Hazard	No Hazard
LFL Frac (43000)	18,75	s	No Hazard	No Hazard

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	19,882	20,0606
Radiation Level	18,43	kW/m2	17,7452	18,2677
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	23,7884	22,9188
Radiation Level	18,43	kW/m2	19,6925	18,6586
Radiation Level	35	kW/m2	14,584	14,2853

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	23,7884	22,9188
Radiation Level	18,43	kW/m2	19,6925	18,6586
Radiation Level	35	kW/m2	14,584	14,2853

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

			Radiation Level (kW/m2)	
			Dia	Noite

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H16(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H17(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release
Outdoor Release Direction	Horizontal

Flammable

Explosion Method	TNT
Jet Fire Method	Cone Model

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.108,28	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.086,98	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,998007	0,998079
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	54,0225	116,101
Pool Vaporization Rate		kg/s	1,96101	2,44925
Total Vapor Flowrate		kg/s	4,92189	5,30383
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	845,977	783,899
Pool Vaporization Rate		kg/s	4,09826	3,24648
Total Vapor Flowrate		kg/s	7,05914	6,10106
Maximum Pool Radius		m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	8,54435	8,51828
LFL (43000)	18,75	s	25,5318	31,5318
LFL Frac (43000)	18,75	s	25,5318	31,5318

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m) Dia	Distance (m) Noite
Radiation Level	9,83	kW/m2	67,9892	72,1445
Radiation Level	18,43	kW/m2	61,1369	64,7634
Radiation Level	35	kW/m2	54,1005	55,9079

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

	Radiation Level (kW/m2) Dia	Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

			Distance (m) Dia	Distance (m) Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

	Radiation Level (kW/m2) Dia	Radiation Level (kW/m2) Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	25,5318	31,5318
Furthest Extent	43000	ppm	25,5318	31,5318

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	24,8153	37,6269
Overpressure	0,2	bar	19,4861	29,4879
Overpressure	0,3	bar	17,3978	26,2984

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4,77539	17,012
Used Flammable Mass	kg	4,77539	17,012
Overpressure Radius	m	14,8153	22,6269
Distance to:			
- Ignition Source	m	20	30
- Cloud Front/Centre	m	20	30
- Explosion Centre	m	10	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4,77539	17,012
Used Flammable Mass	kg	4,77539	17,012
Overpressure Radius	m	9,48612	14,4879
Distance to:			
- Ignition Source	m	20	30
- Cloud Front/Centre	m	20	30
- Explosion Centre	m	10	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4,77539	17,012
Used Flammable Mass	kg	4,77539	17,012
Overpressure Radius	m	7,39779	11,2984
Distance to:			
- Ignition Source	m	20	30
- Cloud Front/Centre	m	20	30
- Explosion Centre	m	10	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H17(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H18(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	399,20	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	391,53	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,958193	0,961172
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	289,851	276,391
Pool Vaporization Rate	kg/s	0,100667	0,0639668
Total Vapor Flowrate	kg/s	0,721851	0,640883
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	117,18	117,632
Pool Vaporization Rate	kg/s	0,249602	0,150846
Total Vapor Flowrate	kg/s	0,870786	0,727762
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	90,2594	91,0781
Pool Vaporization Rate	kg/s	0,326454	0,194965
Total Vapor Flowrate	kg/s	0,947637	0,771881
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	76,3125	77,775
Pool Vaporization Rate	kg/s	0,387761	0,2299
Total Vapor Flowrate	kg/s	1,00894	0,806816
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	66,4875	68,39
Pool Vaporization Rate	kg/s	0,439909	0,259646
Total Vapor Flowrate	kg/s	1,06109	0,836562
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	116,16	120,865
Pool Vaporization Rate	kg/s	0,505936	0,297503
Total Vapor Flowrate	kg/s	1,12712	0,874419
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	143,75	147,869
Pool Vaporization Rate	kg/s	0,598608	0,35019
Total Vapor Flowrate	kg/s	1,21979	0,927106
Maximum Pool Radius	m	12,973	13,0099

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	6,95902	6,97082
LFL (43000)	18,75	s	7,22271	7,16878
LFL Frac (43000)	18,75	s	7,22271	7,16878

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	33,4958	34,9811
Radiation Level	18,43	kW/m2	30,0474	31,3832
Radiation Level	35	kW/m2	26,1515	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	45,1382	44,0095
Radiation Level	18,43	kW/m2	36,5254	34,783
Radiation Level	35	kW/m2	24,2167	23,4538

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	45,1382	44,0095
Radiation Level	18,43	kW/m2	36,5254	34,783
Radiation Level	35	kW/m2	24,2167	23,4538

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	7,22271	7,16878
Furthest Extent	43000	ppm	7,22271	7,16878

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H18(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H19(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	11,08	m/s
	Droplet Diameter(1)	1525	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,05	degC
	Release Rate(1)	196,5	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	4,113E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,996638	0,997017
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	268,141	256
Pool Vaporization Rate	kg/s	1,56147	1,08055
Total Vapor Flowrate	kg/s	2,22202	1,66668
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	117	116,49
Pool Vaporization Rate	kg/s	3,58639	2,38499
Total Vapor Flowrate	kg/s	4,24695	2,97112
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,19	91,9125
Pool Vaporization Rate	kg/s	4,59281	3,01673
Total Vapor Flowrate	kg/s	5,25337	3,60286
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,2719	79,6531
Pool Vaporization Rate	kg/s	5,38114	3,50555
Total Vapor Flowrate	kg/s	6,04169	4,09168
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	133,148	135,85
Pool Vaporization Rate	kg/s	6,33064	4,08679
Total Vapor Flowrate	kg/s	6,9912	4,67292
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	166,35	172,734
Pool Vaporization Rate	kg/s	7,62514	4,8721
Total Vapor Flowrate	kg/s	8,28569	5,45823
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	45,8994	47,36
Pool Vaporization Rate	kg/s	8,51411	5,40676
Total Vapor Flowrate	kg/s	9,17466	5,9929
Maximum Pool Radius	m	48,1405	48,2234

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (190000)	18,75	s	4,58649	4,60801
LFL (43000)	18,75	s	12,3384	14,5608
LFL Frac (43000)	18,75	s	12,3384	14,5608

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	35,805	36,6061
Radiation Level	18,43	kW/m2	32,2398	32,6644
Radiation Level	35	kW/m2	28,3319	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	101,815	100,682
Radiation Level	18,43	kW/m2	73,1541	70,6228
Radiation Level	35	kW/m2	60,5848	57,9381

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

		Radiation Level (kW/m2)
Dia		Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	101,815	100,682
Radiation Level	18,43	kW/m2	73,1541	70,6228
Radiation Level	35	kW/m2	60,5848	57,9381

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

		Radiation Level (kW/m2)
Dia		Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	12,3384	14,5608
Furthest Extent	43000	ppm	12,3384	14,5608

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	15,2617	15,6069
Overpressure	0,2	bar	11,5706	11,7915
Overpressure	0,3	bar	10,1241	10,2964

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	1,58679	1,75244
Used Flammable Mass	kg	1,58679	1,75244
Overpressure Radius	m	10,2616	10,6069
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00014	5

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	1,58679	1,75244
Used Flammable Mass	kg	1,58679	1,75244
Overpressure Radius	m	6,57041	6,79152
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00014	5

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	1,58679	1,75244
Used Flammable Mass	kg	1,58679	1,75244
Overpressure Radius	m	5,12396	5,2964
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00014	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H19(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H20(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	1,96	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	4,113E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

			Dia	Noite
Release Segment 1				
Release Duration		s	900	900
Liquid Rainout		fraction	0,955799	0,958831
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	295,84	
Pool Vaporization Rate		kg/s	0,0166563	
Total Vapor Flowrate		kg/s	0,10329	0,0806909
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	116,25	
Pool Vaporization Rate		kg/s	0,0424312	
Total Vapor Flowrate		kg/s	0,129065	
Release Segment 1	Cloud Segment 3			
Cloud Segment Duration		s	88,5506	
Pool Vaporization Rate		kg/s	0,0554591	
Total Vapor Flowrate		kg/s	0,142093	
Release Segment 1	Cloud Segment 4			
Cloud Segment Duration		s	75,3594	
Pool Vaporization Rate		kg/s	0,0657837	
Total Vapor Flowrate		kg/s	0,152418	
Release Segment 1	Cloud Segment 5			
Cloud Segment Duration		s	66,6225	
Pool Vaporization Rate		kg/s	0,0746369	
Total Vapor Flowrate		kg/s	0,161271	
Release Segment 1	Cloud Segment 6			
Cloud Segment Duration		s	115,003	
Pool Vaporization Rate		kg/s	0,0858253	
Total Vapor Flowrate		kg/s	0,172459	
Release Segment 1	Cloud Segment 7			
Cloud Segment Duration		s	142,374	
Pool Vaporization Rate		kg/s	0,101435	
Total Vapor Flowrate		kg/s	0,188069	
Maximum Pool Radius		m	4,69718	4,71666

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	No Hazard
LFL (43000)	18,75	s	4,15206	4,17506
LFL Frac (43000)	18,75	s	4,15206	4,17506

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	14,2803	14,9137
Radiation Level	18,43	kW/m2	12,7341	13,2801
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	19,4262	18,8384
Radiation Level	18,43	kW/m2	15,2568	14,5045
Radiation Level	35	kW/m2	9,9202	9,96802

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

	Radiation Level (kW/m2)
Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	19,4262	18,8384
Radiation Level	18,43	kW/m2	15,2568	14,5045
Radiation Level	35	kW/m2	9,9202	9,96802

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

	Radiation Level (kW/m2)
Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	4,15206	4,17506
Furthest Extent	43000	ppm	4,15206	4,17506

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H20(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H21(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

User-Defined Data

Material

Material Identifier	ETHANOL	

Scenario

Building Wake Effect	None	

Vessel/Tank

Release Type	Continuous	

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Number of Release Segments	1	
Fluid Phase(1)	Liquid	
Discharge Velocity(1)	11,08	m/s
Droplet Diameter(1)	1525	um
Duration of Discharge(1)	900	s
Final Temperature(1)	25,05	degC
Release Rate(1)	196,5	kg/s
Pre-Dilution Air Rates(1)	0	kg/s
Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,996638	0,997017
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	268,141	256
Pool Vaporization Rate	kg/s	1,56147	1,08055
Total Vapor Flowrate	kg/s	2,22202	1,66668
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	117	116,49
Pool Vaporization Rate	kg/s	3,58639	2,38499
Total Vapor Flowrate	kg/s	4,24695	2,97112
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	91,19	91,9125
Pool Vaporization Rate	kg/s	4,59281	3,01673
Total Vapor Flowrate	kg/s	5,25337	3,60286
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	78,2719	79,6531
Pool Vaporization Rate	kg/s	5,38114	3,50555
Total Vapor Flowrate	kg/s	6,04169	4,09168
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	133,148	135,85
Pool Vaporization Rate	kg/s	6,33064	4,08679
Total Vapor Flowrate	kg/s	6,9912	4,67292
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	166,35	172,734
Pool Vaporization Rate	kg/s	7,62514	4,8721
Total Vapor Flowrate	kg/s	8,28569	5,45823
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	45,8994	47,36
Pool Vaporization Rate	kg/s	8,51411	5,40676
Total Vapor Flowrate	kg/s	9,17466	5,9929
Maximum Pool Radius	m	48,1405	48,2234

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (190000)	18,75	s	4,58649	4,60801
LFL (43000)	18,75	s	12,3384	14,5608
LFL Frac (43000)	18,75	s	12,3384	14,5608

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	35,805	36,6061
Radiation Level	18,43	kW/m2	32,2398	32,6644
Radiation Level	35	kW/m2	28,3319	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	101,815	100,682
Radiation Level	18,43	kW/m2	73,1541	70,6228
Radiation Level	35	kW/m2	60,5848	57,9381

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	101,815	100,682
Radiation Level	18,43	kW/m2	73,1541	70,6228
Radiation Level	35	kW/m2	60,5848	57,9381

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	12,3384	14,5608
Furthest Extent	43000	ppm	12,3384	14,5608

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	15,2617	15,6069
Overpressure	0,2	bar	11,5706	11,7915
Overpressure	0,3	bar	10,1241	10,2964

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	1,58679	1,75244
Used Flammable Mass	kg	1,58679	1,75244
Overpressure Radius	m	10,2616	10,6069
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00014	5

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	1,58679	1,75244
Used Flammable Mass	kg	1,58679	1,75244
Overpressure Radius	m	6,57041	6,79152
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00014	5

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	1,58679	1,75244
Used Flammable Mass	kg	1,58679	1,75244
Overpressure Radius	m	5,12396	5,2964
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00014	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H21(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H22(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

User-Defined Data

Material

Material Identifier	ETHANOL	

Scenario

Building Wake Effect	None	

Vessel/Tank

Release Type	Continuous	

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Number of Release Segments	1	
Fluid Phase(1)	Liquid	
Discharge Velocity(1)	18,46	m/s
Droplet Diameter(1)	549,3	um
Duration of Discharge(1)	900	s
Final Temperature(1)	24,97	degC
Release Rate(1)	1,96	kg/s
Pre-Dilution Air Rates(1)	0	kg/s
Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,955799	0,958831
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	295,84	
Pool Vaporization Rate	kg/s	0,0166563	
Total Vapor Flowrate	kg/s	0,10329	0,0806909
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	116,25	
Pool Vaporization Rate	kg/s	0,0424312	
Total Vapor Flowrate	kg/s	0,129065	
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	88,5506	
Pool Vaporization Rate	kg/s	0,0554591	
Total Vapor Flowrate	kg/s	0,142093	
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	75,3594	
Pool Vaporization Rate	kg/s	0,0657837	
Total Vapor Flowrate	kg/s	0,152418	
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	66,6225	
Pool Vaporization Rate	kg/s	0,0746369	
Total Vapor Flowrate	kg/s	0,161271	
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	115,003	
Pool Vaporization Rate	kg/s	0,0858253	
Total Vapor Flowrate	kg/s	0,172459	
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	142,374	
Pool Vaporization Rate	kg/s	0,101435	
Total Vapor Flowrate	kg/s	0,188069	
Maximum Pool Radius	m	4,69718	4,71666

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	No Hazard
LFL (43000)	18,75	s	4,15206	4,17506
LFL Frac (43000)	18,75	s	4,15206	4,17506

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	14,2803	14,9137
Radiation Level	18,43	kW/m2	12,7341	13,2801
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	19,4262	18,8384
Radiation Level	18,43	kW/m2	15,2568	14,5045
Radiation Level	35	kW/m2	9,9202	9,96802

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

	Radiation Level (kW/m2)
Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	19,4262	18,8384
Radiation Level	18,43	kW/m2	15,2568	14,5045
Radiation Level	35	kW/m2	9,9202	9,96802

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

	Radiation Level (kW/m2)
Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	4,15206	4,17506
Furthest Extent	43000	ppm	4,15206	4,17506

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H22(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H23(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.108,28	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.086,98	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	900	900
Liquid Rainout		fraction	0,998007	0,998079
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	54,0225	116,101
Pool Vaporization Rate		kg/s	1,96101	2,44925
Total Vapor Flowrate		kg/s	4,92189	5,30383
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	845,977	783,899
Pool Vaporization Rate		kg/s	4,09826	3,24648
Total Vapor Flowrate		kg/s	7,05914	6,10106
Maximum Pool Radius		m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	8,54435	8,51828
LFL (43000)	18,75	s	25,5318	31,5318
LFL Frac (43000)	18,75	s	25,5318	31,5318

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	67,9892	72,1445
Radiation Level	18,43	kW/m2	61,1369	64,7634
Radiation Level	35	kW/m2	54,1005	55,9079

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

			Radiation Level (kW/m2)
		Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	25,5318	31,5318
Furthest Extent	43000	ppm	25,5318	31,5318

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	24,8153	37,6269
Overpressure	0,2	bar	19,4861	29,4879
Overpressure	0,3	bar	17,3978	26,2984

