

**Dados de Entrada do Trecho Ribeirão Preto-REPLAN / Estação Meteorológica de
REPLAN – Álcool Bombeado**

Cenário	Liberação de produto desde o km 238+500 até o km 342+700. (Ø da linha=24”).
Modelos de Simulação Utilizados	User Defined
Diâmetro do vazamento	609,9 mm (100% do diâmetro) 121,92 mm (20% do diâmetro) 30,48 mm (5% do diâmetro)
Direção do vazamento	Vertical (V) Angular 45° (A) Horizontal Impingement(HI)
Altura da linha	0 m
Substância	Etanol Bombeado
Velocidade de vazamento^{A, B}	6,2 m/s (100% do diâmetro) 54,6 m/s (20% do diâmetro) 91,4 m/s (5% do diâmetro)
Diâmetro de gota^{A, B}	45,90 mm (100% do diâmetro) 0,125 mm (20% do diâmetro) 0,053 mm (5% do diâmetro)
Tempo de vazamento	300 s (100% do diâmetro) 600 s (20% do diâmetro) 2820 s (5% do diâmetro)
Taxa de vazamento^{A, B}	853,5 kg/s (100% do diâmetro) 301,5 kg/s (20% do diâmetro) 31,6 kg/s (5% do diâmetro)
Temperatura	40°C
Área da poça^{A, B}	3741,0 m ² (100% do diâmetro) 3238,3 m ² (20% do diâmetro) 1363,8 m ² (5% do diâmetro)
Volume de confinamento	3312 m ³
Considerações	
A – Calculado pelo LeakMap	
B – Os valores para ruptura foram retirados do Aglomerado Humano denominado Propriedade Rural (km 276,59). Os valores para furo com 20% do diâmetro foram retirados do Aglomerado Humano denominado Propriedade Rural (km 272,52). Os valores para furo com 5% do diâmetro foram retirados do Aglomerado Humano denominado Propriedade Rural (km 272,52).	



SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 3238 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 54,6 m/s
Droplet Diameter(1) 124,9 um
Duration of Discharge(1) 600 s
Final Temperature(1) 40 degC
Release Rate(1) 301,5 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	8,17923	10,6572
LFL (43000)	18,75	s	30,9067	34,0448
LFL Frac (43000)	18,75	s	30,9067	34,0448

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

Early Pool Fire Status	REPLAN - DIA	REPLAN - NOITE
	Hazard	Hazard

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	74,6639	89,6739
Overpressure	0,1	bar	44,6811	52,1481
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	60,2364	118,095
Used Flammable Mass				
Overpressure Radius		m	59,6639	74,6739
Distance to:				
- Ignition Source		m	30	30
- Cloud Front/Centre		m	30	30
- Explosion Centre		m	15	15
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	60,2364	118,095
Used Flammable Mass				
Overpressure Radius		m	29,6811	37,1481
Distance to:				
- Ignition Source		m	30	30
- Cloud Front/Centre		m	30	30
- Explosion Centre		m	15	15
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	30,9067	34,0448
Furthest Extent	43000	ppm	30,9067	34,0448

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	600	600		
Liquid Rainout	fraction	0,999997	0,999997		
		Release Segment 1		Cloud Segment 1	
Cloud Segment Duration	s	101,003	105,063		
Pool Vaporization Rate	kg/s	4,28188	3,06786		
Total Vapor Flowrate	kg/s	4,28288	3,0689		
		Release Segment 1		Cloud Segment 2	
Cloud Segment Duration	s	500,223	496,163		
Pool Vaporization Rate	kg/s	6,89005	5,16979		
Total Vapor Flowrate	kg/s	6,89105	5,17083		
		Release Segment 1		Cloud Segment 3	
Cloud Segment Duration	s	20998,8	20998,8		
Pool Vaporization Rate	kg/s	2,76133	2,23891		
Total Vapor Flowrate	kg/s	6,89005	5,16979		
Maximum Pool Radius	m	32,1058	32,1058		

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

		Distance (m)		REPLAN - DIA		REPLAN - NOITE	
Radiation Level	3	kW/m2	133,476	132,575			
Radiation Level	18,3	kW/m2	65,1574	64,3507			
Radiation Level	36	kW/m2	42,5561	42,0566			
Radiation Level	71,2	kW/m2	33,1182	33,1182			



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	133,476	132,575
Radiation Level	18,3	kW/m2	65,1574	64,3507
Radiation Level	36	kW/m2	42,5561	42,0566
Radiation Level	71,2	kW/m2	33,1182	33,1182

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

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Study Folder: SEDA

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Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 3238 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 54,6 m/s
Droplet Diameter(1) 124,9 um
Duration of Discharge(1) 600 s
Final Temperature(1) 40 degC
Release Rate(1) 301,5 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

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Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - 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	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	600	600
Liquid Rainout	fraction	0,239343	0,187031
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	227,256	251,223
Pool Vaporization Rate	kg/s	1,71048	0,959389
Total Vapor Flowrate	kg/s	231,048	246,069
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	86,92	98,4675
Pool Vaporization Rate	kg/s	4,46079	2,44902
Total Vapor Flowrate	kg/s	233,799	247,559
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	68,0269	76,7325
Pool Vaporization Rate	kg/s	5,70812	3,17725
Total Vapor Flowrate	kg/s	235,046	248,287
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	58,7975	64,2
Pool Vaporization Rate	kg/s	6,69953	3,75518
Total Vapor Flowrate	kg/s	236,037	248,865
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	99,5625	56,9375
Pool Vaporization Rate	kg/s	7,89882	4,24589
Total Vapor Flowrate	kg/s	237,237	249,356
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	120,963	190,671
Pool Vaporization Rate	kg/s	9,42143	5,00855
Total Vapor Flowrate	kg/s	238,759	250,119
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	20938,5	20861,8
Pool Vaporization Rate	kg/s	1,87342	1,46478
Total Vapor Flowrate	kg/s	9,42143	5,00855
Maximum Pool Radius	m	57,0348	50,9569

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	166,031	177,499
Radiation Level	18,3	kW/m2	100,43	118,367
Radiation Level	36	kW/m2	78,5531	98,4373
Radiation Level	71,2	kW/m2	69,6956	91,4401

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE

**Radiation Effects: Late Pool Fire Ellipse****Path:** \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	261,156	263,705
Radiation Level	18,3	kW/m2	148,992	162,085
Radiation Level	36	kW/m2	115,621	131,514
Radiation Level	71,2	kW/m2	96,092	115,179

Weather Conditions**Path:** \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

			REPLAN - DIA	REPLAN - NOITE
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

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Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 3238 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 54,6 m/s
Droplet Diameter(1) 124,9 um
Duration of Discharge(1) 600 s
Final Temperature(1) 40 degC
Release Rate(1) 301,5 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

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[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]

Multi Energy Explosion

Use Unconfined Volumes	No
Use Fractions	No
Source 1 (Source in Use)	Yes
Source 2 (Source in Use)	No
Source 3 (Source in Use)	No
Source 4 (Source in Use)	No
Source 5 (Source in Use)	No
Source 6 (Source in Use)	No
Source 7 (Source in Use)	No
Source 1 (Strength)	5
Source 1 (Volume)	3312 m3