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4,77539	17,012
Used Flammable Mass	kg	4,77539	17,012
Overpressure Radius	m	14,8153	22,6269
Distance to:			
- Ignition Source	m	20	30
- Cloud Front/Centre	m	20	30
- Explosion Centre	m	10	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4,77539	17,012
Used Flammable Mass	kg	4,77539	17,012
Overpressure Radius	m	9,48612	14,4879
Distance to:			
- Ignition Source	m	20	30
- Cloud Front/Centre	m	20	30
- Explosion Centre	m	10	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4,77539	17,012
Used Flammable Mass	kg	4,77539	17,012
Overpressure Radius	m	7,39779	11,2984
Distance to:			
- Ignition Source	m	20	30
- Cloud Front/Centre	m	20	30
- Explosion Centre	m	10	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H23(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H24(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	900,00	s

Orifice or pipe exit data (before atmospheric expansion):

- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	

Final data (after atmospheric expansion):

- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	399,20	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	391,53	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,958193	0,961172
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	289,851	276,391
Pool Vaporization Rate	kg/s	0,100667	0,0639668
Total Vapor Flowrate	kg/s	0,721851	0,640883
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	117,18	117,632
Pool Vaporization Rate	kg/s	0,249602	0,150846
Total Vapor Flowrate	kg/s	0,870786	0,727762
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	90,2594	91,0781
Pool Vaporization Rate	kg/s	0,326454	0,194965
Total Vapor Flowrate	kg/s	0,947637	0,771881
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	76,3125	77,775
Pool Vaporization Rate	kg/s	0,387761	0,2299
Total Vapor Flowrate	kg/s	1,00894	0,806816
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	66,4875	68,39
Pool Vaporization Rate	kg/s	0,439909	0,259646
Total Vapor Flowrate	kg/s	1,06109	0,836562
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	116,16	120,865
Pool Vaporization Rate	kg/s	0,505936	0,297503
Total Vapor Flowrate	kg/s	1,12712	0,874419
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	143,75	147,869
Pool Vaporization Rate	kg/s	0,598608	0,35019
Total Vapor Flowrate	kg/s	1,21979	0,927106
Maximum Pool Radius	m	12,973	13,0099

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	6,95902	6,97082
LFL (43000)	18,75	s	7,22271	7,16878
LFL Frac (43000)	18,75	s	7,22271	7,16878

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	33,4958	34,9811
Radiation Level	18,43	kW/m2	30,0474	31,3832
Radiation Level	35	kW/m2	26,1515	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	45,1382	44,0095
Radiation Level	18,43	kW/m2	36,5254	34,783
Radiation Level	35	kW/m2	24,2167	23,4538

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

		Radiation Level (kW/m2)
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	45,1382	44,0095
Radiation Level	18,43	kW/m2	36,5254	34,783
Radiation Level	35	kW/m2	24,2167	23,4538

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

		Radiation Level (kW/m2)
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	7,22271	7,16878
Furthest Extent	43000	ppm	7,22271	7,16878

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H24(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H25(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	3051	m2
	[Type of Bund Surface	User-Defined (Land)]	
	Bund Height	1,9	m
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	11,08	m/s
	Droplet Diameter(1)	1525	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	25,05	degC
	Release Rate(1)	196,5	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	4,113E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

		Dia	Noite
Release Segment 1			
Release Duration	s	900	900
Liquid Rainout	fraction	0,996638	0,997017
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	119,356	115,563
Pool Vaporization Rate	kg/s	0,733391	0,536429
Total Vapor Flowrate	kg/s	1,39395	1,12257
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	51,6	51,4931
Pool Vaporization Rate	kg/s	1,70828	1,21131
Total Vapor Flowrate	kg/s	2,36884	1,79745
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	40,02	40,3044
Pool Vaporization Rate	kg/s	2,20176	1,54428
Total Vapor Flowrate	kg/s	2,86231	2,13042
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	33,9469	34,4425
Pool Vaporization Rate	kg/s	2,58998	1,80291
Total Vapor Flowrate	kg/s	3,25054	2,38904
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	30,6375	59,22
Pool Vaporization Rate	kg/s	2,92239	2,11334
Total Vapor Flowrate	kg/s	3,58295	2,69948
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	52,9556	598,977
Pool Vaporization Rate	kg/s	3,34403	2,63689
Total Vapor Flowrate	kg/s	4,00458	3,22302
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	571,484	
Pool Vaporization Rate	kg/s	3,82157	
Total Vapor Flowrate	kg/s	4,48213	
Maximum Pool Radius	m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	4,58664	4,60901
LFL (43000)	18,75	s	12,4568	14,4371
LFL Frac (43000)	18,75	s	12,4568	14,4371

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	35,805	36,6061
Radiation Level	18,43	kW/m2	32,2398	32,6644
Radiation Level	35	kW/m2	28,3319	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

		Radiation Level (kW/m2)
Dia		Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

		Radiation Level (kW/m2)
Dia		Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	12,4568	14,4371
Furthest Extent	43000	ppm	12,4568	14,4371

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	13,021	13,4054
Overpressure	0,2	bar	10,136	10,3819
Overpressure	0,3	bar	9,00551	9,19713

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	0,757602	0,872084
Used Flammable Mass	kg	0,757602	0,872084
Overpressure Radius	m	8,02025	8,40543
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00072	5

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	0,757602	0,872084
Used Flammable Mass	kg	0,757602	0,872084
Overpressure Radius	m	5,1353	5,38194
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00072	5

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	0,757602	0,872084
Used Flammable Mass	kg	0,757602	0,872084
Overpressure Radius	m	4,00479	4,19713
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5,00072	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H25(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H26(E)'

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

User-Defined Data

Material			
	Material Identifier	ETHANOL	
Scenario			
	Building Wake Effect	None	
Vessel/Tank			
	Release Type	Continuous	
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	Bund present	
	Bund Area	3051	m2
	[Type of Bund Surface	User-Defined (Land)]	
	Bund Height	1,9	m
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	18,46	m/s
	Droplet Diameter(1)	549,3	um
	Duration of Discharge(1)	900	s
	Final Temperature(1)	24,97	degC
	Release Rate(1)	1,96	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	4,113E6	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

			Dia	Noite
Release Segment 1				
Release Duration		s	900	900
Liquid Rainout		fraction	0,955799	0,958831
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	295,84	
Pool Vaporization Rate		kg/s	0,0166563	
Total Vapor Flowrate		kg/s	0,10329	0,0806909
Release Segment 1	Cloud Segment 2			
Cloud Segment Duration		s	116,25	
Pool Vaporization Rate		kg/s	0,0424312	
Total Vapor Flowrate		kg/s	0,129065	
Release Segment 1	Cloud Segment 3			
Cloud Segment Duration		s	88,5506	
Pool Vaporization Rate		kg/s	0,0554591	
Total Vapor Flowrate		kg/s	0,142093	
Release Segment 1	Cloud Segment 4			
Cloud Segment Duration		s	75,3594	
Pool Vaporization Rate		kg/s	0,0657837	
Total Vapor Flowrate		kg/s	0,152418	
Release Segment 1	Cloud Segment 5			
Cloud Segment Duration		s	66,6225	
Pool Vaporization Rate		kg/s	0,0746369	
Total Vapor Flowrate		kg/s	0,161271	
Release Segment 1	Cloud Segment 6			
Cloud Segment Duration		s	115,003	
Pool Vaporization Rate		kg/s	0,0858253	
Total Vapor Flowrate		kg/s	0,172459	
Release Segment 1	Cloud Segment 7			
Cloud Segment Duration		s	142,374	
Pool Vaporization Rate		kg/s	0,101435	
Total Vapor Flowrate		kg/s	0,188069	
Maximum Pool Radius		m	4,69718	4,71666

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	No Hazard
LFL (43000)	18,75	s	4,15206	4,17506
LFL Frac (43000)	18,75	s	4,15206	4,17506

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	14,2803	14,9137
Radiation Level	18,43	kW/m2	12,7341	13,2801
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	19,4262	18,8384
Radiation Level	18,43	kW/m2	15,2568	14,5045
Radiation Level	35	kW/m2	9,9202	9,96802

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

	Radiation Level (kW/m2)
Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	19,4262	18,8384
Radiation Level	18,43	kW/m2	15,2568	14,5045
Radiation Level	35	kW/m2	9,9202	9,96802

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

	Radiation Level (kW/m2)
Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	4,15206	4,17506
Furthest Extent	43000	ppm	4,15206	4,17506

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H26(E)'

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H27(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1525	m
North(1)	-1419	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	1	1
Initial Vapor Cloud	kg	0,560624	0,559224
Time Pool Left Behind	s	29,3102	65,9874
Cloud Segment 1			
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	4,26154	3,49565
Maximum Pool Radius	m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	12,5438	12,5619
LFL (43000)	18,75	s	12,7047	12,723
LFL Frac (43000)	18,75	s	12,7047	12,723

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	12,7047	12,723
Furthest Extent	43000	ppm	12,7047	12,723

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	4,11337e+006	4,11337e+006

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	4,36882	4,12144
Overpressure	0,2	bar	2,79732	2,63893
Overpressure	0,3	bar	2,1815	2,05798

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,122453	0,102808
Used Flammable Mass	kg	0,122453	0,102808
Overpressure Radius	m	4,36882	4,12144
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0	0
- Explosion Centre	m	0	0

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,122453	0,102808
Used Flammable Mass	kg	0,122453	0,102808
Overpressure Radius	m	2,79732	2,63893
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0	0
- Explosion Centre	m	0	0

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,122453	0,102808
Used Flammable Mass	kg	0,122453	0,102808
Overpressure Radius	m	2,1815	2,05798
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0	0
- Explosion Centre	m	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H27(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H28(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	3972	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	2312	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,122E6	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1520	m
North(1)	-1465	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	3.121.575,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	3.121.575,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	1	1
Initial Vapor Cloud	kg	0,425449	0,424387
Time Pool Left Behind	s	26,4594	60,1749
	Cloud Segment 1		
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	3,27895	2,68975
Maximum Pool Radius	m	27,1257	27,1257

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	11,4429	11,4585
LFL (43000)	18,75	s	11,5897	11,6054
LFL Frac (43000)	18,75	s	11,5897	11,6054

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	73,5545	71,8236
Radiation Level	18,43	kW/m2	57,7286	55,0318
Radiation Level	35	kW/m2	38,079	36,2202

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	11,5897	11,6054
Furthest Extent	43000	ppm	11,5897	11,6054

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	3,12157e+006	3,12157e+006

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	3,97394	3,75507
Overpressure	0,2	bar	2,54448	2,40434
Overpressure	0,3	bar	1,98433	1,87504

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,0921598	0,0777556
Used Flammable Mass	kg	0,0921598	0,0777556
Overpressure Radius	m	3,97394	3,75507
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0	0
- Explosion Centre	m	0	0

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,0921598	0,0777556
Used Flammable Mass	kg	0,0921598	0,0777556
Overpressure Radius	m	2,54448	2,40434
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0	0
- Explosion Centre	m	0	0

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,0921598	0,0777556
Used Flammable Mass	kg	0,0921598	0,0777556
Overpressure Radius	m	1,98433	1,87504
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0	0
- Explosion Centre	m	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H28(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H29(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	3051	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,397E6	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1525	m
North(1)	-1419	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	2.397.451,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	2.397.451,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	1	1
Initial Vapor Cloud	kg	0,326756	0,32594
Time Pool Left Behind	s	28,0612	63,6568
Cloud Segment 1			
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	4,24794	3,46532
Maximum Pool Radius	m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	10,4802	10,4937
LFL (43000)	18,75	s	10,6146	10,6283
LFL Frac (43000)	18,75	s	10,6146	10,6283

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	10,6146	10,6283
Furthest Extent	43000	ppm	10,6146	10,6283

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	2,39745e+006	2,39745e+006

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	3,62919	3,42897
Overpressure	0,2	bar	2,32375	2,19555
Overpressure	0,3	bar	1,81218	1,71221

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,0701954	0,0592067
Used Flammable Mass	kg	0,0701954	0,0592067
Overpressure Radius	m	3,62919	3,42897
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0	0
- Explosion Centre	m	0	0

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,0701954	0,0592067
Used Flammable Mass	kg	0,0701954	0,0592067
Overpressure Radius	m	2,32375	2,19555
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0	0
- Explosion Centre	m	0	0

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	0,0701954	0,0592067
Used Flammable Mass	kg	0,0701954	0,0592067
Overpressure Radius	m	1,81218	1,71221
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	0	0
- Explosion Centre	m	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H29(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H30(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	1743	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	2312	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,37E6	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	1.369.815,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	1.369.815,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	1	1
Initial Vapor Cloud	kg	0,186696	0,18623
Time Pool Left Behind	s	24,8025	56,7684
	Cloud Segment 1		
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	3,26083	2,64892
Maximum Pool Radius	m	27,1281	27,1281

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	8,69809	8,70795
LFL (43000)	18,75	s	8,80965	8,81963
LFL Frac (43000)	18,75	s	8,80965	8,81963

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	73,5602	71,8293
Radiation Level	18,43	kW/m2	57,7331	55,0363
Radiation Level	35	kW/m2	38,0824	36,2235

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	8,80965	8,81963
Furthest Extent	43000	ppm	8,80965	8,81963

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	1,36981e+006	1,36981e+006

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H30(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H31(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	50	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,929E4	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	39.294,75	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	39.294,75	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	1	1
Initial Vapor Cloud	kg	0,0053556	0,00534223
Time Pool Left Behind	s	16,7749	44,0246
Cloud Segment 1			
Cloud Segment Duration	s	31,36	900
Pool Vaporization Rate	kg/s	1,75553	1,29046
Cloud Segment 2			
Cloud Segment Duration	s	868,64	
Pool Vaporization Rate	kg/s	2,05258	
Maximum Pool Radius	m	23,0271	23,0149

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	2,66448	2,66586
LFL (43000)	18,75	s	2,69866	2,70005
LFL Frac (43000)	18,75	s	2,69866	2,70005

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	63,4768	61,8613
Radiation Level	18,43	kW/m2	49,6762	47,1997
Radiation Level	35	kW/m2	31,988	24,8199

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

	Dia	Noite
Fireball Flame Status	No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	2,69866	2,70005
Furthest Extent	43000	ppm	2,69866	2,70005

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	39294,7	39294,7
			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard
			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H31(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H32(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	206	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,619E5	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	161.894,38	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	161.894,38	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	1	1
Initial Vapor Cloud	kg	0,0220651	0,02201
Time Pool Left Behind	s	22,5109	57,8364
Cloud Segment 1			
Cloud Segment Duration	s	30,25	900
Pool Vaporization Rate	kg/s	3,33174	2,78822
Cloud Segment 2			
Cloud Segment Duration	s	869,75	
Pool Vaporization Rate	kg/s	3,94767	
Maximum Pool Radius	m	31,1615	31,1615

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	4,27069	4,27368
LFL (43000)	18,75	s	4,32547	4,41498
LFL Frac (43000)	18,75	s	4,32547	4,41498

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	83,3258	81,4616
Radiation Level	18,43	kW/m2	65,5467	62,6291
Radiation Level	35	kW/m2	44,2292	41,9369

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

	Dia	Noite
Fireball Flame Status	No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	4,32547	4,41498
Furthest Extent	43000	ppm	4,32547	4,41498

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	161894	161894
			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard
			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H32(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H33(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	138	m2
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,358E4	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Catastrophic rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	10.000,00	um
- Expanded Radius	n/a	m
- Velocity	0,00	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

N.B. Pool vaporization segments begin when the cloud has left the pool

		Dia	Noite
Liquid Rainout	fraction	1	1
Initial Vapor Cloud	kg	0,00321336	0,00320534
Time Pool Left Behind	s	7,20755	16,1133
	Cloud Segment 1		
Cloud Segment Duration	s	900	900
Pool Vaporization Rate	kg/s	0,220118	0,172255
Maximum Pool Radius	m	6,62773	6,62773

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	2,24742	2,24847
LFL (43000)	18,75	s	2,27624	2,27731
LFL Frac (43000)	18,75	s	2,27624	2,27731

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	20,7108	19,905
Radiation Level	18,43	kW/m2	15,5685	14,4245
Radiation Level	35	kW/m2	7,76871	7,62773

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

			Dia	Noite
Fireball Flame Status			No Hazard	No Hazard

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	2,27624	2,27731
Furthest Extent	43000	ppm	2,27624	2,27731

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	23576,8	23576,8

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,2	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	0	0
Overpressure	0,2	bar	0	0
Overpressure	0,3	bar	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\Etanol\H33(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