Geometry

Geometry shape	Point
Coordinates	Absolute
East(1)	0 m
North(1)	0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0864585	0,0847714
LFL (43000)	18,75	s	0,119118	0,0982824
LFL Frac (43000)	18,75	s	0,119118	0,0982824

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,119118	0,0982824
Furthest Extent	43000	ppm	0,119118	0,0982824

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

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Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

Late Pool Fire Status

REPLAN - DIA
REPLAN - NOITE
Hazard Hazard

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	600	600
Liquid Rainout	fraction	0,332579	0,40437
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	230,281	262,44
Pool Vaporization Rate	kg/s	2,31958	1,96094
Total Vapor Flowrate	kg/s	203,547	181,544
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	85,67	95,7156
Pool Vaporization Rate	kg/s	6,29033	5,36384
Total Vapor Flowrate	kg/s	207,518	184,946
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	67,23	75,525
Pool Vaporization Rate	kg/s	7,97626	6,8666
Total Vapor Flowrate	kg/s	209,204	186,449
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	57,8194	64,725
Pool Vaporization Rate	kg/s	9,31448	8,07069
Total Vapor Flowrate	kg/s	210,542	187,653
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	98,4006	57,375
Pool Vaporization Rate	kg/s	10,9382	9,10808
Total Vapor Flowrate	kg/s	212,165	188,691
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	120,839	190,625
Pool Vaporization Rate	kg/s	13,0063	10,6186
Total Vapor Flowrate	kg/s	214,234	190,201
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	20939,8	20853,6
Pool Vaporization Rate	kg/s	2,60382	3,16343
Total Vapor Flowrate	kg/s	13,0063	10,6186
Maximum Pool Radius	m	67,2547	74,9984

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	236,639	263,653
Radiation Level	18,3	kW/m2	160,991	181,119
Radiation Level	36	kW/m2	136,478	155,215
Radiation Level	71,2	kW/m2	125,437	143,146

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	346,667	384,988
Radiation Level	18,3	kW/m2	217,487	243,522
Radiation Level	36	kW/m2	179,872	202,967
Radiation Level	71,2	kW/m2	156,576	178,123

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-fenda Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1364 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 91,4 m/s
Droplet Diameter(1) 53,04 um
Duration of Discharge(1) 2820 s
Final Temperature(1) 40 degC
Release Rate(1) 31,6 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	4,39498	5,54817
LFL (43000)	18,75	s	16,6948	17,9698
LFL Frac (43000)	18,75	s	16,6948	17,9698

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

Early Pool Fire Status	REPLAN - DIA	REPLAN - NOITE
	Hazard	Hazard



Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

Explosion Model Used : Multi Energy
 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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	30,776	38,6814
Overpressure	0,1	bar	17,823	21,7555
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA REPLAN - NOITE	
Supplied Flammable Mass		kg	4,85676	10,8366
Used Flammable Mass				
Overpressure Radius		m	25,7755	33,6814
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5,00043	5
			Supplementary Data at 0,1 bar	
			REPLAN - DIA REPLAN - NOITE	
Supplied Flammable Mass		kg	4,85676	10,8366
Used Flammable Mass				
Overpressure Radius		m	12,8226	16,7555
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5,00043	5
			Supplementary Data at 0,3 bar	
			REPLAN - DIA REPLAN - NOITE	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA REPLAN - NOITE	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	16,6948	17,9698
Furthest Extent	43000	ppm	16,6948	17,9698

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

		REPLAN - DIA		REPLAN - NOITE	
	Release Segment 1				
Release Duration	s	2820		2820	
Liquid Rainout	fraction	0,999987		0,999986	
	Release Segment 1 Cloud Segment 1				
Cloud Segment Duration	s	72,6756		408,04	
Pool Vaporization Rate	kg/s	0,620326		1,21718	
Total Vapor Flowrate	kg/s	0,621326		1,21818	
	Release Segment 1 Cloud Segment 2				
Cloud Segment Duration	s	33,4144		2411,96	
Pool Vaporization Rate	kg/s	1,36995		1,64155	
Total Vapor Flowrate	kg/s	1,37095		1,64255	
	Release Segment 1 Cloud Segment 3				
Cloud Segment Duration	s	26,7356		18780	
Pool Vaporization Rate	kg/s	1,69423		0,946542	
Total Vapor Flowrate	kg/s	1,69523		0,946542	
	Release Segment 1 Cloud Segment 4				
Cloud Segment Duration	s	23,4244			
Pool Vaporization Rate	kg/s	1,94849			
Total Vapor Flowrate	kg/s	1,94949			
	Release Segment 1 Cloud Segment 5				
Cloud Segment Duration	s	19,9756			
Pool Vaporization Rate	kg/s	2,15913			
Total Vapor Flowrate	kg/s	2,16013			
	Release Segment 1 Cloud Segment 6				
Cloud Segment Duration	s	21423,8			
Pool Vaporization Rate	kg/s	1,26785			
Total Vapor Flowrate	kg/s	1,26885			
Maximum Pool Radius	m	20,8353		20,8353	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	88,2876	88,0499
Radiation Level	18,3	kW/m2	42,4499	42,0555
Radiation Level	36	kW/m2	25,937	25,7941
Radiation Level	71,2	kW/m2	21,2852	21,3855

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	90,4844	89,8421
Radiation Level	18,3	kW/m2	43,5472	42,9422
Radiation Level	36	kW/m2	26,7261	26,4177
Radiation Level	71,2	kW/m2	21,8459	21,8459

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

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Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1364 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 91,4 m/s
Droplet Diameter(1) 53,04 um
Duration of Discharge(1) 2820 s
Final Temperature(1) 40 degC
Release Rate(1) 31,6 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0290996	0,0276244
LFL (43000)	18,75	s	0,0400865	0,0356883
LFL Frac (43000)	18,75	s	0,0400865	0,0356883

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,0400865	0,0356883
Furthest Extent	43000	ppm	0,0400865	0,0356883

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

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Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	2820	2820
Liquid Rainout	fraction	0,0227943	0,0307132
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	843,903	900
Pool Vaporization Rate	kg/s	0,0902007	0,078072
Total Vapor Flowrate	kg/s	30,9699	30,7075
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	379,348	388,81
Pool Vaporization Rate	kg/s	0,200436	0,180823
Total Vapor Flowrate	kg/s	31,0801	30,8103
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	305,559	307,193
Pool Vaporization Rate	kg/s	0,249953	0,229558
Total Vapor Flowrate	kg/s	31,1297	30,859
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	266,831	263,763
Pool Vaporization Rate	kg/s	0,286796	0,266828
Total Vapor Flowrate	kg/s	31,1665	30,8963
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	462,985	456,25
Pool Vaporization Rate	kg/s	0,328565	0,3106
Total Vapor Flowrate	kg/s	31,2083	30,9401
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	593,339	568,094
Pool Vaporization Rate	kg/s	0,381025	0,367638
Total Vapor Flowrate	kg/s	31,2607	30,9971
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	4740,89	7456,51
Pool Vaporization Rate	kg/s	0,186158	0,202862
Total Vapor Flowrate	kg/s	0,381025	0,367638
Maximum Pool Radius	m	10,4712	13,0749