Vopak Área 06 - Consequência-final

GLP

H34

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\GLP\H34

User-Defined Data

Material

Material Identifier	PROPANE	
Type of Vessel	Padded Liquid	
Pressure Specification	Pressure specified	
Storage Pressure - gauge	8,52	bar
Temperature	25	degC
Volume Inventory	16,36	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	0	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	25,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	8034	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\GLP\H34

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Line rupture	
Inventory	8.033,63	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.01508E+000	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	7,26	bar
- Temperature	14,69	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	40,94	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	105,96	um
- Expanded Radius	0,03	m
- Velocity	212,64	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Line rupture	
Inventory	8.033,63	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.01508E+000	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	7,26	bar
- Temperature	14,69	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	40,94	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	105,96	um
- Expanded Radius	0,03	m
- Velocity	212,64	m/s

Consequence Results

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\GLP\H34

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (95000)	18,75	s	No Hazard	No Hazard
LFL (20000)	18,75	s	32,546	39,4864
LFL Frac (20000)	18,75	s	32,546	39,4864

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (95000)	18,75	s	0	0
LFL (20000)	18,75	s	0	0
LFL Frac (20000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\GLP\H34

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\GLP\H34

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	32,134	34,2603
Radiation Level	18,43	kW/m2	28,6937	30,8357
Radiation Level	35	kW/m2	25,9866	28,1228

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\GLP\H34

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\GLP\H34

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	20000	ppm	32,546	39,4864
Furthest Extent	20000	ppm	32,546	39,4864

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	20000	ppm	0	0
Furthest Extent	20000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\GLP\H34

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	31,5391	34,2666
Overpressure	0,2	bar	25,5899	27,3363
Overpressure	0,3	bar	23,2586	24,6205

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	3,84401	6,07666
Used Flammable Mass	kg	3,84401	6,07666
Overpressure Radius	m	16,5391	19,2666
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	3,84401	6,07666
Used Flammable Mass	kg	3,84401	6,07666
Overpressure Radius	m	10,5899	12,3363
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	3,84401	6,07666
Used Flammable Mass	kg	3,84401	6,07666
Overpressure Radius	m	8,25855	9,6205
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\GLP\H34

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H35

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\GLP\H35

User-Defined Data

Material

Material Identifier	PROPANE	
Type of Vessel	Padded Liquid	
Pressure Specification	Pressure specified	
Storage Pressure - gauge	8,52	bar
Temperature	25	degC
Volume Inventory	16,36	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	2,54	mm
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	8034	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\GLP\H35

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Leak	
Inventory	8.033,63	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	9.21354E-002	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,12	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	61,54	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	109,42	um
- Expanded Radius	0,00	m
- Velocity	213,26	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Leak	
Inventory	8.033,63	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	9.21354E-002	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,12	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	61,54	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	109,42	um
- Expanded Radius	0,00	m
- Velocity	213,26	m/s

Consequence Results

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\GLP\H35

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (95000)	18,75	s	No Hazard	No Hazard
LFL (20000)	18,75	s	No Hazard	No Hazard
LFL Frac (20000)	18,75	s	No Hazard	No Hazard

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (95000)	18,75	s	0	0
LFL (20000)	18,75	s	0	0
LFL Frac (20000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\GLP\H35

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\GLP\H35

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	6,43642	6,88875
Radiation Level	18,43	kW/m2	5,7473	6,20085
Radiation Level	35	kW/m2	5,31924	5,82624

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\GLP\H35

	Radiation Level (kW/m2)	
	Dia	Noite

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\GLP\H35

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H36

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\GLP\H36

User-Defined Data

Material

Material Identifier	PROPANE	
Type of Vessel	Padded Liquid	
Pressure Specification	Pressure specified	
Storage Pressure - gauge	8,52	bar
Temperature	25	degC
Volume Inventory	3,8	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	0	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	25,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1866	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\GLP\H36

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Line rupture	
Inventory	1.866,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.01508E+000	kg/s
Release Duration	618,89	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	7,26	bar
- Temperature	14,69	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	40,94	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	105,96	um
- Expanded Radius	0,03	m
- Velocity	212,64	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Line rupture	
Inventory	1.866,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.01508E+000	kg/s
Release Duration	618,89	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	7,26	bar
- Temperature	14,69	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	40,94	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	105,96	um
- Expanded Radius	0,03	m
- Velocity	212,64	m/s

Consequence Results

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\GLP\H36

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (95000)	18,75	s	No Hazard	No Hazard
LFL (20000)	18,75	s	32,546	39,4864
LFL Frac (20000)	18,75	s	32,546	39,4864

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (95000)	18,75	s	0	0
LFL (20000)	18,75	s	0	0
LFL Frac (20000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\GLP\H36

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\GLP\H36

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	32,134	34,2603
Radiation Level	18,43	kW/m2	28,6937	30,8357
Radiation Level	35	kW/m2	25,9866	28,1228

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\GLP\H36

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\GLP\H36

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	20000	ppm	32,546	39,4864
Furthest Extent	20000	ppm	32,546	39,4864

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	20000	ppm	0	0
Furthest Extent	20000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\GLP\H36

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	31,5391	34,2666
Overpressure	0,2	bar	25,5899	27,3363
Overpressure	0,3	bar	23,2586	24,6205

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	3,84401	6,07666
Used Flammable Mass	kg	3,84401	6,07666
Overpressure Radius	m	16,5391	19,2666
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	3,84401	6,07666
Used Flammable Mass	kg	3,84401	6,07666
Overpressure Radius	m	10,5899	12,3363
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	3,84401	6,07666
Used Flammable Mass	kg	3,84401	6,07666
Overpressure Radius	m	8,25855	9,6205
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\GLP\H36

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H37

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\GLP\H37

User-Defined Data

Material

Material Identifier	PROPANE	
Type of Vessel	Padded Liquid	
Pressure Specification	Pressure specified	
Storage Pressure - gauge	8,52	bar
Temperature	25	degC
Volume Inventory	3,8	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	2,54	mm
Building Wake Effect	None	
Tank Head	0	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1866	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\GLP\H37

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Leak	
Inventory	1.866,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	9.21354E-002	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,12	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	61,54	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	109,42	um
- Expanded Radius	0,00	m
- Velocity	213,26	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Leak	
Inventory	1.866,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	9.21354E-002	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,12	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	61,54	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	109,42	um
- Expanded Radius	0,00	m
- Velocity	213,26	m/s

Consequence Results

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\GLP\H37

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (95000)	18,75	s	No Hazard	No Hazard
LFL (20000)	18,75	s	No Hazard	No Hazard
LFL Frac (20000)	18,75	s	No Hazard	No Hazard

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (95000)	18,75	s	0	0
LFL (20000)	18,75	s	0	0
LFL Frac (20000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\GLP\H37

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\GLP\H37

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	6,43642	6,88875
Radiation Level	18,43	kW/m2	5,7473	6,20085
Radiation Level	35	kW/m2	5,31924	5,82624

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\GLP\H37

	Radiation Level (kW/m2)	
	Dia	Noite

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\GLP\H37

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H38

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\GLP\H38

User-Defined Data

Material

Material Identifier	PROPANE	
Type of Vessel	Pressurized Gas	
Pressure Specification	Pressure specified	
Storage Pressure - gauge	2	bar
Temperature	25	degC
Volume Inventory	3,8	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Vapor	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	38,1	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	21,39	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\GLP\H38

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Line rupture	
Inventory	21,39	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	3,01	bar
- Temperature	25,00	degC
- Fluid State	Pressurized gas	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.78113E-001	kg/s
Release Duration	27,49	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,62	bar
- Temperature	12,65	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	219,92	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	-3,34	degC
- Liquid Mass Fraction	0,00	fraction
- Droplet Diameter	0,00	um
- Expanded Radius	0,02	m
- Velocity	309,47	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Line rupture	
Inventory	21,39	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	3,01	bar
- Temperature	25,00	degC
- Fluid State	Pressurized gas	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.78113E-001	kg/s
Release Duration	27,49	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,62	bar
- Temperature	12,65	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	219,92	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	-3,34	degC
- Liquid Mass Fraction	0,00	fraction
- Droplet Diameter	0,00	um
- Expanded Radius	0,02	m
- Velocity	309,47	m/s

Consequence Results

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\GLP\H38

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (95000)	18,75	s	No Hazard	No Hazard
LFL (20000)	18,75	s	No Hazard	No Hazard
LFL Frac (20000)	18,75	s	No Hazard	No Hazard

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (95000)	18,75	s	0	0
LFL (20000)	18,75	s	0	0
LFL Frac (20000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\GLP\H38

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\GLP\H38

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	13,8325	13,4487
Radiation Level	18,43	kW/m2	12,1118	11,6763
Radiation Level	35	kW/m2	10,0858	7,43926

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\GLP\H38

	Radiation Level (kW/m2)	
	Dia	Noite

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\GLP\H38

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H39

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\GLP\H39

User-Defined Data

Material

Material Identifier	PROPANE	
Type of Vessel	Pressurized Gas	
Pressure Specification	Pressure specified	
Storage Pressure - gauge	2	bar
Temperature	25	degC
Volume Inventory	3,8	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Vapor	
Hole Diameter	3,81	mm
Building Wake Effect	None	

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	21,39	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\GLP\H39

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Leak	
Inventory	21,39	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	3,01	bar
- Temperature	25,00	degC
- Fluid State	Pressurized gas	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.78113E-003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,75	bar
- Temperature	5,78	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	237,95	m/s
- Discharge Coefficient	0,83	
Final data (after atmospheric expansion):		
- Temperature	-12,00	degC
- Liquid Mass Fraction	0,00	fraction
- Droplet Diameter	0,00	um
- Expanded Radius	0,00	m
- Velocity	328,05	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Leak	
Inventory	21,39	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	3,01	bar
- Temperature	25,00	degC
- Fluid State	Pressurized gas	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.78113E-003	kg/s
Release Duration	900,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,75	bar
- Temperature	5,78	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	237,95	m/s
- Discharge Coefficient	0,83	
Final data (after atmospheric expansion):		
- Temperature	-12,00	degC
- Liquid Mass Fraction	0,00	fraction
- Droplet Diameter	0,00	um
- Expanded Radius	0,00	m
- Velocity	328,05	m/s

Consequence Results

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\GLP\H39

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (95000)	18,75	s	No Hazard	No Hazard
LFL (20000)	18,75	s	No Hazard	No Hazard
LFL Frac (20000)	18,75	s	No Hazard	No Hazard

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (95000)	18,75	s	0	0
LFL (20000)	18,75	s	0	0
LFL Frac (20000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\GLP\H39

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\GLP\H39

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	Not Reached	Not Reached
Radiation Level	18,43	kW/m2	Not Reached	Not Reached
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\GLP\H39

	Radiation Level (kW/m2)	
	Dia	Noite

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\GLP\H39

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H40

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\GLP\H40

User-Defined Data

Material

Material Identifier	PROPANE	
Type of Vessel	Padded Liquid	
Pressure Specification	Pressure specified	
Storage Pressure - gauge	8,52	bar
Temperature	25	degC
Volume Inventory	16,36	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	8034	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]

	[Tail Time	1800	s]
	[Set averaging time equal to exposure time	Use a fixed averaging time]	
	[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\GLP\H40

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Catastrophic rupture	
Inventory	8.033,63	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	102,48	um
- Expanded Radius	n/a	m
- Velocity	204,97	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Catastrophic rupture	
Inventory	8.033,63	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	102,48	um
- Expanded Radius	n/a	m
- Velocity	204,97	m/s

Consequence Results

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\GLP\H40

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (95000)	18,75	s	20,6232	19,5376
LFL (20000)	18,75	s	61,0413	47,1832
LFL Frac (20000)	18,75	s	61,0413	47,1832

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (95000)	18,75	s	0	0
LFL (20000)	18,75	s	0	0
LFL Frac (20000)	18,75	s	0	0

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\GLP\H40

	Dia	Noite
Fireball Flame Status	Hazard	Hazard

Radiation Effects: Fireball Ellipse

Path: \Vopak Área 06 - Consequência-final\GLP\H40

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	199,87	204,346
Radiation Level	18,43	kW/m2	127,092	130,666
Radiation Level	35	kW/m2	50,9449	56,3188

Radiation Effects: Fireball Distance

Path: \Vopak Área 06 - Consequência-final\GLP\H40

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\GLP\H40

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	20000	ppm	61,0413	47,1832
Furthest Extent	20000	ppm	61,0413	47,1832

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	20000	ppm	0	0
Furthest Extent	20000	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\GLP\H40

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	8033,63	8033,63

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	211,456	211,456
Overpressure	0,2	bar	135,394	135,394
Overpressure	0,3	bar	105,588	105,588

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	8033,63	8033,63
Overpressure	0,2	bar	8033,63	8033,63
Overpressure	0,3	bar	8033,63	8033,63

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\GLP\H40

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	188,194	179,523
Overpressure	0,2	bar	123,908	118,348
Overpressure	0,3	bar	98,716	94,3751

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4850,18	4179,55
Used Flammable Mass	kg	4850,18	4179,55
Overpressure Radius	m	178,719	170,07
Distance to:			
- Ignition Source	m	40	40
- Cloud Front/Centre	m	9,47555	9,4533
- Explosion Centre	m	9,47555	9,4533

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4850,18	4179,55
Used Flammable Mass	kg	4850,18	4179,55
Overpressure Radius	m	114,432	108,894
Distance to:			
- Ignition Source	m	40	40
- Cloud Front/Centre	m	9,47555	9,4533
- Explosion Centre	m	9,47555	9,4533

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	4850,18	4179,55
Used Flammable Mass	kg	4850,18	4179,55
Overpressure Radius	m	89,2404	84,9218
Distance to:			
- Ignition Source	m	40	40
- Cloud Front/Centre	m	9,47555	9,4533
- Explosion Centre	m	9,47555	9,4533

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\GLP\H40

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

H41

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\GLP\H41

User-Defined Data

Material

Material Identifier	PROPANE	
Type of Vessel	Padded Liquid	
Pressure Specification	Pressure specified	
Storage Pressure - gauge	8,52	bar
Temperature	25	degC
Volume Inventory	3,8	m3

Scenario

Scenario Type	Catastrophic rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1866	kg
Use Burst Pressure	No - Use release pressure for fireball	

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]

	[Tail Time	1800	s]
	[Set averaging time equal to exposure time	Use a fixed averaging time]	
	[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	1424	m
North(1)	-1428	m

Path: \Vopak Área 06 - Consequência-final\GLP\H41

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Catastrophic rupture	
Inventory	1.866,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	102,48	um
- Expanded Radius	n/a	m
- Velocity	204,97	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	PROPANE	
Scenario	Catastrophic rupture	
Inventory	1.866,00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9,53	bar
- Temperature	25,00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	-42,07	degC
- Liquid Mass Fraction	0,66	fraction
- Droplet Diameter	102,48	um
- Expanded Radius	n/a	m
- Velocity	204,97	m/s

Consequence Results

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\GLP\H41

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (95000)	18,75	s	12,2845	11,6075
LFL (20000)	18,75	s	35,0687	26,0569
LFL Frac (20000)	18,75	s	35,0687	26,0569

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (95000)	18,75	s	0	0
LFL (20000)	18,75	s	0	0
LFL Frac (20000)	18,75	s	0	0

Fireball Hazard

Path: \Vopak Área 06 - Consequência-final\GLP\H41

	Dia	Noite
Fireball Flame Status	Hazard	Hazard

Radiation Effects: Fireball Ellipse

Path: \Vopak Área 06 - Consequência-final\GLP\H41

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	119,349	121,766
Radiation Level	18,43	kW/m2	74,2194	76,179
Radiation Level	35	kW/m2	23,6509	26,5385

Radiation Effects: Fireball Distance

Path: \Vopak Área 06 - Consequência-final\GLP\H41

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\GLP\H41

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	20000	ppm	35,0687	26,0569
Furthest Extent	20000	ppm	35,0687	26,0569

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	20000	ppm	0	0
Furthest Extent	20000	ppm	0	0

Explosion Effects: Early Explosion

Path: \Vopak Área 06 - Consequência-final\GLP\H41

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Dia	Noite
Supplied Flammable Mass		kg	1866	1866

			Distance (m) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	129,983	129,983
Overpressure	0,2	bar	83,2274	83,2274
Overpressure	0,3	bar	64,9053	64,9053