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	63,72	88,402
Radiation Level	18,3	kW/m2	54,2157	77,7969
Radiation Level	36	kW/m2	51,8525	74,8202
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	96,3909	129,214
Radiation Level	18,3	kW/m2	70,549	97,9101
Radiation Level	36	kW/m2	60,2577	86,186
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

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Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1364 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 91,4 m/s
Droplet Diameter(1) 53,04 um
Duration of Discharge(1) 2820 s
Final Temperature(1) 40 degC
Release Rate(1) 31,6 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0417218	0,0402762
LFL (43000)	18,75	s	1,89522	0,080079
LFL Frac (43000)	18,75	s	1,89522	0,080079

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	1,89522	0,080079
Furthest Extent	43000	ppm	1,89522	0,080079

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

SUMMARY REPORT

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Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

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Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	2820	2820
Liquid Rainout	fraction	0,0192469	0,0529664
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	842,451	901,501
Pool Vaporization Rate	kg/s	0,0774282	0,130771
Total Vapor Flowrate	kg/s	31,0692	30,057
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	380,8	389,105
Pool Vaporization Rate	kg/s	0,17163	0,303488
Total Vapor Flowrate	kg/s	31,1634	30,2297
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	305,559	305,397
Pool Vaporization Rate	kg/s	0,213928	0,385425
Total Vapor Flowrate	kg/s	31,2057	30,3117
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	266,831	263,763
Pool Vaporization Rate	kg/s	0,245293	0,448132
Total Vapor Flowrate	kg/s	31,2371	30,3744
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	467,74	451,44
Pool Vaporization Rate	kg/s	0,281032	0,521652
Total Vapor Flowrate	kg/s	31,2728	30,4479
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	593,929	567,534
Pool Vaporization Rate	kg/s	0,325773	0,617807
Total Vapor Flowrate	kg/s	31,3176	30,5441
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	3930,18	10843,1
Pool Vaporization Rate	kg/s	0,169788	0,282698
Total Vapor Flowrate	kg/s	0,325773	0,617807
Maximum Pool Radius	m	9,59147	17,2339

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	85,3733	101,871
Radiation Level	18,3	kW/m2	76,4566	88,7834
Radiation Level	36	kW/m2	74,4344	84,305
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	115,509	154,307
Radiation Level	18,3	kW/m2	91,5517	114,532
Radiation Level	36	kW/m2	81,9034	100,092
Radiation Level	71,2	kW/m2	Not Reached	96,8497

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-furo Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

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Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 3741 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 6,2 m/s
Droplet Diameter(1) 4,589E4 um
Duration of Discharge(1) 300 s
Final Temperature(1) 40 degC
Release Rate(1) 853,5 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

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Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	4,5115	7,72228
LFL (43000)	18,75	s	30,2379	55,0416
LFL Frac (43000)	18,75	s	30,2379	55,0416

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	105,693	121,134
Overpressure	0,1	bar	60,1172	73,1976
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	211,566	246,174
Used Flammable Mass				
Overpressure Radius		m	90,6931	95,3907
Distance to:				
- Ignition Source		m	30	50
- Cloud Front/Centre		m	30	50
- Explosion Centre		m	15	25,7435
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	211,566	246,174
Used Flammable Mass				
Overpressure Radius		m	45,1172	47,4541
Distance to:				
- Ignition Source		m	30	50
- Cloud Front/Centre		m	30	50
- Explosion Centre		m	15	25,7435
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	30,2379	55,0416
Furthest Extent	43000	ppm	30,2379	55,0416

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	300		300	
Liquid Rainout	fraction	0,992649		0,992116	
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	59,29		60,0625	
Pool Vaporization Rate	kg/s	4,34999		3,20764	
Total Vapor Flowrate	kg/s	10,6242		9,93684	
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	241,577		240,804	
Pool Vaporization Rate	kg/s	8,50849		6,32719	
Total Vapor Flowrate	kg/s	14,7827		13,0564	
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	21299,1		21299,1	
Pool Vaporization Rate	kg/s	3,27278		2,64333	
Total Vapor Flowrate	kg/s	8,50849		6,32719	
Maximum Pool Radius	m	34,5079		34,5079	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

		Distance (m)		REPLAN - DIA		REPLAN - NOITE	
Radiation Level	3	kW/m2	142,633		141,61		
Radiation Level	18,3	kW/m2	69,9105		68,9924		
Radiation Level	36	kW/m2	46,1821		45,5441		
Radiation Level	71,2	kW/m2	35,7575		35,6863		



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	142,633	141,61
Radiation Level	18,3	kW/m2	69,9105	68,9924
Radiation Level	36	kW/m2	46,1821	45,5441
Radiation Level	71,2	kW/m2	35,7575	35,6863

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool c/ bomba-ruptura Estação da REPLAN

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

**Dados de Entrada do Trecho Ribeirão Preto-REPLAN / Estação Meteorológica de
REPLAN – Álcool não Bombeado**

Cenário	Liberação de produto desde o km 238+500 até o km 342+700. (Ø da linha=24”).
Modelos de Simulação Utilizados	User Defined
Diâmetro do vazamento	609,9 mm (100% do diâmetro) 121,92 mm (20% do diâmetro) 30,48 mm (5% do diâmetro)
Direção do vazamento	Vertical (V) Angular 45° (A) Horizontal Impingement(HI)
Altura da linha	0 m
Substância	Etanol Parado
Velocidade de vazamento^{A, B}	1,9 m/s (100% do diâmetro) 36,6 m/s (20% do diâmetro) 58,9 m/s (5% do diâmetro)
Diâmetro de gota^{A, B}	117,00 mm (100% do diâmetro) 0,206 mm (20% do diâmetro) 0,025 mm (5% do diâmetro)
Tempo de vazamento	468 s (100% do diâmetro) 666 s (20% do diâmetro) 4290 s (5% do diâmetro)
Taxa de vazamento^{A, B}	257,3 kg/s (100% do diâmetro) 202,2 kg/s (20% do diâmetro) 20,3 kg/s (5% do diâmetro)
Temperatura	40°C
Área da poça^{A, B}	2962,2 m ² (100% do diâmetro) 2912,7 m ² (20% do diâmetro) 1298,8 m ² (5% do diâmetro)
Volume de confinamento	3312 m ³
Considerações	
A – Calculado pelo LeakMap	
B – Os valores para ruptura foram retirados do Aglomerado Humano denominado Proximidade à edificações (km 268,74). Os valores para furo com 20% do diâmetro foram retirados do Aglomerado Humano Bairro Jardim Jandira (km 239,15). Os valores para furo com 5% do diâmetro foram retirados do Aglomerado Humano denominado Propriedade Rural (km 272,52).	