			Used Mass (kg) at Overpressure Levels	
			Dia	Noite
Overpressure	0,1	bar	1866	1866
Overpressure	0,2	bar	1866	1866
Overpressure	0,3	bar	1866	1866

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\GLP\H41

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	110,658	113,611
Overpressure	0,2	bar	71,8624	73,564
Overpressure	0,3	bar	56,6597	57,871

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	1065,96	1172,47
Used Flammable Mass	kg	1065,96	1172,47
Overpressure Radius	m	107,853	111,331
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	2,8051	2,27931
- Explosion Centre	m	2,8051	2,27931

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	1065,96	1172,47
Used Flammable Mass	kg	1065,96	1172,47
Overpressure Radius	m	69,0573	71,2847
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	2,8051	2,27931
- Explosion Centre	m	2,8051	2,27931

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	1065,96	1172,47
Used Flammable Mass	kg	1065,96	1172,47
Overpressure Radius	m	53,8546	55,5917
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	2,8051	2,27931
- Explosion Centre	m	2,8051	2,27931

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\GLP\H41

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

Vopak Área 06 - Consequência

GLP

H40

Base Case

Data

Weather: **Global Weathers\Dia**
Speed: **3,00** **m/s** **Stability: C**

\Vopak Área 06 - Consequência\GLP\H40

Flame Data

User-Defined Quantities

Calculation Method	DNV Recommended	
Material	PROPANE	
Ambient Temperature	25,00	degC
Ambient Relative Humidity	0,80	fraction
Mass Modifcation Factor	3,00	
Potential Fireball Mass	8033.63	kg
Vapor Fraction	0,34	fraction
Actual Flammable Mass	8033.63	kg
Vessel Burst Pressure (gauge)	8,52	bar

Input and/or Output Quantities	**Input**	**Output**	
Fireball Radius		60,21	m
Fireball Duration		8,83	s
Flame Emissive Power		245,18	kW/m2
Fireball Lift Off Height		120,41	m

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	60,21	0,00	0,00
0,00	63,84	20,59	0,00
0,00	74,29	38,70	0,00
0,00	90,31	52,14	0,00
0,00	109,96	59,29	0,00
0,00	130,87	59,29	0,00
0,00	150,52	52,14	0,00
0,00	166,53	38,70	0,00
0,00	176,99	20,59	0,00
0,00	180,62	0,00	0,00

Ellipse Results

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	8,83	s
Effect Height	0,00	m

Radiation Intensity Ellipse

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,00	%
View Factor	0,04	
Probit Level	0,57	
Dose Level	1.857.753,92	(W/m2)^Probit N.s
Downwind semi-axis (A)	199,87	m
Crosswind semi-axis (B)	199,87	m
Offset Ratio (D)	0,00	
Effect Distance	199,87	m
Area	125.499,90	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	1,13	%
View Factor	0,08	
Probit Level	2,72	
Dose Level	4.294.785,83	(W/m2)^Probit N.s
Downwind semi-axis (A)	127,09	m
Crosswind semi-axis (B)	127,09	m
Offset Ratio (D)	0,00	
Effect Distance	127,09	m
Area	50.745,06	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	46,33	%
View Factor	0,14	
Probit Level	4,91	
Dose Level	10.100.026,32	(W/m2)^Probit N.s
Downwind semi-axis (A)	50,94	m
Crosswind semi-axis (B)	50,94	m
Offset Ratio (D)	0,00	
Effect Distance	50,94	m
Area	8.153,36	m2

Radiation Lethality Ellipse

Lethality Level:	**1,00**	%
Intensity Level	18,19	kW/m2
View Factor	0,07	
Probit Level	2,67	
Dose Level	4.219.984,47	(W/m2)^Probit N.s
Downwind semi-axis (A)	128,54	m
Crosswind semi-axis (B)	128,54	m
Offset Ratio (D)	0,00	
Effect Distance	128,54	m
Area	51.910,77	m2
Lethality Level:	**50,00**	%
Intensity Level	35,96	kW/m2
View Factor	0,15	
Probit Level	5,00	
Dose Level	10.470.272,18	(W/m2)^Probit N.s
Downwind semi-axis (A)	46,71	m
Crosswind semi-axis (B)	46,71	m
Offset Ratio (D)	0,00	
Effect Distance	46,71	m
Area	6.854,98	m2
Lethality Level:	**99,00**	%
Intensity Level	71,09	kW/m2
View Factor	0,29	
Probit Level	7,33	
Dose Level	25.978.582,16	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	199,87	m
Angle from Wind Direction	0,00	deg
Height above Origin	0,00	m
Observer Inclination	Variable	deg
Observer Orientation	Variable	deg

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			41,99		
4,08			41,93		
8,16			41,77		
12,24			41,51		
16,32			41,15		
20,39			40,69		
24,47			40,15		
28,55			39,52		
32,63			38,82		
36,71			38,05		
40,79			37,23		
44,87			36,36		
48,95			35,46		
53,03			34,79		
57,11			33,81		
61,18			32,82		
65,26			31,82		
69,34			30,82		
73,42			29,82		
77,50			28,83		
81,58			27,86		
85,66			26,73		
89,74			25,80		
93,82			24,89		
97,90			24,01		
101,97			23,15		
106,05			22,31		
110,13			21,50		
114,21			20,72		
118,29			19,97		
122,37			19,24		
126,45			18,54		
130,53			17,86		
134,61			17,22		
138,69			16,60		
142,76			16,00		
146,84			15,43		
150,92			14,88		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
155,00			14,35		
159,08			13,85		
163,16			13,36		
167,24			12,90		
171,32			12,46		
175,40			12,03		
179,48			11,62		
183,55			11,23		
187,63			10,86		
191,71			10,50		
195,79			10,16		
199,87			9,83		

Weather: **Global Weathers\Noite**

Speed: **2,00** **m/s** **Stability: E**

\Vopak Área 06 - Consequência\GLP\H40

Flame Data

User-Defined Quantities

Calculation Method	DNV Recommended	
Material	PROPANE	
Ambient Temperature	20,00	degC
Ambient Relative Humidity	0,80	fraction
Mass Modifcation Factor	3,00	
Potential Fireball Mass	8033.63	kg
Vapor Fraction	0,34	fraction
Actual Flammable Mass	8033.63	kg
Vessel Burst Pressure (gauge)	8,52	bar

Input and/or Output Quantities	**Input**	**Output**	
Fireball Radius		60,21	m
Fireball Duration		8,83	s
Flame Emissive Power		245,18	kW/m2
Fireball Lift Off Height		120,41	m

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	60,21	0,00	0,00
0,00	63,84	20,59	0,00
0,00	74,29	38,70	0,00
0,00	90,31	52,14	0,00
0,00	109,96	59,29	0,00
0,00	130,87	59,29	0,00
0,00	150,52	52,14	0,00
0,00	166,53	38,70	0,00
0,00	176,99	20,59	0,00
0,00	180,62	0,00	0,00

Ellipse Results

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	8,83	s
Effect Height	0,00	m

Radiation Intensity Ellipse

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,00	%
View Factor	0,04	
Probit Level	0,57	
Dose Level	1.857.753,92	(W/m2)^Probit N.s
Downwind semi-axis (A)	204,35	m
Crosswind semi-axis (B)	204,34	m
Offset Ratio (D)	0,00	
Effect Distance	204,35	m
Area	131.182,99	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	1,13	%
View Factor	0,08	
Probit Level	2,72	
Dose Level	4.294.785,83	(W/m2)^Probit N.s
Downwind semi-axis (A)	130,67	m
Crosswind semi-axis (B)	130,66	m
Offset Ratio (D)	0,00	
Effect Distance	130,67	m
Area	53.637,50	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	46,33	%
View Factor	0,14	
Probit Level	4,91	
Dose Level	10.100.026,32	(W/m2)^Probit N.s
Downwind semi-axis (A)	56,32	m
Crosswind semi-axis (B)	56,32	m
Offset Ratio (D)	0,00	
Effect Distance	56,32	m
Area	9.964,51	m2

Radiation Lethality Ellipse

Lethality Level:	**1,00**	%
Intensity Level	18,19	kW/m2
View Factor	0,07	
Probit Level	2,67	
Dose Level	4.219.984,47	(W/m2)^Probit N.s
Downwind semi-axis (A)	132,13	m
Crosswind semi-axis (B)	132,13	m
Offset Ratio (D)	0,00	
Effect Distance	132,13	m
Area	54.844,82	m2
Lethality Level:	**50,00**	%
Intensity Level	35,96	kW/m2
View Factor	0,15	
Probit Level	5,00	
Dose Level	10.470.272,18	(W/m2)^Probit N.s
Downwind semi-axis (A)	51,22	m
Crosswind semi-axis (B)	52,39	m
Offset Ratio (D)	0,00	
Effect Distance	52,39	m
Area	8.430,46	m2
Lethality Level:	**99,00**	%
Intensity Level	71,09	kW/m2
View Factor	0,29	
Probit Level	7,33	
Dose Level	25.978.582,16	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	204,35	m
Angle from Wind Direction	0,00	deg
Height above Origin	0,00	m
Observer Inclination	Variable	deg
Observer Orientation	Variable	deg

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			43,17		
4,17			43,11		
8,34			42,94		
12,51			42,66		
16,68			42,28		
20,85			41,79		
25,02			41,21		
29,19			40,54		
33,36			39,80		
37,53			38,98		
41,70			38,11		
45,87			37,19		
50,04			36,23		
54,21			35,52		
58,38			34,49		
62,55			33,45		
66,73			32,40		
70,90			31,35		
75,07			30,31		
79,24			29,28		
83,41			28,27		
87,58			27,10		
91,75			26,14		
95,92			25,20		
100,09			24,28		
104,26			23,39		
108,43			22,53		
112,60			21,70		
116,77			20,90		
120,94			20,12		
125,11			19,38		
129,28			18,66		
133,45			17,97		
137,62			17,31		
141,79			16,68		
145,96			16,07		
150,13			15,49		
154,30			14,93		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
158,47			14,40		
162,64			13,89		
166,81			13,40		
170,98			12,93		
175,15			12,48		
179,32			12,05		
183,49			11,64		
187,66			11,24		
191,83			10,87		
196,01			10,51		
200,18			10,16		
204,35			9,83		

Vopak Área 06 - Consequência

GLP

H41

Base Case

Data

Weather: **Global Weathers\Dia**
Speed: **3,00** **m/s** **Stability: C**

\Vopak Área 06 - Consequência\GLP\H41

Flame Data

User-Defined Quantities

Calculation Method	DNV Recommended	
Material	PROPANE	
Ambient Temperature	25,00	degC
Ambient Relative Humidity	0,80	fraction
Mass Modifcation Factor	3,00	
Potential Fireball Mass	1866.00	kg
Vapor Fraction	0,34	fraction
Actual Flammable Mass	1866.00	kg
Vessel Burst Pressure (gauge)	8,52	bar

Input and/or Output Quantities	**Input**	**Output**	
Fireball Radius		37,46	m
Fireball Duration		6,04	s
Flame Emissive Power		214,99	kW/m2
Fireball Lift Off Height		74,92	m

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	37,46	0,00	0,00
0,00	39,72	12,81	0,00
0,00	46,23	24,08	0,00
0,00	56,19	32,44	0,00
0,00	68,42	36,89	0,00
0,00	81,43	36,89	0,00
0,00	93,66	32,44	0,00
0,00	103,62	24,08	0,00
0,00	110,13	12,81	0,00
0,00	112,39	0,00	0,00

Ellipse Results

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	6,04	s
Effect Height	0,00	m

Radiation Intensity Ellipse

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,00	%
View Factor	0,05	
Probit Level	-0,40	
Dose Level	1.271.008,03	(W/m2)^Probit N.s
Downwind semi-axis (A)	119,35	m
Crosswind semi-axis (B)	119,35	m
Offset Ratio (D)	0,00	
Effect Distance	119,35	m
Area	44.748,84	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	0,06	%
View Factor	0,09	
Probit Level	1,75	
Dose Level	2.938.337,09	(W/m2)^Probit N.s
Downwind semi-axis (A)	74,22	m
Crosswind semi-axis (B)	74,22	m
Offset Ratio (D)	0,00	
Effect Distance	74,22	m
Area	17.306,12	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	14,37	%
View Factor	0,16	
Probit Level	3,94	
Dose Level	6.910.072,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	23,65	m
Crosswind semi-axis (B)	23,65	m
Offset Ratio (D)	0,00	
Effect Distance	23,65	m
Area	1.757,29	m2

Radiation Lethality Ellipse

Lethality Level:	**1,00**	%
Intensity Level	24,18	kW/m2
View Factor	0,11	
Probit Level	2,67	
Dose Level	4.219.984,47	(W/m2)^Probit N.s
Downwind semi-axis (A)	55,23	m
Crosswind semi-axis (B)	55,23	m
Offset Ratio (D)	0,00	
Effect Distance	55,23	m
Area	9.583,06	m2
Lethality Level:	**50,00**	%
Intensity Level	47,80	kW/m2
View Factor	0,22	
Probit Level	5,00	
Dose Level	10.470.272,18	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2
Lethality Level:	**99,00**	%
Intensity Level	94,50	kW/m2
View Factor	0,44	
Probit Level	7,33	
Dose Level	25.978.582,16	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	119,35	m
Angle from Wind Direction	0,00	deg
Height above Origin	0,00	m
Observer Inclination	Variable	deg
Observer Orientation	Variable	deg

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			38,84		
2,44			38,79		
4,87			38,66		
7,31			38,44		
9,74			38,13		
12,18			37,74		
14,61			37,28		
17,05			36,75		
19,49			36,15		
21,92			35,50		
24,36			34,79		
26,79			34,04		
29,23			33,26		
31,66			32,44		
34,10			31,85		
36,54			30,98		
38,97			30,11		
41,41			29,22		
43,84			28,34		
46,28			27,46		
48,71			26,59		
51,15			25,73		
53,59			24,73		
56,02			23,91		
58,46			23,11		
60,89			22,33		
63,33			21,57		
65,76			20,83		
68,20			20,11		
70,64			19,41		
73,07			18,74		
75,51			18,09		
77,94			17,46		
80,38			16,86		
82,81			16,28		
85,25			15,72		
87,69			15,18		
90,12			14,66		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
92,56			14,16		
94,99			13,68		
97,43			13,22		
99,86			12,78		
102,30			12,36		
104,74			11,95		
107,17			11,56		
109,61			11,18		
112,04			10,83		
114,48			10,48		
116,91			10,15		
119,35			9,83		

Weather: **Global Weathers\Noite**

Speed: **2,00** **m/s** **Stability: E**

\Vopak Área 06 - Consequência\GLP\H41

Flame Data

User-Defined Quantities

Calculation Method	DNV Recommended	
Material	PROPANE	
Ambient Temperature	20,00	degC
Ambient Relative Humidity	0,80	fraction
Mass Modifcation Factor	3,00	
Potential Fireball Mass	1866.00	kg
Vapor Fraction	0,34	fraction
Actual Flammable Mass	1866.00	kg
Vessel Burst Pressure (gauge)	8,52	bar

Input and/or Output Quantities	**Input**	**Output**	
Fireball Radius		37,46	m
Fireball Duration		6,04	s
Flame Emissive Power		214,99	kW/m2
Fireball Lift Off Height		74,92	m

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	37,46	0,00	0,00
0,00	39,72	12,81	0,00
0,00	46,23	24,08	0,00
0,00	56,19	32,44	0,00
0,00	68,42	36,89	0,00
0,00	81,43	36,89	0,00
0,00	93,66	32,44	0,00
0,00	103,62	24,08	0,00
0,00	110,13	12,81	0,00
0,00	112,39	0,00	0,00

Ellipse Results

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	6,04	s
Effect Height	0,00	m