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Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 2913 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 36,6 m/s
Droplet Diameter(1) 206,3 um
Duration of Discharge(1) 666 s
Final Temperature(1) 40 degC
Release Rate(1) 202,2 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	7,47732	9,46088
LFL (43000)	18,75	s	28,0368	30,4852
LFL Frac (43000)	18,75	s	28,0368	30,4852

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	52,8109	84,1843
Overpressure	0,1	bar	31,2972	49,4172
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	22,2529	93,9176
Used Flammable Mass				
Overpressure Radius		m	42,8109	69,1843
Distance to:				
- Ignition Source		m	20	30
- Cloud Front/Centre		m	20	30
- Explosion Centre		m	10	15
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	22,2529	93,9176
Used Flammable Mass				
Overpressure Radius		m	21,2972	34,4172
Distance to:				
- Ignition Source		m	20	30
- Cloud Front/Centre		m	20	30
- Explosion Centre		m	10	15
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	28,0368	30,4852
Furthest Extent	43000	ppm	28,0368	30,4852

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	666	666		
Liquid Rainout	fraction	0,999997	0,999997		
		Release Segment 1		Cloud Segment 1	
Cloud Segment Duration	s	111,303	116,64		
Pool Vaporization Rate	kg/s	3,62963	2,56659		
Total Vapor Flowrate	kg/s	3,63063	2,56759		
		Release Segment 1		Cloud Segment 2	
Cloud Segment Duration	s	554,697	550,652		
Pool Vaporization Rate	kg/s	5,81078	4,34487		
Total Vapor Flowrate	kg/s	5,81178	4,34587		
		Release Segment 1		Cloud Segment 3	
Cloud Segment Duration	s	20934	20932,7		
Pool Vaporization Rate	kg/s	2,43372	1,97069		
Total Vapor Flowrate	kg/s	2,43372	4,34487		
Maximum Pool Radius	m	30,449	30,449		

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

		Distance (m)		REPLAN - DIA		REPLAN - NOITE	
Radiation Level	3	kW/m2	127,276	126,415			
Radiation Level	18,3	kW/m2	62,0264	61,2481			
Radiation Level	36	kW/m2	40,2426	39,7608			
Radiation Level	71,2	kW/m2	31,4614	31,4614			



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	127,276	126,415
Radiation Level	18,3	kW/m2	62,0264	61,2481
Radiation Level	36	kW/m2	40,2426	39,7608
Radiation Level	71,2	kW/m2	31,4614	31,4614

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Ribeirão Preto - REPLAN-24"-álcool s/

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 2913 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 36,6 m/s
Droplet Diameter(1) 206,3 um
Duration of Discharge(1) 666 s
Final Temperature(1) 40 degC
Release Rate(1) 202,2 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - 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	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	666	666		
Liquid Rainout	fraction	0,422961	0,413407		
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	277,222	276,391		
Pool Vaporization Rate	kg/s	1,73176	1,53012		
Total Vapor Flowrate	kg/s	118,409	120,139		
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	703,103	106,79		
Pool Vaporization Rate	kg/s	2,05154	3,95355		
Total Vapor Flowrate	kg/s	118,729	122,563		
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	20619,7	83,3794		
Pool Vaporization Rate	kg/s	2,24089	5,10108		
Total Vapor Flowrate	kg/s	2,05154	123,71		
		Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s		70,5206		
Pool Vaporization Rate	kg/s		6,01651		
Total Vapor Flowrate	kg/s	2,24089	124,626		
		Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s		61,945		
Pool Vaporization Rate	kg/s		6,7943		
Total Vapor Flowrate	kg/s		125,403		
		Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s		208,024		
Pool Vaporization Rate	kg/s		8,03252		
Total Vapor Flowrate	kg/s		126,642		
		Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s		20793		
Pool Vaporization Rate	kg/s		2,40299		
Total Vapor Flowrate	kg/s		8,03252		
Maximum Pool Radius	m	30,449	65,2343		

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	151,316	172,439
Radiation Level	18,3	kW/m2	86,0667	102,32
Radiation Level	36	kW/m2	64,2829	79,5382
Radiation Level	71,2	kW/m2	55,5017	70,1928

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	151,316	285,924
Radiation Level	18,3	kW/m2	86,0667	160,339
Radiation Level	36	kW/m2	64,2829	123,764
Radiation Level	71,2	kW/m2	55,5017	102,288

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 2913 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 36,6 m/s
Droplet Diameter(1) 206,3 um
Duration of Discharge(1) 666 s
Final Temperature(1) 40 degC
Release Rate(1) 202,2 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

SUMMARY REPORT

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Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0865792	0,0847017
LFL (43000)	18,75	s	0,121895	0,0982291
LFL Frac (43000)	18,75	s	0,121895	0,0982291

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,121895	0,0982291
Furthest Extent	43000	ppm	0,121895	0,0982291

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

SUMMARY REPORT

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Phast 6.53.1



Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

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Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	666	666
Liquid Rainout	fraction	0,581969	0,605432
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	250,431	275,56
Pool Vaporization Rate	kg/s	2,9686	2,183
Total Vapor Flowrate	kg/s	87,4946	81,9646
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	92,745	102,742
Pool Vaporization Rate	kg/s	8,0538	5,83941
Total Vapor Flowrate	kg/s	92,5798	85,621
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	72,9844	80,7281
Pool Vaporization Rate	kg/s	10,1754	7,45634
Total Vapor Flowrate	kg/s	94,7014	87,2379
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	63,45	68,82
Pool Vaporization Rate	kg/s	11,8545	8,75016
Total Vapor Flowrate	kg/s	96,3804	88,5317
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	108,453	61,425
Pool Vaporization Rate	kg/s	13,9057	9,86286
Total Vapor Flowrate	kg/s	98,4317	89,6444
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	131,929	203,624
Pool Vaporization Rate	kg/s	16,5484	11,6537
Total Vapor Flowrate	kg/s	101,074	91,4352
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	20880	20807,1
Pool Vaporization Rate	kg/s	3,37902	3,52039
Total Vapor Flowrate	kg/s	16,5484	11,6537
Maximum Pool Radius	m	76,476	78,9531

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	215,915	222,463
Radiation Level	18,3	kW/m2	134,85	139,782
Radiation Level	36	kW/m2	109,046	113,842
Radiation Level	71,2	kW/m2	96,7057	101,741

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	346,156	356,729
Radiation Level	18,3	kW/m2	201,993	208,911
Radiation Level	36	kW/m2	160,636	166,773
Radiation Level	71,2	kW/m2	134,057	140,59

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-fenda Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

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Phast 6.53.1



Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1299 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 58,9 m/s
Droplet Diameter(1) 25,16 um
Duration of Discharge(1) 4290 s
Final Temperature(1) 40 degC
Release Rate(1) 20,3 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	3,98157	5,00602
LFL (43000)	18,75	s	15,3486	16,4089
LFL Frac (43000)	18,75	s	15,3486	16,4089

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

Early Pool Fire Status	REPLAN - DIA	REPLAN - NOITE
	Hazard	Hazard

SUMMARY REPORT

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Phast 6.53.1



Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	27,1443	37,2538
Overpressure	0,1	bar	16,0161	21,0453
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	3,0797	9,51624
Used Flammable Mass				
Overpressure Radius		m	22,1443	32,2538
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	3,0797	9,51624
Used Flammable Mass				
Overpressure Radius		m	11,0161	16,0453
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	15,3486	16,4089
Furthest Extent	43000	ppm	15,3486	16,4089