Radiation Intensity Ellipse

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,00	%
View Factor	0,05	
Probit Level	-0,40	
Dose Level	1.271.008,03	(W/m2)^Probit N.s
Downwind semi-axis (A)	121,76	m
Crosswind semi-axis (B)	121,77	m
Offset Ratio (D)	0,00	
Effect Distance	121,77	m
Area	46.579,44	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	0,06	%
View Factor	0,09	
Probit Level	1,75	
Dose Level	2.938.337,09	(W/m2)^Probit N.s
Downwind semi-axis (A)	76,18	m
Crosswind semi-axis (B)	76,18	m
Offset Ratio (D)	0,00	
Effect Distance	76,18	m
Area	18.232,28	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	14,37	%
View Factor	0,16	
Probit Level	3,94	
Dose Level	6.910.072,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	26,54	m
Crosswind semi-axis (B)	26,54	m
Offset Ratio (D)	0,00	
Effect Distance	26,54	m
Area	2.212,40	m2

Radiation Lethality Ellipse

Lethality Level:	**1,00**	%
Intensity Level	24,18	kW/m2
View Factor	0,11	
Probit Level	2,67	
Dose Level	4.219.984,47	(W/m2)^Probit N.s
Downwind semi-axis (A)	57,18	m
Crosswind semi-axis (B)	57,18	m
Offset Ratio (D)	0,00	
Effect Distance	57,18	m
Area	10.271,20	m2
Lethality Level:	**50,00**	%
Intensity Level	47,80	kW/m2
View Factor	0,22	
Probit Level	5,00	
Dose Level	10.470.272,18	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2
Lethality Level:	**99,00**	%
Intensity Level	94,50	kW/m2
View Factor	0,44	
Probit Level	7,33	
Dose Level	25.978.582,16	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	121,76	m
Angle from Wind Direction	0,00	deg
Height above Origin	0,00	m
Observer Inclination	Variable	deg
Observer Orientation	Variable	deg

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			39,81		
2,48			39,76		
4,97			39,62		
7,45			39,39		
9,94			39,06		
12,42			38,65		
14,91			38,16		
17,39			37,60		
19,88			36,96		
22,36			36,27		
24,85			35,53		
27,33			34,74		
29,82			33,92		
32,30			33,32		
34,79			32,43		
37,27			31,52		
39,76			30,61		
42,24			29,69		
44,73			28,77		
47,21			27,86		
49,70			26,95		
52,18			26,06		
54,67			25,03		
57,15			24,19		
59,64			23,36		
62,12			22,55		
64,61			21,77		
67,09			21,01		
69,58			20,27		
72,06			19,56		
74,55			18,87		
77,03			18,20		
79,52			17,56		
82,00			16,95		
84,49			16,36		
86,97			15,78		
89,46			15,24		
91,94			14,71		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
94,43			14,20		
96,91			13,72		
99,40			13,25		
101,88			12,81		
104,37			12,38		
106,85			11,97		
109,34			11,57		
111,82			11,20		
114,31			10,83		
116,79			10,48		
119,28			10,15		
121,76			9,83		

Vopak Área 06 - Consequência-final

SISTEMA DE SEGURANCA 30s

SH01(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	3	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	101,6	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	138	m2
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,358E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.21155E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	5,04	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	9.269,77	um
- Expanded Radius	0,05	m
- Velocity	5,04	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.21155E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	5,04	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	9.091,59	um
- Expanded Radius	0,05	m
- Velocity	5,04	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,996848	0,997308
Maximum Pool Radius		m	3,59782	3,59681

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	1,89298	1,92337
LFL (43000)	18,75	s	3,04452	4,45773
LFL Frac (43000)	18,75	s	3,04452	4,45773

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	16,3659	16,4657
Radiation Level	18,43	kW/m2	14,8369	14,852
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

	Radiation Level (kW/m2)
	Dia / Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	13,8743	13,3084
Radiation Level	18,43	kW/m2	10,0677	9,53263
Radiation Level	35	kW/m2	6,5082	6,52241

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

	Radiation Level (kW/m2)
	Dia / Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	13,8743	13,3084
Radiation Level	18,43	kW/m2	10,0677	9,53263
Radiation Level	35	kW/m2	6,5082	6,52241

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

	Radiation Level (kW/m2)
	Dia / Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	3,04452	4,45773
Furthest Extent	43000	ppm	3,04452	4,45773

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH01(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	3	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	101,6	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	138	m2
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,968E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	2.58871E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	4,87	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	8.058,15	um
- Expanded Radius	0,05	m
- Velocity	4,87	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	2.58871E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	4,87	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	7.903,27	um
- Expanded Radius	0,05	m
- Velocity	4,87	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,982633	0,984965
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	30	
Pool Vaporization Rate		kg/s	0,12429	
Total Vapor Flowrate		kg/s	0,573864	0,389215
Maximum Pool Radius		m	3,49932	3,50225

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	4,41425	5,3009
LFL (10500)	18,75	s	14,5077	13,3772
LFL Frac (10500)	18,75	s	14,5077	13,3772

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	28,7023	29,06
Radiation Level	18,43	kW/m2	25,6191	26,0029
Radiation Level	35	kW/m2	23,1277	23,4425

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	22,0121	20,3344
Radiation Level	18,43	kW/m2	13,9827	12,934
Radiation Level	35	kW/m2	7,60629	7,29941

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	22,0121	20,3344
Radiation Level	18,43	kW/m2	13,9827	12,934
Radiation Level	35	kW/m2	7,60629	7,29941

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	14,5077	13,3772
Furthest Extent	10500	ppm	14,5077	13,3772

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	16,8773	18,0108
Overpressure	0,2	bar	12,605	13,3307
Overpressure	0,3	bar	10,9308	11,4968

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	1,47451	1,93824
Used Flammable Mass	kg	1,47451	1,93824
Overpressure Radius	m	11,8773	13,0108
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5	5

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	1,47451	1,93824
Used Flammable Mass	kg	1,47451	1,93824
Overpressure Radius	m	7,60496	8,33074
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5	5

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	1,47451	1,93824
Used Flammable Mass	kg	1,47451	1,93824
Overpressure Radius	m	5,93076	6,49677
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH01(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH02(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	10,16	mm
Building Wake Effect	None	
Tank Head	3	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	138	m2
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,358E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	23.576,85	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.21155E-001	kg/s
Release Duration	30,00	s

Orifice or pipe exit data (before atmospheric expansion):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,40	m/s
- Discharge Coefficient	0,60	

Final data (after atmospheric expansion):

- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	3.337,34	um
- Expanded Radius	0,00	m
- Velocity	8,40	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	23.576,85	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.21155E-001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,40	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	3.273,19	um
- Expanded Radius	0,00	m
- Velocity	8,40	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,992644	0,992652
Maximum Pool Radius		m	0,359045	0,358383

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	No Hazard
LFL (43000)	18,75	s	1,94134	1,95684
LFL Frac (43000)	18,75	s	1,94134	1,95684

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	3,69578	4,0108
Radiation Level	18,43	kW/m2	Not Reached	Not Reached
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	3,3768	3,38769
Radiation Level	18,43	kW/m2	3,3768	3,38769
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	3,3768	3,38769
Radiation Level	18,43	kW/m2	3,3768	3,38769
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	1,94134	1,95684
Furthest Extent	43000	ppm	1,94134	1,95684

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH02(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	10,16	mm
Building Wake Effect	None	
Tank Head	3	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	138	m2
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,968E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	2.58871E-001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,99	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,11	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,99	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	2.901,31	um
- Expanded Radius	0,00	m
- Velocity	8,11	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	2.58871E-001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,99	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,11	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,99	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	2.845,55	um
- Expanded Radius	0,00	m
- Velocity	8,11	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,960717	0,960669
Maximum Pool Radius		m	0,345853	0,345127

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	No Hazard	No Hazard
LFL (10500)	18,75	s	1,84758	1,83799
LFL Frac (10500)	18,75	s	1,84758	1,83799

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	5,22742	5,64378
Radiation Level	18,43	kW/m2	4,70725	5,14453
Radiation Level	35	kW/m2	4,70725	5,14453

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	5,85051	5,66468
Radiation Level	18,43	kW/m2	5,04575	4,76119
Radiation Level	35	kW/m2	3,54912	3,39421

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	5,85051	5,66468
Radiation Level	18,43	kW/m2	5,04575	4,76119
Radiation Level	35	kW/m2	3,54912	3,39421

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	1,84758	1,83799
Furthest Extent	10500	ppm	1,84758	1,83799

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH02(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH03(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	3	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	152,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	2,358E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.22598E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	5,04	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	9.269,77	um
- Expanded Radius	0,08	m
- Velocity	5,04	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.22598E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	5,04	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	9.091,59	um
- Expanded Radius	0,08	m
- Velocity	5,04	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,997611	0,998331
Maximum Pool Radius		m	5,39946	5,39906

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	1,9598	1,97542
LFL (43000)	18,75	s	4,99666	5,37314
LFL Frac (43000)	18,75	s	4,99666	5,37314

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	20,6446	19,0455
Radiation Level	18,43	kW/m2	18,7271	16,9029
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

	Radiation Level (kW/m2)
	Dia / Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	19,1967	18,4908
Radiation Level	18,43	kW/m2	14,7184	13,7531
Radiation Level	35	kW/m2	8,36858	8,3844

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

	Radiation Level (kW/m2)
	Dia / Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	19,1967	18,4908
Radiation Level	18,43	kW/m2	14,7184	13,7531
Radiation Level	35	kW/m2	8,36858	8,3844

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

	Radiation Level (kW/m2)
	Dia / Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	4,99666	5,37314
Furthest Extent	43000	ppm	4,99666	5,37314

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH03(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	3	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	152,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,968E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	5.82459E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	4,87	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	8.058,15	um
- Expanded Radius	0,08	m
- Velocity	4,87	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	5.82459E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,01	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	4,87	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,01	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	7.903,27	um
- Expanded Radius	0,08	m
- Velocity	4,87	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,986062	0,989323
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	30	30
Pool Vaporization Rate		kg/s	0,27345	0,219788
Total Vapor Flowrate		kg/s	1,08527	0,841659
Maximum Pool Radius		m	5,25988	5,26749

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	5,97523	7,32553
LFL (10500)	18,75	s	18,2207	17,3283
LFL Frac (10500)	18,75	s	18,2207	17,3283

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	37,1811	35,6757
Radiation Level	18,43	kW/m2	33,1322	31,8876
Radiation Level	35	kW/m2	29,8753	28,7355

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	25,3671	23,0772
Radiation Level	18,43	kW/m2	14,4277	13,4604
Radiation Level	35	kW/m2	8,14303	8,16355

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	25,3671	23,0772
Radiation Level	18,43	kW/m2	14,4277	13,4604
Radiation Level	35	kW/m2	8,14303	8,16355

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	18,2207	17,3283
Furthest Extent	10500	ppm	18,2207	17,3283

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	19,5888	21,4708
Overpressure	0,2	bar	14,3411	15,5461
Overpressure	0,3	bar	12,2847	13,2244

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	2,73246	3,93219
Used Flammable Mass	kg	2,73246	3,93219
Overpressure Radius	m	14,5888	16,4708
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5	5

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	2,73246	3,93219
Used Flammable Mass	kg	2,73246	3,93219
Overpressure Radius	m	9,34111	10,5461
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5	5

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	2,73246	3,93219
Used Flammable Mass	kg	2,73246	3,93219
Overpressure Radius	m	7,28471	8,22443
Distance to:			
- Ignition Source	m	10	10
- Cloud Front/Centre	m	10	10
- Explosion Centre	m	5	5

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH03(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH04(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

User-Defined Data

Material			
	Material Identifier	ETHANOL	
	Type of Vessel	Unpressurized (at atmospheric pressure)	
	Pressure Specification	Pressure not used	
	Temperature	25	degC
	Volume Inventory	30	m3
Scenario			
	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	15,24	mm
	Building Wake Effect	None	
	Tank Head	3	m
Location			
	Elevation	0,5	m
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	User-Defined (Land)]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Outdoor			
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	TNT	
	Jet Fire Method	Cone Model	
Dispersion			
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	2,358E4	kg
Fireball Parameters			
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parameters			
	[Indoor Calculations	Unselected]	
	[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.22598E-001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,40	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	3.337,34	um
- Expanded Radius	0,01	m
- Velocity	8,40	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	23.576,85	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	7.22598E-001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,40	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	25,00	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	3.273,19	um
- Expanded Radius	0,01	m
- Velocity	8,40	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,992932	0,993017
Maximum Pool Radius		m	0,538511	0,537765

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	No Hazard	2,1978
LFL (43000)	18,75	s	2,20086	2,22368
LFL Frac (43000)	18,75	s	2,20086	2,22368

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	4,71696	5,13255
Radiation Level	18,43	kW/m2	Not Reached	Not Reached
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	4,09843	3,98827
Radiation Level	18,43	kW/m2	3,77157	3,79738
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	4,09843	3,98827
Radiation Level	18,43	kW/m2	3,77157	3,79738
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	2,20086	2,22368
Furthest Extent	43000	ppm	2,20086	2,22368

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH04(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	30	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	15,24	mm
Building Wake Effect	None	
Tank Head	3	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	No bund present	
[Type of Bund Surface	User-Defined (Land)]	
[Bund Height	0	m]
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	1,968E4	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	

[Building Exchange Rate		4	/hr]
[Tail Time		1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]		
[Cut-off fraction of toxic load for exposure time calculation		0,05	fraction]
[Cut-off concentration for exposure time calculations		0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	5.82459E-001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,99	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,11	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,99	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	2.901,31	um
- Expanded Radius	0,01	m
- Velocity	8,11	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	19.680,79	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	5.82459E-001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,99	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	8,11	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,99	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	2.845,55	um
- Expanded Radius	0,01	m
- Velocity	8,11	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,96214	0,962443
Maximum Pool Radius		m	0,518963	0,518217

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	2,05248	2,05761
LFL (10500)	18,75	s	2,07296	2,09495
LFL Frac (10500)	18,75	s	2,07296	2,09495

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	7,45202	8,00044
Radiation Level	18,43	kW/m2	6,64442	7,14503
Radiation Level	35	kW/m2	6,11462	6,6959

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

			Dia	Noite
Early Pool Fire Status			Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	7,74341	7,46842
Radiation Level	18,43	kW/m2	6,49535	6,07748
Radiation Level	35	kW/m2	4,36287	4,16108

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

			Dia	Noite
Late Pool Fire Status			Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	7,74341	7,46842
Radiation Level	18,43	kW/m2	6,49535	6,07748
Radiation Level	35	kW/m2	4,36287	4,16108

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	2,07296	2,09495
Furthest Extent	10500	ppm	2,07296	2,09495

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH04(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH07(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.108,28	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.086,98	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,998007	0,998079
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	30	30
Pool Vaporization Rate		kg/s	0,962097	0,768904
Total Vapor Flowrate		kg/s	3,92298	3,62349
Maximum Pool Radius		m	21,8467	21,8423

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (190000)	18,75	s	8,56205	8,56049
LFL (43000)	18,75	s	24,0155	27,5074
LFL Frac (43000)	18,75	s	24,0155	27,5074

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	67,9892	72,1445
Radiation Level	18,43	kW/m2	61,1369	64,7634
Radiation Level	35	kW/m2	54,1005	55,9079

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	69,2752	67,6987
Radiation Level	18,43	kW/m2	56,0668	53,6469
Radiation Level	35	kW/m2	38,859	37,3989

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	69,2752	67,6987
Radiation Level	18,43	kW/m2	56,0668	53,6469
Radiation Level	35	kW/m2	38,859	37,3989

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	24,0155	27,5074
Furthest Extent	43000	ppm	24,0155	27,5074

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	22,3505	23,1567
Overpressure	0,2	bar	17,9079	18,4242
Overpressure	0,3	bar	16,167	16,5696

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	2,76649	3,34442
Used Flammable Mass	kg	2,76649	3,34442
Overpressure Radius	m	12,3505	13,1567
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	2,76649	3,34442
Used Flammable Mass	kg	2,76649	3,34442
Overpressure Radius	m	7,90792	8,42415
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	2,76649	3,34442
Used Flammable Mass	kg	2,76649	3,34442
Overpressure Radius	m	6,16702	6,56961
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH07(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	963,38	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	944,86	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,987991	0,988432
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	30	30
Pool Vaporization Rate		kg/s	3,44231	2,75368
Total Vapor Flowrate		kg/s	17,8233	16,6066
Maximum Pool Radius		m	21,4576	21,456

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	27,755	33,862
LFL (10500)	18,75	s	69,63	78,3914
LFL Frac (10500)	18,75	s	69,63	78,3914

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	128,897	135,72
Radiation Level	18,43	kW/m2	112,892	119,41
Radiation Level	35	kW/m2	100,217	106,323

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	37,3802	35,9461
Radiation Level	18,43	kW/m2	30,8178	30,7751
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	37,3802	35,9461
Radiation Level	18,43	kW/m2	30,8178	30,7751
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	10500	ppm	69,63	78,3914
Furthest Extent	10500	ppm	69,63	78,3914

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	95,3687	125,509
Overpressure	0,2	bar	71,8551	100,815
Overpressure	0,3	bar	62,6409	91,138

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	245,812	284,719
Used Flammable Mass	kg	245,812	284,719
Overpressure Radius	m	65,3687	68,6501
Distance to:			
- Ignition Source	m	60	70
- Cloud Front/Centre	m	60	70
- Explosion Centre	m	30	56,8586

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	245,812	284,719
Used Flammable Mass	kg	245,812	284,719
Overpressure Radius	m	41,8551	43,9561
Distance to:			
- Ignition Source	m	60	70
- Cloud Front/Centre	m	60	70
- Explosion Centre	m	30	56,8586

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	245,812	284,719
Used Flammable Mass	kg	245,812	284,719
Overpressure Radius	m	32,6409	34,2794
Distance to:			
- Ignition Source	m	60	70
- Cloud Front/Centre	m	60	70
- Explosion Centre	m	30	56,8586

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH07(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH08(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	30,00	s

Orifice or pipe exit data (before atmospheric expansion):

- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	

Final data (after atmospheric expansion):

- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	399,20	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	391,53	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,958193	0,961172
Maximum Pool Radius		m	2,38824	2,3901

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	6,95654	6,96864
LFL (43000)	18,75	s	7,21727	7,16475
LFL Frac (43000)	18,75	s	7,21727	7,16475

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	33,4958	34,9811
Radiation Level	18,43	kW/m2	30,0474	31,3832
Radiation Level	35	kW/m2	26,1515	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,5312	15,0092
Radiation Level	18,43	kW/m2	12,3093	11,9516
Radiation Level	35	kW/m2	10,6451	10,5823

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,5312	15,0092
Radiation Level	18,43	kW/m2	12,3093	11,9516
Radiation Level	35	kW/m2	10,6451	10,5823

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	7,21727	7,16475
Furthest Extent	43000	ppm	7,21727	7,16475

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH08(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	347,19	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	340,52	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,828012	0,843156
Maximum Pool Radius		m	2,16645	2,18367

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	7,04276	6,99186
LFL (10500)	18,75	s	30,6633	33,7573
LFL Frac (10500)	18,75	s	30,6633	33,7573

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	53,9667	55,3061
Radiation Level	18,43	kW/m2	47,359	48,831
Radiation Level	35	kW/m2	42,0858	43,5885

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	22,743	21,6147
Radiation Level	18,43	kW/m2	17,7202	16,5923
Radiation Level	35	kW/m2	12,2473	11,828

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	22,743	21,6147
Radiation Level	18,43	kW/m2	17,7202	16,5923
Radiation Level	35	kW/m2	12,2473	11,828

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	30,6633	33,7573
Furthest Extent	10500	ppm	30,6633	33,7573

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	35,6438	41,4471
Overpressure	0,2	bar	28,2181	31,9339
Overpressure	0,3	bar	25,3082	28,206

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	7,74216	16,279
Used Flammable Mass	kg	7,74216	16,279
Overpressure Radius	m	20,6438	26,4471
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	7,74216	16,279
Used Flammable Mass	kg	7,74216	16,279
Overpressure Radius	m	13,2181	16,9339
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	7,74216	16,279
Used Flammable Mass	kg	7,74216	16,279
Overpressure Radius	m	10,3082	13,206
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH08(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH17(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.108,28	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.086,98	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,998007	0,998079
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	30	30
Pool Vaporization Rate		kg/s	0,962097	0,768904
Total Vapor Flowrate		kg/s	3,92298	3,62349
Maximum Pool Radius		m	21,8467	21,8423

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (190000)	18,75	s	8,56205	8,56049
LFL (43000)	18,75	s	24,0155	27,5074
LFL Frac (43000)	18,75	s	24,0155	27,5074

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	67,9892	72,1445
Radiation Level	18,43	kW/m2	61,1369	64,7634
Radiation Level	35	kW/m2	54,1005	55,9079

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	69,2752	67,6987
Radiation Level	18,43	kW/m2	56,0668	53,6469
Radiation Level	35	kW/m2	38,859	37,3989

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	69,2752	67,6987
Radiation Level	18,43	kW/m2	56,0668	53,6469
Radiation Level	35	kW/m2	38,859	37,3989

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	24,0155	27,5074
Furthest Extent	43000	ppm	24,0155	27,5074

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	22,3505	23,1567
Overpressure	0,2	bar	17,9079	18,4242
Overpressure	0,3	bar	16,167	16,5696

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	2,76649	3,34442
Used Flammable Mass	kg	2,76649	3,34442
Overpressure Radius	m	12,3505	13,1567
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	2,76649	3,34442
Used Flammable Mass	kg	2,76649	3,34442
Overpressure Radius	m	7,90792	8,42415
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	2,76649	3,34442
Used Flammable Mass	kg	2,76649	3,34442
Overpressure Radius	m	6,16702	6,56961
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH17(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	963,38	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	944,86	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,987991	0,988432
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	30	30
Pool Vaporization Rate		kg/s	3,44231	2,75368
Total Vapor Flowrate		kg/s	17,8233	16,6066
Maximum Pool Radius		m	21,4576	21,456

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	27,755	33,862
LFL (10500)	18,75	s	69,63	78,3914
LFL Frac (10500)	18,75	s	69,63	78,3914

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	128,897	135,72
Radiation Level	18,43	kW/m2	112,892	119,41
Radiation Level	35	kW/m2	100,217	106,323

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	37,3802	35,9461
Radiation Level	18,43	kW/m2	30,8178	30,7751
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	37,3802	35,9461
Radiation Level	18,43	kW/m2	30,8178	30,7751
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

		Radiation Level (kW/m2)
Dia		Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	69,63	78,3914
Furthest Extent	10500	ppm	69,63	78,3914

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	95,3687	125,509
Overpressure	0,2	bar	71,8551	100,815
Overpressure	0,3	bar	62,6409	91,138

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	245,812	284,719
Used Flammable Mass	kg	245,812	284,719
Overpressure Radius	m	65,3687	68,6501
Distance to:			
- Ignition Source	m	60	70
- Cloud Front/Centre	m	60	70
- Explosion Centre	m	30	56,8586

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	245,812	284,719
Used Flammable Mass	kg	245,812	284,719
Overpressure Radius	m	41,8551	43,9561
Distance to:			
- Ignition Source	m	60	70
- Cloud Front/Centre	m	60	70
- Explosion Centre	m	30	56,8586

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	245,812	284,719
Used Flammable Mass	kg	245,812	284,719
Overpressure Radius	m	32,6409	34,2794
Distance to:			
- Ignition Source	m	60	70
- Cloud Front/Centre	m	60	70
- Explosion Centre	m	30	56,8586

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH17(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH18(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	30,00	s

Orifice or pipe exit data (before atmospheric expansion):

- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	

Final data (after atmospheric expansion):

- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	399,20	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	391,53	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,958193	0,961172
Maximum Pool Radius		m	2,38824	2,3901

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	6,95654	6,96864
LFL (43000)	18,75	s	7,21727	7,16475
LFL Frac (43000)	18,75	s	7,21727	7,16475

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	33,4958	34,9811
Radiation Level	18,43	kW/m2	30,0474	31,3832
Radiation Level	35	kW/m2	26,1515	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,5312	15,0092
Radiation Level	18,43	kW/m2	12,3093	11,9516
Radiation Level	35	kW/m2	10,6451	10,5823

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,5312	15,0092
Radiation Level	18,43	kW/m2	12,3093	11,9516
Radiation Level	35	kW/m2	10,6451	10,5823

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	7,21727	7,16475
Furthest Extent	43000	ppm	7,21727	7,16475

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH18(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	347,19	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	340,52	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,828012	0,843156
Maximum Pool Radius		m	2,16645	2,18367

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	7,04276	6,99186
LFL (10500)	18,75	s	30,6633	33,7573
LFL Frac (10500)	18,75	s	30,6633	33,7573

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	53,9667	55,3061
Radiation Level	18,43	kW/m2	47,359	48,831
Radiation Level	35	kW/m2	42,0858	43,5885

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	22,743	21,6147
Radiation Level	18,43	kW/m2	17,7202	16,5923
Radiation Level	35	kW/m2	12,2473	11,828

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	22,743	21,6147
Radiation Level	18,43	kW/m2	17,7202	16,5923
Radiation Level	35	kW/m2	12,2473	11,828

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	30,6633	33,7573
Furthest Extent	10500	ppm	30,6633	33,7573

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	35,6438	41,4471
Overpressure	0,2	bar	28,2181	31,9339
Overpressure	0,3	bar	25,3082	28,206

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	7,74216	16,279
Used Flammable Mass	kg	7,74216	16,279
Overpressure Radius	m	20,6438	26,4471
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	7,74216	16,279
Used Flammable Mass	kg	7,74216	16,279
Overpressure Radius	m	13,2181	16,9339
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	7,74216	16,279
Used Flammable Mass	kg	7,74216	16,279
Overpressure Radius	m	10,3082	13,206
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH18(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH23(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.108,28	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Line rupture	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,58	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,06	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	1.086,98	um
- Expanded Radius	0,20	m
- Velocity	14,58	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,998007	0,998079
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	30	30
Pool Vaporization Rate		kg/s	0,962097	0,768904
Total Vapor Flowrate		kg/s	3,92298	3,62349
Maximum Pool Radius		m	21,8467	21,8423

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (190000)	18,75	s	8,56205	8,56049
LFL (43000)	18,75	s	24,0155	27,5074
LFL Frac (43000)	18,75	s	24,0155	27,5074

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	67,9892	72,1445
Radiation Level	18,43	kW/m2	61,1369	64,7634
Radiation Level	35	kW/m2	54,1005	55,9079

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	69,2752	67,6987
Radiation Level	18,43	kW/m2	56,0668	53,6469
Radiation Level	35	kW/m2	38,859	37,3989

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	69,2752	67,6987
Radiation Level	18,43	kW/m2	56,0668	53,6469
Radiation Level	35	kW/m2	38,859	37,3989

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

	Radiation Level (kW/m2)
Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	43000	ppm	24,0155	27,5074
Furthest Extent	43000	ppm	24,0155	27,5074

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	22,3505	23,1567
Overpressure	0,2	bar	17,9079	18,4242
Overpressure	0,3	bar	16,167	16,5696

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	2,76649	3,34442
Used Flammable Mass	kg	2,76649	3,34442
Overpressure Radius	m	12,3505	13,1567
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	2,76649	3,34442
Used Flammable Mass	kg	2,76649	3,34442
Overpressure Radius	m	7,90792	8,42415
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	2,76649	3,34442
Used Flammable Mass	kg	2,76649	3,34442
Overpressure Radius	m	6,16702	6,56961
Distance to:			
- Ignition Source	m	20	20
- Cloud Front/Centre	m	20	20
- Explosion Centre	m	10	10

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH23(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Line rupture	
Phase to be Released	Liquid	
Building Wake Effect	None	
Specify Pump Head	No pump head supplied	
Tank Head	25,08	m
Number of Excess Flow Valves	0	
Number of Non-Return Valves	0	
Number of Shut-Off Valves	0	

Pipe

Internal Diameter	406,4	mm
Line length	1	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	963,38	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Line rupture	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+003	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	25,08	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	14,07	m/s
- Discharge Coefficient	1,00	
Final data (after atmospheric expansion):		
- Temperature	25,08	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	944,86	um
- Expanded Radius	0,20	m
- Velocity	14,07	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,987991	0,988432
Release Segment 1	Cloud Segment 1			
Cloud Segment Duration		s	30	30
Pool Vaporization Rate		kg/s	3,44231	2,75368
Total Vapor Flowrate		kg/s	17,8233	16,6066
Maximum Pool Radius		m	21,4576	21,456

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (76800)	18,75	s	27,755	33,862
LFL (10500)	18,75	s	69,63	78,3914
LFL Frac (10500)	18,75	s	69,63	78,3914

Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	128,897	135,72
Radiation Level	18,43	kW/m2	112,892	119,41
Radiation Level	35	kW/m2	100,217	106,323

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	37,3802	35,9461
Radiation Level	18,43	kW/m2	30,8178	30,7751
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

				Distance (m)
			Dia	Noite
Radiation Level	9,83	kW/m2	37,3802	35,9461
Radiation Level	18,43	kW/m2	30,8178	30,7751
Radiation Level	35	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

			Radiation Level (kW/m2)
		Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	69,63	78,3914
Furthest Extent	10500	ppm	69,63	78,3914

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level Dia	Noite
Overpressure	0,1	bar	95,3687	125,509
Overpressure	0,2	bar	71,8551	100,815
Overpressure	0,3	bar	62,6409	91,138

		Supplementary Data at 0,1 bar Dia	Noite
Supplied Flammable Mass	kg	245,812	284,719
Used Flammable Mass	kg	245,812	284,719
Overpressure Radius	m	65,3687	68,6501
Distance to:			
- Ignition Source	m	60	70
- Cloud Front/Centre	m	60	70
- Explosion Centre	m	30	56,8586

		Supplementary Data at 0,2 bar Dia	Noite
Supplied Flammable Mass	kg	245,812	284,719
Used Flammable Mass	kg	245,812	284,719
Overpressure Radius	m	41,8551	43,9561
Distance to:			
- Ignition Source	m	60	70
- Cloud Front/Centre	m	60	70
- Explosion Centre	m	30	56,8586

		Supplementary Data at 0,3 bar Dia	Noite
Supplied Flammable Mass	kg	245,812	284,719
Used Flammable Mass	kg	245,812	284,719
Overpressure Radius	m	32,6409	34,2794
Distance to:			
- Ignition Source	m	60	70
- Cloud Front/Centre	m	60	70
- Explosion Centre	m	30	56,8586

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH23(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH24(E)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

User-Defined Data

Material

Material Identifier	ETHANOL	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	4,113E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	399,20	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	ETHANOL	
Scenario	Leak	
Inventory	4.113.374,50	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.48584E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	24,29	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,97	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	391,53	um
- Expanded Radius	0,02	m
- Velocity	24,29	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,958193	0,961172
Maximum Pool Radius		m	2,38824	2,3901

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (190000)	18,75	s	6,95654	6,96864
LFL (43000)	18,75	s	7,21727	7,16475
LFL Frac (43000)	18,75	s	7,21727	7,16475

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	33,4958	34,9811
Radiation Level	18,43	kW/m2	30,0474	31,3832
Radiation Level	35	kW/m2	26,1515	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,5312	15,0092
Radiation Level	18,43	kW/m2	12,3093	11,9516
Radiation Level	35	kW/m2	10,6451	10,5823

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	15,5312	15,0092
Radiation Level	18,43	kW/m2	12,3093	11,9516
Radiation Level	35	kW/m2	10,6451	10,5823

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

	Radiation Level (kW/m2)	
	Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

All flammable results are reported at the flammable effect height 0 m

			Distance (m)	
			Dia	Noite
Furthest Extent	43000	ppm	7,21727	7,16475
Furthest Extent	43000	ppm	7,21727	7,16475

			Heights (m) for above distances	
			Dia	Noite
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(E)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

SH24(G)

Base Case

CASE Name: **Data**

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

User-Defined Data

Material

Material Identifier	N-HEXANE	
Type of Vessel	Unpressurized (at atmospheric pressure)	
Pressure Specification	Pressure not used	
Temperature	25	degC
Volume Inventory	5234	m3

Scenario

Scenario Type	Leak	
Phase to be Released	Liquid	
Hole Diameter	40,64	mm
Building Wake Effect	None	
Tank Head	25,08	m

Location

Elevation	0,5	m
Use ERPG averaging time	ERPG not selected	
Use IDLH averaging time	IDLH not selected	
Use STEL averaging time	STEL not selected	
Supply a user defined averaging time	Not supplied	

Bund

Status of Bund	Bund present	
Bund Area	3051	m2
[Type of Bund Surface	User-Defined (Land)]	
Bund Height	1,9	m
[Bund Failure Modeling	Bund cannot fail]	