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	4290	4290
Liquid Rainout	fraction	0,999987	0,999986
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	82,3556	606,391
Pool Vaporization Rate	kg/s	0,46694	1,07282
Total Vapor Flowrate	kg/s	0,46794	1,07382
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	39,195	3683,61
Pool Vaporization Rate	kg/s	0,98337	1,41217
Total Vapor Flowrate	kg/s	0,98437	1,41317
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	31,59	17310
Pool Vaporization Rate	kg/s	1,22495	0,894549
Total Vapor Flowrate	kg/s	1,22595	0,894549
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	27,09	
Pool Vaporization Rate	kg/s	1,41221	
Total Vapor Flowrate	kg/s	1,41321	
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	47,7794	
Pool Vaporization Rate	kg/s	1,63801	
Total Vapor Flowrate	kg/s	1,63901	
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	38,4956	
Pool Vaporization Rate	kg/s	1,88559	
Total Vapor Flowrate	kg/s	1,88659	
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	21333,5	
Pool Vaporization Rate	kg/s	1,21607	
Total Vapor Flowrate	kg/s	1,21707	
Maximum Pool Radius	m	20,3328	20,3328

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	72,3166	72,1079
Radiation Level	18,3	kW/m2	34,4963	34,149
Radiation Level	36	kW/m2	20,3287	20,2131
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	88,5157	87,8855
Radiation Level	18,3	kW/m2	42,5639	41,9737
Radiation Level	36	kW/m2	26,0144	25,733
Radiation Level	71,2	kW/m2	21,3434	21,3434

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

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Ribeirão Preto - REPLAN-24"-álcool s/

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1299 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 58,9 m/s
Droplet Diameter(1) 25,16 um
Duration of Discharge(1) 4290 s
Final Temperature(1) 40 degC
Release Rate(1) 20,3 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

Study Folder: SEDA

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0290996	0,0276244
LFL (43000)	18,75	s	0,0400865	0,0356883
LFL Frac (43000)	18,75	s	0,0400865	0,0356883

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,0400865	0,0356883
Furthest Extent	43000	ppm	0,0400865	0,0356883

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

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Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	4290		4290	
Liquid Rainout	fraction	0,0373341		0,0507289	
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	1221,5		1310,44	
Pool Vaporization Rate	kg/s	0,130167		0,117378	
Total Vapor Flowrate	kg/s	19,6723		19,3876	
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	569,903		579,636	
Pool Vaporization Rate	kg/s	0,279738		0,264912	
Total Vapor Flowrate	kg/s	19,8219		19,5351	
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	462,47		462,174	
Pool Vaporization Rate	kg/s	0,344123		0,332985	
Total Vapor Flowrate	kg/s	19,8862		19,6032	
		Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	782,134		401,376	
Pool Vaporization Rate	kg/s	0,407951		0,384162	
Total Vapor Flowrate	kg/s	19,9501		19,6544	
		Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	1290,09		697,937	
Pool Vaporization Rate	kg/s	0,490685		0,443096	
Total Vapor Flowrate	kg/s	20,0328		19,7133	
		Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	6200,41		881,118	
Pool Vaporization Rate	kg/s	0,217018		0,518097	
Total Vapor Flowrate	kg/s	0,490685		19,7883	
		Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s			9715,25	
Pool Vaporization Rate	kg/s			0,251118	
Total Vapor Flowrate	kg/s	0,217018		0,518097	
Maximum Pool Radius	m	12,1764		15,6723	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	48,7714	57,577
Radiation Level	18,3	kW/m2	39,0705	46,7223
Radiation Level	36	kW/m2	36,6108	43,6069
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE

**Radiation Effects: Late Pool Fire Ellipse****Path:** \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	88,1788	108,394
Radiation Level	18,3	kW/m2	58,7355	71,7665
Radiation Level	36	kW/m2	47,2589	58,2705
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions**Path:** \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

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Phast 6.53.1



Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1299 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 58,9 m/s
Droplet Diameter(1) 25,16 um
Duration of Discharge(1) 4290 s
Final Temperature(1) 40 degC
Release Rate(1) 20,3 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,041721	0,0402756
LFL (43000)	18,75	s	0,0865461	0,0800128
LFL Frac (43000)	18,75	s	0,0865461	0,0800128

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,0865461	0,0800128
Furthest Extent	43000	ppm	0,0865461	0,0800128

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

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Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	4290	4290
Liquid Rainout	fraction	0,0323123	0,104501
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	1216,27	1315,88
Pool Vaporization Rate	kg/s	0,113905	0,233566
Total Vapor Flowrate	kg/s	19,758	18,4122
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	568,797	582,905
Pool Vaporization Rate	kg/s	0,244156	0,529108
Total Vapor Flowrate	kg/s	19,8882	18,7077
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	461,697	463,179
Pool Vaporization Rate	kg/s	0,300238	0,666201
Total Vapor Flowrate	kg/s	19,9443	18,8448
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	780,991	399,542
Pool Vaporization Rate	kg/s	0,355782	0,769036
Total Vapor Flowrate	kg/s	19,9998	18,9477
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	1291,77	692,998
Pool Vaporization Rate	kg/s	0,427834	0,887166
Total Vapor Flowrate	kg/s	20,0719	19,0658
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	5476,27	884,765
Pool Vaporization Rate	kg/s	0,199743	1,03841
Total Vapor Flowrate	kg/s	0,427834	19,217
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s		14313,2
Pool Vaporization Rate	kg/s		0,400662
Total Vapor Flowrate	kg/s	0,199743	1,03841
Maximum Pool Radius	m	11,2855	22,6469

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	63,7885	77,8639
Radiation Level	18,3	kW/m2	54,624	63,4373
Radiation Level	36	kW/m2	52,4433	58,2442
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	100,53	148,808
Radiation Level	18,3	kW/m2	72,9602	98,3901
Radiation Level	36	kW/m2	62,052	80,871
Radiation Level	71,2	kW/m2	Not Reached	75,612

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-furo Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

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Phast 6.53.1



Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 2962 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 1,9 m/s
Droplet Diameter(1) 1,175E5 um
Duration of Discharge(1) 468 s
Final Temperature(1) 40 degC
Release Rate(1) 257,3 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

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Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	3,45697	5,68037
LFL (43000)	18,75	s	16,9355	23,8428
LFL Frac (43000)	18,75	s	16,9355	23,8428

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	46,06	1,56479
Overpressure	0,1	bar	25,4262	0,778454
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	19,6327	0,0010866
Used Flammable Mass				
Overpressure Radius		m	41,06	1,56476
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	2,92219e-005

			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	19,6327	0,0010866
Used Flammable Mass				
Overpressure Radius		m	20,4262	0,778425
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	2,92219e-005

			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0

			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \\SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	16,9355	23,8428
Furthest Extent	43000	ppm	16,9355	23,8428

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \\SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	468		468	
Liquid Rainout	fraction	0,997421		0,999057	
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	86,0256		88,8306	
Pool Vaporization Rate	kg/s	3,32373		2,29805	
Total Vapor Flowrate	kg/s	3,98741		2,54081	
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	381,974		380,253	
Pool Vaporization Rate	kg/s	5,98783		4,27519	
Total Vapor Flowrate	kg/s	6,65151		4,51795	
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	21132		21130,9	
Pool Vaporization Rate	kg/s	2,45556		1,97618	
Total Vapor Flowrate	kg/s	2,45556		4,27519	
Maximum Pool Radius	m	30,7066		30,7066	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

		Distance (m)		
		REPLAN - DIA	REPLAN - NOITE	
Radiation Level	3	kW/m2	128,285	127,456
Radiation Level	18,3	kW/m2	62,5579	61,8127
Radiation Level	36	kW/m2	40,6476	40,1975
Radiation Level	71,2	kW/m2	31,7627	31,8003



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	128,285	127,456
Radiation Level	18,3	kW/m2	62,5579	61,8127
Radiation Level	36	kW/m2	40,6476	40,1975
Radiation Level	71,2	kW/m2	31,7627	31,8003

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-álcool s/ bomba-ruptura Estação da REPLAN

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

**Dados de Entrada do Trecho Ribeirão Preto-REPLAN / Estação Meteorológica de
REPLAN – Gasolina Bombeada**

Cenário	Liberação de produto desde o km 238+500 até o km 342+700. (Ø da linha=24”).
Modelos de Simulação Utilizados	User Defined
Diâmetro do vazamento	609,9 mm (100% do diâmetro) 121,92 mm (20% do diâmetro) 30,48 mm (5% do diâmetro)
Direção do vazamento	Vertical (V) Angular 45° (A) Horizontal Impingement(HI)
Altura da linha	0 m
Substância	Gasolina
Velocidade de vazamento^{A, B}	6,2 m/s (100% do diâmetro) 55,7 m/s (20% do diâmetro) 91,4 m/s (5% do diâmetro)
Diâmetro de gota^{A, B}	5,38 mm (100% do diâmetro) 0,067 mm (20% do diâmetro) 0,024 mm (5% do diâmetro)
Tempo de vazamento	300 s (100% do diâmetro) 582 s (20% do diâmetro) 2652 s (5% do diâmetro)
Taxa de vazamento^{A, B}	811,2 kg/s (100% do diâmetro) 292,7 kg/s (20% do diâmetro) 30,8 kg/s (5% do diâmetro)
Temperatura	40°C
Área da poça^{A, B}	4119,8 m ² (100% do diâmetro) 3654,6 m ² (20% do diâmetro) 1402,2 m ² (5% do diâmetro)
Volume de confinamento	3312 m ³
Considerações	
A – Calculado pelo LeakMap	
B – Os valores para ruptura foram retirados do Aglomerado Humano denominado Propriedade Rural (km 276,59). Os valores para furo com 20% do diâmetro foram retirados do Aglomerado Humano denominado Propriedade Rural (km 272,52). Os valores para furo com 5% do diâmetro foram retirados do Aglomerado Humano Bairro Jardim Jandira (km 239,15).	



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Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 3655 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 55,7 m/s
Droplet Diameter(1) 66,67 um
Duration of Discharge(1) 582 s
Final Temperature(1) 40 degC
Release Rate(1) 292,7 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75 s		29,3341	46,6629
LFL (10500)	18,75 s		104,891	127,56
LFL Frac (10500)	18,75 s		104,891	127,56

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75 s		0	0
LFL (10500)	18,75 s		0	0
LFL Frac (10500)	18,75 s		0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Early Pool Fire Status	REPLAN - DIA	REPLAN - NOITE
	Hazard	Hazard

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	166,767	177,301
Overpressure	0,1	bar	108,088	118,354
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	702,44	1739,65
Used Flammable Mass				
Overpressure Radius		m	116,767	117,301
Distance to:				
- Ignition Source		m	100	120
- Cloud Front/Centre		m	100	120
- Explosion Centre		m	50	60
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	702,44	1739,65
Used Flammable Mass				
Overpressure Radius		m	58,0884	58,354
Distance to:				
- Ignition Source		m	100	120
- Cloud Front/Centre		m	100	120
- Explosion Centre		m	50	60
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	104,891	127,56
Furthest Extent	10500	ppm	104,891	127,56

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

		REPLAN - DIA		REPLAN - NOITE	
	Release Segment 1				
Release Duration	s	582		582	
Liquid Rainout	fraction	0,999982		0,99998	
	Release Segment 1				
	Cloud Segment 1				
Cloud Segment Duration	s	97,5156		101,506	
Pool Vaporization Rate	kg/s	14,8885		10,8342	
Total Vapor Flowrate	kg/s	14,8937		10,84	
	Release Segment 1				
	Cloud Segment 2				
Cloud Segment Duration	s	484,484		481,701	
Pool Vaporization Rate	kg/s	23,9406		18,2179	
Total Vapor Flowrate	kg/s	23,9459		18,2237	
	Release Segment 1				
	Cloud Segment 3				
Cloud Segment Duration	s	21018		21016,8	
Pool Vaporization Rate	kg/s	7,47416		7,40987	
Total Vapor Flowrate	kg/s	7,47416		18,2179	
Maximum Pool Radius	m	34,1071		34,1071	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

		Distance (m)		REPLAN - DIA		REPLAN - NOITE	
Radiation Level	3	kW/m2	97,3273	96,3039			
Radiation Level	18,3	kW/m2	31,5714	31,8547			
Radiation Level	36	kW/m2					
Radiation Level	71,2	kW/m2					



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	106,062	104,231
Radiation Level	18,3	kW/m2	35,1197	35,1197
Radiation Level	36	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

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Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 3655 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 55,7 m/s
Droplet Diameter(1) 66,67 um
Duration of Discharge(1) 582 s
Final Temperature(1) 40 degC
Release Rate(1) 292,7 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

SUMMARY REPORT

Study Folder: SEDA

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Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - 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	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Early Pool Fire Status
REPLAN - NOITE
Hazard

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Late Pool Fire Status
REPLAN - NOITE
Hazard

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

	Release Segment 1		REPLAN - NOITE
Release Duration	s		582
Liquid Rainout	fraction		0,000321566
Maximum Pool Radius	m		1,97078

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

			Distance (m)	REPLAN - NOITE
Radiation Level	3	kW/m2		72,3423
Radiation Level	18,3	kW/m2		67,4964
Radiation Level	36	kW/m2		65,4069
Radiation Level	71,2	kW/m2		64,9308



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

			Distance (m)
			REPLAN - NOITE
Radiation Level	3	kW/m2	85,9496
Radiation Level	18,3	kW/m2	72,505
Radiation Level	36	kW/m2	67,7816
Radiation Level	71,2	kW/m2	66,3485

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

		REPLAN - DIA	REPLAN - NOITE
Wind Speed	m/s	2,08	1,92
Pasquill Stability		B	F
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,08	19,7
Surface Temperature	degC	28,08	19,7
Relative Humidity	fraction	0,6686	0,7863