Indoor/Outdoor

Location of release	Open air release	
Outdoor Release Direction	Horizontal	

Flammable

Explosion Method	TNT	
Jet Fire Method	Cone Model	

Dispersion

Late Ignition Location	No ignition location	
Mass Inventory of material to Disperse	3,434E6	kg

Fireball Parameters

[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]

Toxic Parameters

[Indoor Calculations	Unselected]	

[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calculation	0,05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]

Geometry

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

DISCHARGE DATA for Weather: Global Weathers\Dia

Wind Speed:	3,00	m/s
Wind Speed at Height (Calculated)	1,78	m/s
Pasquill Stability:	C	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	347,19	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

DISCHARGE DATA for Weather: Global Weathers\Noite

Wind Speed:	2,00	m/s
Wind Speed at Height (Calculated)	0,83	m/s
Pasquill Stability:	E	

USER-DEFINED QUANTITIES

Material	N-HEXANE	
Scenario	Leak	
Inventory	3.433.641,25	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	1,01	bar
- Temperature	25,00	degC
- Fluid State	Liquid at atmospheric pressure	

CALCULATED QUANTITIES

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.19755E+001	kg/s
Release Duration	30,00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1,01	bar
- Temperature	24,95	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	23,45	m/s
- Discharge Coefficient	0,60	
Final data (after atmospheric expansion):		
- Temperature	24,95	degC
- Liquid Mass Fraction	1,00	fraction
- Droplet Diameter	340,52	um
- Expanded Radius	0,02	m
- Velocity	23,45	m/s

Consequence Results

Pool Vaporization Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

			Dia	Noite
	Release Segment 1			
Release Duration		s	30	30
Liquid Rainout		fraction	0,828012	0,843156
Maximum Pool Radius		m	2,16645	2,18367

Distance to Concentration Results

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the flammable effect height 0 m

Concentration(ppm)	Averaging Time		Distance (m)	
			Dia	Noite
UFL (76800)	18,75	s	7,04276	6,99186
LFL (10500)	18,75	s	30,6633	33,7573
LFL Frac (10500)	18,75	s	30,6633	33,7573

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			Dia	Noite
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Jet Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	53,9667	55,3061
Radiation Level	18,43	kW/m2	47,359	48,831
Radiation Level	35	kW/m2	42,0858	43,5885

Radiation Effects: Jet Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Early Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	22,743	21,6147
Radiation Level	18,43	kW/m2	17,7202	16,5923
Radiation Level	35	kW/m2	12,2473	11,828

Radiation Effects: Early Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Late Pool Fire Hazard

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

			Distance (m)	
			Dia	Noite
Radiation Level	9,83	kW/m2	22,743	21,6147
Radiation Level	18,43	kW/m2	17,7202	16,5923
Radiation Level	35	kW/m2	12,2473	11,828

Radiation Effects: Late Pool Fire Distance

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

			Radiation Level (kW/m2)	
			Dia	Noite

Flash Fire Envelope

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	10500	ppm	30,6633	33,7573
Furthest Extent	10500	ppm	30,6633	33,7573

				Heights (m) for above distances
			Dia	Noite
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Explosion Effects: Late Ignition

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

Explosion Model Used : TNT
Explosion Location Criterion: Cloud Center
All distances are measured from the Source
All flammable results are reported at the flammable effect height 0 m

			Maximum Distance (m) at Overpressure Level	
			Dia	Noite
Overpressure	0,1	bar	35,6438	41,4471
Overpressure	0,2	bar	28,2181	31,9339
Overpressure	0,3	bar	25,3082	28,206

		Supplementary Data at 0,1 bar	
		Dia	Noite
Supplied Flammable Mass	kg	7,74216	16,279
Used Flammable Mass	kg	7,74216	16,279
Overpressure Radius	m	20,6438	26,4471
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,2 bar	
		Dia	Noite
Supplied Flammable Mass	kg	7,74216	16,279
Used Flammable Mass	kg	7,74216	16,279
Overpressure Radius	m	13,2181	16,9339
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

		Supplementary Data at 0,3 bar	
		Dia	Noite
Supplied Flammable Mass	kg	7,74216	16,279
Used Flammable Mass	kg	7,74216	16,279
Overpressure Radius	m	10,3082	13,206
Distance to:			
- Ignition Source	m	30	30
- Cloud Front/Centre	m	30	30
- Explosion Centre	m	15	15

Weather Conditions

Path: \Vopak Área 06 - Consequência-final\SISTEMA DE SEGURANCA 30s\SH24(G)

		Dia	Noite
Wind Speed	m/s	3	2
Pasquill Stability		C	E
Surface Roughness Length	mm	1000	1000
Surface Roughness Parameter		0,173718	0,173718
Atmospheric Temperature	degC	25	20
Surface Temperature	degC	30	20
Relative Humidity	fraction	0,8	0,8

ANEXO IX – RELATÓRIO DE INCENDIO EM POÇA

Vopak Área 06 - Consequência-final

Gasolina poça

H02(G)

Base Case

Data

Weather: Global Weathers\Dia

Speed: 3,00 m/s **Stability:** C

\Vopak Área 06 - Consequência-final\Gasolina poça\H02(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	25,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	3,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

	Input	Output	
Pool Diameter		3,48	m
Downwind distance of pool fire centre		1,91	m
Downwind distance of liquid rainout	1,91		m
Flame Length		11,15	m
Flame Angle		48,50	deg
Flame Emissive Power		99,00	kW/m2
Burn Rate		0,96	kg/s
Radiative fraction for general fires		0,30	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	1,74	0,00
8,35	7,39	1,74	0,00
8,35	7,39	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,10	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	8,86	m
Crosswind semi-axis (B)	8,30	m
Offset Ratio (D)	0,76	
Effect Distance	15,57	m
Area	231,20	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,19	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	6,17	m
Crosswind semi-axis (B)	5,20	m
Offset Ratio (D)	0,87	
Effect Distance	11,52	m
Area	100,93	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	0,35	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	3,72	m
Crosswind semi-axis (B)	3,06	m
Offset Ratio (D)	0,78	
Effect Distance	6,62	m
Area	35,81	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	20,53
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			25,50		
0,42			99,00		
0,84			99,00		
1,26			99,00		
1,68			99,00		
2,09			99,00		
2,51			99,00		
2,93			99,00		
3,35			99,00		
3,77			68,75		
4,19			60,67		
4,61			54,06		
5,03			47,95		
5,45			43,78		
5,86			39,78		
6,28			37,02		
6,70			34,41		
7,12			31,95		
7,54			30,23		
7,96			28,28		
8,38			26,36		
8,80			25,10		
9,22			23,81		
9,63			22,71		
10,05			21,58		
10,47			20,49		
10,89			19,65		
11,31			18,83		
11,73			18,11		
12,15			17,28		
12,57			16,34		
12,99			15,34		
13,40			14,34		
13,82			13,38		
14,24			12,45		
14,66			11,56		
15,08			10,73		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
15,50			9,95		
15,92			9,22		
16,34			8,54		
16,76			7,92		
17,17			7,34		
17,59			6,81		
18,01			6,32		
18,43			5,87		
18,85			5,52		
19,27			5,21		
19,69			4,91		
20,11			4,64		
20,53			4,38		

Weather: **Global Weathers\Noite**

Speed: **2,00** **m/s** **Stability:** **E**

\Vopak Área 06 - Consequência-final\Gasolina poça\H02(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	20,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	2,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		3,60	m
	Input	**Output**	
Downwind distance of pool fire centre		1,92	m
Downwind distance of liquid rainout	1,92		m
Flame Length		11,08	m
Flame Angle		40,90	deg
Flame Emissive Power		97,92	kW/m2
Burn Rate		1,00	kg/s
Radiative fraction for general fires		0,30	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	1,80	0,00
7,26	8,38	1,80	0,00
7,26	8,38	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,10	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	8,82	m
Crosswind semi-axis (B)	8,32	m
Offset Ratio (D)	0,69	
Effect Distance	14,91	m
Area	230,44	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,19	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	5,79	m
Crosswind semi-axis (B)	5,12	m
Offset Ratio (D)	0,85	
Effect Distance	10,70	m
Area	93,21	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	0,36	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	3,60	m
Crosswind semi-axis (B)	2,97	m
Offset Ratio (D)	0,75	
Effect Distance	6,32	m
Area	33,59	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	18,34
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			30,63		
0,37			97,92		
0,75			97,92		
1,12			97,92		
1,50			97,92		
1,87			97,92		
2,25			97,92		
2,62			97,92		
2,99			97,92		
3,37			97,92		
3,74			69,14		
4,12			61,42		
4,49			54,38		
4,87			48,92		
5,24			44,40		
5,62			40,62		
5,99			37,36		
6,36			34,67		
6,74			32,29		
7,11			30,30		
7,49			28,37		
7,86			26,68		
8,24			25,17		
8,61			23,89		
8,98			22,72		
9,36			21,59		
9,73			20,63		
10,11			19,70		
10,48			18,84		
10,86			18,09		
11,23			17,28		
11,60			16,42		
11,98			15,56		
12,35			14,71		
12,73			13,90		
13,10			13,12		
13,48			12,37		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
13,85			11,66		
14,22			10,98		
14,60			10,34		
14,97			9,73		
15,35			9,16		
15,72			8,63		
16,10			8,12		
16,47			7,65		
16,85			7,21		
17,22			6,80		
17,59			6,41		
17,97			6,05		
18,34			5,71		

H06(G)'

Base Case

Data

Weather: Global Weathers\Dia

Speed: 3,00 m/s **Stability:** C

\Vopak Área 06 - Consequência-final\Gasolina poça\H06(G)'

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	25,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	3,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		3,56	m
	Input	**Output**	
Downwind distance of pool fire centre		1,92	m
Downwind distance of liquid rainout	1,92		m
Flame Length		11,31	m
Flame Angle		48,38	deg
Flame Emissive Power		98,29	kW/m2
Burn Rate		1,00	kg/s
Radiative fraction for general fires		0,30	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	1,78	0,00
8,46	7,51	1,78	0,00
8,46	7,51	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,10	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	8,99	m
Crosswind semi-axis (B)	8,42	m
Offset Ratio (D)	0,75	
Effect Distance	15,76	m
Area	237,63	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,19	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	6,23	m
Crosswind semi-axis (B)	5,27	m
Offset Ratio (D)	0,86	
Effect Distance	11,61	m
Area	103,25	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	0,36	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	3,75	m
Crosswind semi-axis (B)	3,10	m
Offset Ratio (D)	0,77	
Effect Distance	6,65	m
Area	36,55	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	20,76
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			26,08		
0,42			98,29		
0,85			98,29		
1,27			98,29		
1,70			98,29		
2,12			98,29		
2,54			98,29		
2,97			98,29		
3,39			98,29		
3,81			67,36		
4,24			60,28		
4,66			53,73		
5,09			47,60		
5,51			43,60		
5,93			39,67		
6,36			36,87		
6,78			34,30		
7,20			31,68		
7,63			30,13		
8,05			28,19		
8,48			26,44		
8,90			25,03		
9,32			23,74		
9,75			22,65		
10,17			21,52		
10,59			20,38		
11,02			19,60		
11,44			18,78		
11,87			18,07		
12,29			17,25		
12,71			16,31		
13,14			15,33		
13,56			14,34		
13,98			13,38		
14,41			12,46		
14,83			11,58		
15,26			10,75		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
15,68			9,97		
16,10			9,25		
16,53			8,57		
16,95			7,95		
17,37			7,37		
17,80			6,84		
18,22			6,35		
18,65			5,90		
19,07			5,53		
19,49			5,22		
19,92			4,93		
20,34			4,66		
20,76			4,40		

Weather: **Global Weathers\Noite**

Speed: **2,00** **m/s** **Stability:** **E**

\Vopak Área 06 - Consequência-final\Gasolina poça\H06(G)'

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	20,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	2,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		3,67	m
	Input	**Output**	
Downwind distance of pool fire centre		1,93	m
Downwind distance of liquid rainout	1,93		m
Flame Length		11,25	m
Flame Angle		40,76	deg
Flame Emissive Power		97,20	kW/m2
Burn Rate		1,04	kg/s
Radiative fraction for general fires		0,29	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	1,84	0,00
7,34	8,52	1,84	0,00
7,34	8,52	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,10	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	8,94	m
Crosswind semi-axis (B)	8,43	m
Offset Ratio (D)	0,69	
Effect Distance	15,09	m
Area	236,86	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,19	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	5,85	m
Crosswind semi-axis (B)	5,19	m
Offset Ratio (D)	0,84	
Effect Distance	10,80	m
Area	95,47	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	0,36	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	3,64	m
Crosswind semi-axis (B)	3,01	m
Offset Ratio (D)	0,75	
Effect Distance	6,38	m
Area	34,42	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	18,54
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			31,38		
0,38			97,20		
0,76			97,20		
1,14			97,20		
1,51			97,20		
1,89			97,20		
2,27			97,20		
2,65			97,20		
3,03			97,20		
3,41			97,20		
3,78			67,26		
4,16			61,09		
4,54			54,09		
4,92			48,67		
5,30			44,26		
5,68			40,52		
6,05			37,22		
6,43			34,59		
6,81			32,20		
7,19			30,23		
7,57			28,31		
7,95			26,59		
8,33			25,13		
8,70			23,84		
9,08			22,68		
9,46			21,56		
9,84			20,59		
10,22			19,66		
10,60			18,82		
10,97			18,06		
11,35			17,26		
11,73			16,41		
12,11			15,55		
12,49			14,72		
12,87			13,91		
13,24			13,13		
13,62			12,38		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
14,00			11,68		
14,38			11,00		
14,76			10,36		
15,14			9,76		
15,52			9,19		
15,89			8,66		
16,27			8,16		
16,65			7,68		
17,03			7,24		
17,41			6,83		
17,79			6,44		
18,16			6,08		
18,54			5,74		

H27(G)

Base Case

Data

Weather: **Global Weathers\Dia**

Speed: **3,00 m/s** **Stability:** **C**

\Vopak Área 06 - Consequência-final\Gasolina poça\H27(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	25,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	3,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		62,32	m
	Input	**Output**	
Downwind distance of pool fire centre		0,00	m
Downwind distance of liquid rainout	0,00		m
Flame Length		82,81	m
Flame Angle		30,39	deg
Flame Emissive Power		20,07	kW/m2
Burn Rate		307,61	kg/s
Radiative fraction for general fires		0,03	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	31,16	0,00
41,89	71,43	31,16	0,00
41,89	71,43	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,49	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	35,66	m
Crosswind semi-axis (B)	33,53	m
Offset Ratio (D)	0,10	
Effect Distance	39,15	m
Area	3.756,41	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,92	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	32,16	m
Crosswind semi-axis (B)	32,16	m
Offset Ratio (D)	0,00	
Effect Distance	32,16	m
Area	3.249,53	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	1,74	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	83,78
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			20,07		
1,71			20,07		
3,42			20,07		
5,13			20,07		
6,84			20,07		
8,55			20,07		
10,26			20,07		
11,97			20,07		
13,68			20,07		
15,39			20,07		
17,10			20,07		
18,81			20,07		
20,52			20,07		
22,23			20,07		
23,94			20,07		
25,65			20,07		
27,36			20,07		
29,07			20,07		
30,78			20,07		
32,49			12,41		
34,20			11,55		
35,91			10,83		
37,62			10,27		
39,33			9,78		
41,04			9,34		
42,75			9,05		
44,46			8,61		
46,17			8,28		
47,88			7,96		
49,59			7,70		
51,30			7,44		
53,01			7,19		
54,72			6,96		
56,43			6,76		
58,14			6,55		
59,85			6,34		
61,56			6,18		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
63,27			6,01		
64,97			5,83		
66,68			5,69		
68,39			5,55		
70,10			5,40		
71,81			5,27		
73,52			5,14		
75,23			5,01		
76,94			4,87		
78,65			4,74		
80,36			4,60		
82,07			4,47		
83,78			4,35		