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 3655 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 55,7 m/s
Droplet Diameter(1) 66,67 um
Duration of Discharge(1) 582 s
Final Temperature(1) 40 degC
Release Rate(1) 292,7 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75 s		0,113566	0,097553
LFL (10500)	18,75 s		90,7436	5,04143
LFL Frac (10500)	18,75 s		90,7436	5,04143

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75 s		0	0
LFL (10500)	18,75 s		0	0
LFL Frac (10500)	18,75 s		0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Early Pool Fire Status	REPLAN - DIA	REPLAN - NOITE
	Hazard	Hazard

SUMMARY REPORT

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Explosion Model Used : Multi Energy
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 REPLAN - DIA
Overpressure	0,05	bar	95,2877
Overpressure	0,1	bar	91,7414
Overpressure	0,3	bar	Not Reachable
Overpressure	0,4	bar	Not Reachable
			Supplementary Data at 0,05 bar REPLAN - DIA
Supplied Flammable Mass		kg	0,0597273
Used Flammable Mass			
Overpressure Radius		m	7,05686
Distance to:			
- Ignition Source		m	90
- Cloud Front/Centre		m	90
- Explosion Centre		m	88,2309
			Supplementary Data at 0,1 bar REPLAN - DIA
Supplied Flammable Mass		kg	0,0597273
Used Flammable Mass			
Overpressure Radius		m	3,51058
Distance to:			
- Ignition Source		m	90
- Cloud Front/Centre		m	90
- Explosion Centre		m	88,2309
			Supplementary Data at 0,3 bar REPLAN - DIA
Supplied Flammable Mass		kg	Not Reachable
Used Flammable Mass			
Overpressure Radius		m	0
Distance to:			
- Ignition Source		m	Not Reachable
- Cloud Front/Centre		m	Not Reachable
- Explosion Centre		m	0
			Supplementary Data at 0,4 bar REPLAN - DIA
Supplied Flammable Mass		kg	Not Reachable
Used Flammable Mass			
Overpressure Radius		m	0
Distance to:			
- Ignition Source		m	Not Reachable

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- Cloud Front/Centre	m	Not Reachable
- Explosion Centre	m	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	90,7436	5,04143
Furthest Extent	10500	ppm	90,7436	5,04143

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	582		582	
Liquid Rainout	fraction	0,00408139		0,00632077	
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	182,926		191,822	
Pool Vaporization Rate	kg/s	0,130627		0,134468	
Total Vapor Flowrate	kg/s	291,636		290,984	
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	78,705		80,4275	
Pool Vaporization Rate	kg/s	0,304613		0,322309	
Total Vapor Flowrate	kg/s	291,81		291,172	
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	63,27		62,64	
Pool Vaporization Rate	kg/s	0,382008		0,41011	
Total Vapor Flowrate	kg/s	291,887		291,26	
		Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	54,375		54,1856	
Pool Vaporization Rate	kg/s	0,439318		0,476932	
Total Vapor Flowrate	kg/s	291,945		291,327	
		Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	94,875		93,825	
Pool Vaporization Rate	kg/s	0,504223		0,555717	
Total Vapor Flowrate	kg/s	292,01		291,406	
		Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	121,194		114,886	
Pool Vaporization Rate	kg/s	0,586228		0,657315	
Total Vapor Flowrate	kg/s	292,092		291,507	
		Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	1499,99		2457,52	
Pool Vaporization Rate	kg/s	0,247811		0,285771	
Total Vapor Flowrate	kg/s	0,586228		0,657315	
Maximum Pool Radius	m	6,84545		9,04379	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	109,574	126,487
Radiation Level	18,3	kW/m2	96,084	110,686
Radiation Level	36	kW/m2	91,2707	105,473
Radiation Level	71,2	kW/m2	89,762	104,162

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	130,762	148,717
Radiation Level	18,3	kW/m2	98,3931	111,919
Radiation Level	36	kW/m2	94,6551	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-fenda Estação da

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

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Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1402 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 93,7 m/s
Droplet Diameter(1) 23,56 um
Duration of Discharge(1) 2652 s
Final Temperature(1) 40 degC
Release Rate(1) 30,8 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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Unique Audit Number: 570.771

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	14,045	22,3173
LFL (10500)	18,75	s	55,5054	62,7983
LFL Frac (10500)	18,75	s	55,5054	62,7983

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

Early Pool Fire Status	REPLAN - DIA	REPLAN - NOITE
	Hazard	Hazard

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	105,933	143,67
Overpressure	0,1	bar	66,0283	86,5651
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	85,0965	249,388
Used Flammable Mass				
Overpressure Radius		m	79,4068	113,635
Distance to:				
- Ignition Source		m	50	60
- Cloud Front/Centre		m	50	60
- Explosion Centre		m	26,5257	30,035
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	85,0965	249,388
Used Flammable Mass				
Overpressure Radius		m	39,5026	56,5301
Distance to:				
- Ignition Source		m	50	60
- Cloud Front/Centre		m	50	60
- Explosion Centre		m	26,5257	30,035
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	55,5054	62,7983
Furthest Extent	10500	ppm	55,5054	62,7983

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	2652	2652		
Liquid Rainout	fraction	0,999924	0,999919		
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	71,4025	362,903		
Pool Vaporization Rate	kg/s	2,1859	4,16083		
Total Vapor Flowrate	kg/s	2,18824	4,16332		
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	32,6375	2289,1		
Pool Vaporization Rate	kg/s	4,78025	5,26535		
Total Vapor Flowrate	kg/s	4,78259	5,26784		
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	27,0625	18948		
Pool Vaporization Rate	kg/s	5,83976	2,92461		
Total Vapor Flowrate	kg/s	5,84211	2,92461		
		Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	43,7981			
Pool Vaporization Rate	kg/s	6,96813			
Total Vapor Flowrate	kg/s	6,97048			
		Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	21425,1			
Pool Vaporization Rate	kg/s	3,71792			
Total Vapor Flowrate	kg/s	3,72027			
Maximum Pool Radius	m	21,1266	21,1266		

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

		Distance (m)		REPLAN - DIA		REPLAN - NOITE	
Radiation Level	3	kW/m2	50,5524	49,8212			
Radiation Level	18,3	kW/m2	11,3844	11,318			
Radiation Level	36	kW/m2					
Radiation Level	71,2	kW/m2					

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Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	74,0674	72,6842
Radiation Level	18,3	kW/m2	22,1373	22,1373
Radiation Level	36	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

		REPLAN - DIA	REPLAN - NOITE
Wind Speed	m/s	2,08	1,92
Pasquill Stability		B	F
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,08	19,7
Surface Temperature	degC	28,08	19,7
Relative Humidity	fraction	0,6686	0,7863

SUMMARY REPORT

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Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1402 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 93,7 m/s
Droplet Diameter(1) 23,56 um
Duration of Discharge(1) 2652 s
Final Temperature(1) 40 degC
Release Rate(1) 30,8 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0,0361948	0,0328898
LFL (10500)	18,75	s	0,0482602	0,0413968
LFL Frac (10500)	18,75	s	0,0482602	0,0413968