Weather: **Global Weathers\Noite**

Speed: **2,00 m/s** **Stability:** **E**

\Vopak Área 06 - Consequência-final\Gasolina poça\H27(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	20,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	2,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		62,32	m
	Input	**Output**	
Downwind distance of pool fire centre		0,00	m
Downwind distance of liquid rainout	0,00		m
Flame Length		80,48	m
Flame Angle		23,01	deg
Flame Emissive Power		20,07	kW/m2
Burn Rate		299,27	kg/s
Radiative fraction for general fires		0,03	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	31,16	0,00
31,45	74,08	31,16	0,00
31,45	74,08	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,49	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	34,88	m
Crosswind semi-axis (B)	32,57	m
Offset Ratio (D)	0,08	
Effect Distance	37,59	m
Area	3.568,49	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,92	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	32,16	m
Crosswind semi-axis (B)	32,16	m
Offset Ratio (D)	0,00	
Effect Distance	32,16	m
Area	3.249,53	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	1,74	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	62,91
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			20,07		
1,28			20,07		
2,57			20,07		
3,85			20,07		
5,14			20,07		
6,42			20,07		
7,70			20,07		
8,99			20,07		
10,27			20,07		
11,55			20,07		
12,84			20,07		
14,12			20,07		
15,41			20,07		
16,69			20,07		
17,97			20,07		
19,26			20,07		
20,54			20,07		
21,83			20,07		
23,11			20,07		
24,39			20,07		
25,68			20,07		
26,96			20,07		
28,25			20,07		
29,53			20,07		
30,81			20,07		
32,10			12,34		
33,38			11,44		
34,66			10,84		
35,95			10,35		
37,23			9,91		
38,52			9,51		
39,80			9,18		
41,08			8,86		
42,37			8,57		
43,65			8,28		
44,94			8,03		
46,22			7,79		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
47,50			7,56		
48,79			7,35		
50,07			7,15		
51,35			6,96		
52,64			6,78		
53,92			6,61		
55,21			6,44		
56,49			6,28		
57,77			6,14		
59,06			5,99		
60,34			5,85		
61,63			5,73		
62,91			5,60		

H28(G)

Base Case

Data

Weather: Global Weathers\Dia

Speed: 3,00 m/s **Stability:** C

\Vopak Área 06 - Consequência-final\Gasolina poça\H28(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	25,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	3,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		54,25	m
	Input	**Output**	
Downwind distance of pool fire centre		0,00	m
Downwind distance of liquid rainout	0,00		m
Flame Length		75,20	m
Flame Angle		31,27	deg
Flame Emissive Power		20,18	kW/m2
Burn Rate		233,09	kg/s
Radiative fraction for general fires		0,03	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	27,13	0,00
39,04	64,28	27,13	0,00
39,04	64,28	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,49	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	31,45	m
Crosswind semi-axis (B)	29,58	m
Offset Ratio (D)	0,11	
Effect Distance	34,78	m
Area	2.922,60	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,91	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	28,13	m
Crosswind semi-axis (B)	28,13	m
Offset Ratio (D)	0,00	
Effect Distance	28,13	m
Area	2.485,18	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	1,73	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	78,08
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			20,18		
1,59			20,18		
3,19			20,18		
4,78			20,18		
6,37			20,18		
7,97			20,18		
9,56			20,18		
11,15			20,18		
12,75			20,18		
14,34			20,18		
15,93			20,18		
17,53			20,18		
19,12			20,18		
20,71			20,18		
22,31			20,18		
23,90			20,18		
25,49			20,18		
27,09			20,18		
28,68			12,42		
30,27			11,51		
31,87			10,82		
33,46			10,25		
35,05			9,71		
36,65			9,32		
38,24			8,92		
39,83			8,57		
41,43			8,24		
43,02			7,92		
44,61			7,65		
46,21			7,39		
47,80			7,12		
49,39			6,90		
50,99			6,69		
52,58			6,49		
54,17			6,29		
55,77			6,11		
57,36			5,94		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
58,95			5,77		
60,55			5,62		
62,14			5,48		
63,74			5,32		
65,33			5,20		
66,92			5,07		
68,52			4,93		
70,11			4,79		
71,70			4,66		
73,30			4,52		
74,89			4,39		
76,48			4,26		
78,08			4,13		

Weather: **Global Weathers\Noite**

Speed: **2,00 m/s** **Stability:** **E**

\Vopak Área 06 - Consequência-final\Gasolina poça\H28(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	20,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	2,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		54,25	m
	Input	**Output**	
Downwind distance of pool fire centre		0,00	m
Downwind distance of liquid rainout	0,00		m
Flame Length		73,08	m
Flame Angle		23,81	deg
Flame Emissive Power		20,18	kW/m2
Burn Rate		226,77	kg/s
Radiative fraction for general fires		0,03	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	27,13	0,00
29,50	66,86	27,13	0,00
29,50	66,86	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,49	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	30,71	m
Crosswind semi-axis (B)	28,00	m
Offset Ratio (D)	0,08	
Effect Distance	33,30	m
Area	2.701,77	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,91	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	28,13	m
Crosswind semi-axis (B)	28,13	m
Offset Ratio (D)	0,00	
Effect Distance	28,13	m
Area	2.485,18	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	1,73	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	59,00
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			20,18		
1,20			20,18		
2,41			20,18		
3,61			20,18		
4,82			20,18		
6,02			20,18		
7,22			20,18		
8,43			20,18		
9,63			20,18		
10,84			20,18		
12,04			20,18		
13,24			20,18		
14,45			20,18		
15,65			20,18		
16,86			20,18		
18,06			20,18		
19,26			20,18		
20,47			20,18		
21,67			20,18		
22,88			20,18		
24,08			20,18		
25,28			20,18		
26,49			20,18		
27,69			12,72		
28,90			11,78		
30,10			11,14		
31,30			10,57		
32,51			10,10		
33,71			9,69		
34,92			9,31		
36,12			8,98		
37,32			8,66		
38,53			8,38		
39,73			8,11		
40,94			7,84		
42,14			7,61		
43,34			7,39		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
44,55			7,17		
45,75			6,98		
46,96			6,79		
48,16			6,62		
49,36			6,44		
50,57			6,28		
51,77			6,13		
52,98			5,98		
54,18			5,84		
55,39			5,71		
56,59			5,57		
57,79			5,45		
59,00			5,32		

H29(G)

Base Case

Data

Weather: Global Weathers\Dia

Speed: 3,00 m/s **Stability:** C

\Vopak Área 06 - Consequência-final\Gasolina poça\H29(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	25,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	3,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		62,32	m
	Input	**Output**	
Downwind distance of pool fire centre		0,00	m
Downwind distance of liquid rainout	0,00		m
Flame Length		82,81	m
Flame Angle		30,39	deg
Flame Emissive Power		20,07	kW/m2
Burn Rate		307,61	kg/s
Radiative fraction for general fires		0,03	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	31,16	0,00
41,89	71,43	31,16	0,00
41,89	71,43	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,49	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	35,66	m
Crosswind semi-axis (B)	33,53	m
Offset Ratio (D)	0,10	
Effect Distance	39,15	m
Area	3.756,41	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,92	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	32,16	m
Crosswind semi-axis (B)	32,16	m
Offset Ratio (D)	0,00	
Effect Distance	32,16	m
Area	3.249,53	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	1,74	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	83,78
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			20,07		
1,71			20,07		
3,42			20,07		
5,13			20,07		
6,84			20,07		
8,55			20,07		
10,26			20,07		
11,97			20,07		
13,68			20,07		
15,39			20,07		
17,10			20,07		
18,81			20,07		
20,52			20,07		
22,23			20,07		
23,94			20,07		
25,65			20,07		
27,36			20,07		
29,07			20,07		
30,78			20,07		
32,49			12,41		
34,20			11,55		
35,91			10,83		
37,62			10,27		
39,33			9,78		
41,04			9,34		
42,75			9,05		
44,46			8,61		
46,17			8,28		
47,88			7,96		
49,59			7,70		
51,30			7,44		
53,01			7,19		
54,72			6,96		
56,43			6,76		
58,14			6,55		
59,85			6,34		
61,56			6,18		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
63,27			6,01		
64,97			5,83		
66,68			5,69		
68,39			5,55		
70,10			5,40		
71,81			5,27		
73,52			5,14		
75,23			5,01		
76,94			4,87		
78,65			4,74		
80,36			4,60		
82,07			4,47		
83,78			4,35		

Weather: **Global Weathers\Noite**

Speed: **2,00** **m/s** **Stability:** **E**

\Vopak Área 06 - Consequência-final\Gasolina poça\H29(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	20,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	2,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		62,32	m
	Input	**Output**	
Downwind distance of pool fire centre		0,00	m
Downwind distance of liquid rainout	0,00		m
Flame Length		80,48	m
Flame Angle		23,01	deg
Flame Emissive Power		20,07	kW/m2
Burn Rate		299,27	kg/s
Radiative fraction for general fires		0,03	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	31,16	0,00
31,45	74,08	31,16	0,00
31,45	74,08	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,49	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	34,88	m
Crosswind semi-axis (B)	32,57	m
Offset Ratio (D)	0,08	
Effect Distance	37,59	m
Area	3.568,49	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,92	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	32,16	m
Crosswind semi-axis (B)	32,16	m
Offset Ratio (D)	0,00	
Effect Distance	32,16	m
Area	3.249,53	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	1,74	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	62,91
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			20,07		
1,28			20,07		
2,57			20,07		
3,85			20,07		
5,14			20,07		
6,42			20,07		
7,70			20,07		
8,99			20,07		
10,27			20,07		
11,55			20,07		
12,84			20,07		
14,12			20,07		
15,41			20,07		
16,69			20,07		
17,97			20,07		
19,26			20,07		
20,54			20,07		
21,83			20,07		
23,11			20,07		
24,39			20,07		
25,68			20,07		
26,96			20,07		
28,25			20,07		
29,53			20,07		
30,81			20,07		
32,10			12,34		
33,38			11,44		
34,66			10,84		
35,95			10,35		
37,23			9,91		
38,52			9,51		
39,80			9,18		
41,08			8,86		
42,37			8,57		
43,65			8,28		
44,94			8,03		
46,22			7,79		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
47,50			7,56		
48,79			7,35		
50,07			7,15		
51,35			6,96		
52,64			6,78		
53,92			6,61		
55,21			6,44		
56,49			6,28		
57,77			6,14		
59,06			5,99		
60,34			5,85		
61,63			5,73		
62,91			5,60		

H30(G)

Base Case

Data

Weather: Global Weathers\Dia

Speed: 3,00 m/s **Stability:** C

\Vopak Área 06 - Consequência-final\Gasolina poça\H30(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	25,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	3,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		54,26	m
	Input	**Output**	
Downwind distance of pool fire centre		0,00	m
Downwind distance of liquid rainout	0,00		m
Flame Length		75,21	m
Flame Angle		31,27	deg
Flame Emissive Power		20,18	kW/m2
Burn Rate		233,13	kg/s
Radiative fraction for general fires		0,03	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	27,13	0,00
39,04	64,28	27,13	0,00
39,04	64,28	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,49	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	31,46	m
Crosswind semi-axis (B)	29,58	m
Offset Ratio (D)	0,11	
Effect Distance	34,78	m
Area	2.923,05	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,91	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	28,13	m
Crosswind semi-axis (B)	28,13	m
Offset Ratio (D)	0,00	
Effect Distance	28,13	m
Area	2.485,59	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	1,73	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	78,08
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			20,18		
1,59			20,18		
3,19			20,18		
4,78			20,18		
6,37			20,18		
7,97			20,18		
9,56			20,18		
11,15			20,18		
12,75			20,18		
14,34			20,18		
15,93			20,18		
17,53			20,18		
19,12			20,18		
20,71			20,18		
22,31			20,18		
23,90			20,18		
25,50			20,18		
27,09			20,18		
28,68			12,42		
30,28			11,51		
31,87			10,82		
33,46			10,25		
35,06			9,72		
36,65			9,32		
38,24			8,92		
39,84			8,57		
41,43			8,24		
43,02			7,92		
44,62			7,65		
46,21			7,39		
47,80			7,12		
49,40			6,91		
50,99			6,69		
52,58			6,49		
54,18			6,29		
55,77			6,11		
57,36			5,94		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
58,96			5,77		
60,55			5,62		
62,14			5,48		
63,74			5,32		
65,33			5,20		
66,92			5,07		
68,52			4,93		
70,11			4,79		
71,71			4,66		
73,30			4,52		
74,89			4,39		
76,49			4,26		
78,08			4,13		

Weather: **Global Weathers\Noite**

Speed: **2,00 m/s** **Stability:** **E**

\Vopak Área 06 - Consequência-final\Gasolina poça\H30(G)

Flame Data

Correlation Type	Thomas / Johnson	

User-Defined Quantities

Material	N-HEXANE	
Ambient Temperature	20,00	degC
Ambient Relative Humidity	0,80	fraction
Ambient Wind Speed	2,00	m/s
Surface Type	Land	
Elevation	0,00	m
Maximum Exposure Duration	20,00	s

Input and/or Output Quantities

Pool Diameter		54,26	m
	Input	**Output**	
Downwind distance of pool fire centre		0,00	m
Downwind distance of liquid rainout	0,00		m
Flame Length		73,09	m
Flame Angle		23,81	deg
Flame Emissive Power		20,18	kW/m2
Burn Rate		226,81	kg/s
Radiative fraction for general fires		0,03	fraction

Late pool fire is assumed to occur because of delayed ignition; the pool-fire center is located at the rainout point, with the flame diameter taken as the maximum PVAP pool diameter.

Flame Co-ordinates

X	Z	R	Phi
m	m	m	deg
0,00	0,00	27,13	0,00
29,50	66,87	27,13	0,00
29,50	66,87	0,00	0,00

Radiation Intensity Ellipse

User-Defined Quantities

Observer Inclination	Variable	deg
Observer Orientation	Variable	deg
Exposure Duration	20,00	s
Effect Height	0,00	m

Calculated Quantities

Incident Radiation Level:	**9,83**	kW/m2
Lethality Level	0,98	%
View Factor	0,49	
Dose Level	4.210.189,08	(W/m2)^Probit N.s
Downwind semi-axis (A)	30,71	m
Crosswind semi-axis (B)	28,00	m
Offset Ratio (D)	0,08	
Effect Distance	33,30	m
Area	2.702,21	m2
Incident Radiation Level:	**18,43**	kW/m2
Lethality Level	42,59	%
View Factor	0,91	
Dose Level	9.733.183,81	(W/m2)^Probit N.s
Downwind semi-axis (A)	28,13	m
Crosswind semi-axis (B)	28,13	m
Offset Ratio (D)	0,00	
Effect Distance	28,13	m
Area	2.485,59	m2
Incident Radiation Level:	**35,00**	kW/m2
Lethality Level	97,74	%
View Factor	1,73	
Dose Level	22.889.479,61	(W/m2)^Probit N.s
Downwind semi-axis (A)	Not Reached	m
Crosswind semi-axis (B)	Not Reached	m
Offset Ratio (D)	Not Reached	
Effect Distance	n/a	m
Area	n/a	m2

Radiation Distance

User-Defined Quantities

Maximum Distance	59,00
Angle from Wind Direction	0,00
Height above Origin	0,00
Observer Inclination	Variable
Observer Orientation	Variable

Calculated Quantities

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
0,00			20,18		
1,20			20,18		
2,41			20,18		
3,61			20,18		
4,82			20,18		
6,02			20,18		
7,22			20,18		
8,43			20,18		
9,63			20,18		
10,84			20,18		
12,04			20,18		
13,24			20,18		
14,45			20,18		
15,65			20,18		
16,86			20,18		
18,06			20,18		
19,27			20,18		
20,47			20,18		
21,67			20,18		
22,88			20,18		
24,08			20,18		
25,29			20,18		
26,49			20,18		
27,69			12,72		
28,90			11,78		
30,10			11,14		
31,31			10,57		
32,51			10,10		
33,71			9,69		
34,92			9,31		
36,12			8,98		
37,33			8,66		
38,53			8,38		
39,73			8,11		
40,94			7,84		
42,14			7,61		
43,35			7,39		

X Coordinates m	Y Coordinates m	Z Coordinates m	Incident Radiation kW/m2	Lethality Level %	View Factor
44,55			7,17		
45,75			6,98		
46,96			6,79		
48,16			6,62		
49,37			6,44		
50,57			6,28		
51,78			6,13		
52,98			5,98		
54,18			5,84		
55,39			5,71		
56,59			5,57		
57,80			5,45		
59,00			5,32		