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0,0482602	0,0413968
Furthest Extent	10500	ppm	0,0482602	0,0413968

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

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Unique Audit Number: 570.771

Phast 6.53.1



Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

		REPLAN - DIA		REPLAN - NOITE	
Wind Speed	m/s	2,08		1,92	
Pasquill Stability		B		F	
Surface Roughness Length	in	4,62348		4,62348	
Surface Roughness Parameter		0,09		0,09	
Atmospheric Temperature	degC	23,08		19,7	
Surface Temperature	degC	28,08		19,7	
Relative Humidity	fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1402 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 93,7 m/s
Droplet Diameter(1) 23,56 um
Duration of Discharge(1) 2652 s
Final Temperature(1) 40 degC
Release Rate(1) 30,8 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	1,45562	0,0646849
LFL (10500)	18,75	s	3,27629	2,05067
LFL Frac (10500)	18,75	s	3,27629	2,05067

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	3,27629	2,05067
Furthest Extent	10500	ppm	3,27629	2,05067

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-furo Estação da

		REPLAN - DIA		REPLAN - NOITE	
Wind Speed	m/s	2,08		1,92	
Pasquill Stability		B		F	
Surface Roughness Length	in	4,62348		4,62348	
Surface Roughness Parameter		0,09		0,09	
Atmospheric Temperature	degC	23,08		19,7	
Surface Temperature	degC	28,08		19,7	
Relative Humidity	fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4120 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 6,2 m/s
Droplet Diameter(1) 5381 um
Duration of Discharge(1) 300 s
Final Temperature(1) 40 degC
Release Rate(1) 811,2 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 3312 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	42,1184	64,4004
LFL (10500)	18,75	s	168,871	200,12
LFL Frac (10500)	18,75	s	168,871	200,12

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	188,73	244,168
Overpressure	0,1	bar	130,051	185,221
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	2525,28	5612,75
Used Flammable Mass				
Overpressure Radius		m	116,767	117,301
Distance to:				
- Ignition Source		m	160	200
- Cloud Front/Centre		m	160	200
- Explosion Centre		m	71,9628	126,867
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	2525,28	5612,75
Used Flammable Mass				
Overpressure Radius		m	58,0884	58,354
Distance to:				
- Ignition Source		m	160	200
- Cloud Front/Centre		m	160	200
- Explosion Centre		m	71,9628	126,867
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

SUMMARY REPORT

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	168,871	200,12
Furthest Extent	10500	ppm	168,871	200,12

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

		REPLAN - DIA		REPLAN - NOITE	
	Release Segment 1				
Release Duration	s	300		300	
Liquid Rainout	fraction	0,956433		0,97527	
	Release Segment 1				
	Cloud Segment 1				
Cloud Segment Duration	s	49,7025		60,0625	
Pool Vaporization Rate	kg/s	10,4847		10,8763	
Total Vapor Flowrate	kg/s	45,8261		30,9375	
	Release Segment 1				
	Cloud Segment 2				
Cloud Segment Duration	s	19,6031		240,804	
Pool Vaporization Rate	kg/s	26,5147		21,5826	
Total Vapor Flowrate	kg/s	61,8561		41,6438	
	Release Segment 1				
	Cloud Segment 3				
Cloud Segment Duration	s	21530,7		21299,1	
Pool Vaporization Rate	kg/s	10,4697		8,73914	
Total Vapor Flowrate	kg/s	45,8111		21,5826	
Maximum Pool Radius	m	36,2129		36,2129	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

		Distance (m)		REPLAN - DIA		REPLAN - NOITE	
Radiation Level	3	kW/m2	111,303	109,449			
Radiation Level	18,3	kW/m2	37,3353	37,3776			
Radiation Level	36	kW/m2					
Radiation Level	71,2	kW/m2					



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	111,303	109,449
Radiation Level	18,3	kW/m2	37,3353	37,3776
Radiation Level	36	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação REPLAN\Ribeirão Preto - REPLAN-24"-gasolina c/ bomba-ruptura Estação da REPLAN

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

**Dados de Entrada do Trecho REPLAN-Taubaté / Estação Meteorológica de REPLAN –
Álcool Bombeado**

Cenário	Liberação de produto desde o km 342+700 até o km 441+500. (Ø da linha=24”).
Modelos de Simulação Utilizados	User Defined
Diâmetro do vazamento	609,9 mm (100% do diâmetro) 121,92 mm (20% do diâmetro) 30,48 mm (5% do diâmetro)
Direção do vazamento	Vertical (V) Angular 45° (A) Horizontal Impingement(HI)
Altura da linha	0 m
Substância	Etanol Bombeado
Velocidade de vazamento^{A, B}	3,3 m/s (100% do diâmetro) 70,8 m/s (20% do diâmetro) 141,5 m/s (5% do diâmetro)
Diâmetro de gota^{A, B}	7,10 mm (100% do diâmetro) 0,071 mm (20% do diâmetro) 0,018 mm (5% do diâmetro)
Tempo de vazamento	300 s (100% do diâmetro) 534 s (20% do diâmetro) 1812 s (5% do diâmetro)
Taxa de vazamento^{A, B}	461,4 kg/s (100% do diâmetro) 391,2 kg/s (20% do diâmetro) 48,9 kg/s (5% do diâmetro)
Temperatura	40°C
Área da poça^{A, B}	4642,3 m ² (100% do diâmetro) 4373,1 m ² (20% do diâmetro) 1370,1 m ² (5% do diâmetro)
Volume de confinamento	2850 m ³
Considerações	
A – Calculado pelo LeakMap	
B – Os valores para ruptura foram retirados do Aglomerado Humano denominado CLC (km 355,65). Os valores para furo com 20% do diâmetro foram retirados do Aglomerado Humano denominado CLC (km 355,65). Os valores para furo com 5% do diâmetro foram retirados do Aglomerado Humano Bairro Tanquinho (km 355,00).	



SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present

Area of Dike 4373 m2

[Type of Bund Surface Concrete]

Bund Height 0,03 m

[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy

Jet Fire Method Shell

Dispersion

Number of Release Segments 1

Fluid Phase(1) Liquid

Discharge Velocity(1) 70,8 m/s

Droplet Diameter(1) 71,05 um

Duration of Discharge(1) 534 s

Final Temperature(1) 40 degC

Release Rate(1) 391,2 kg/s

Pre-Dilution Air Rates(1) 0 kg/s

Late Ignition Location No ignition location

Mass Inventory of material to Disperse 1E7 kg

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



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]

Multi Energy Explosion

Use Unconfined Volumes	No
Use Fractions	No
Source 1 (Source in Use)	Yes
Source 2 (Source in Use)	No
Source 3 (Source in Use)	No
Source 4 (Source in Use)	No
Source 5 (Source in Use)	No
Source 6 (Source in Use)	No
Source 7 (Source in Use)	No
Source 1 (Strength)	5
Source 1 (Volume)	2850 m3

Geometry

Geometry shape	Point
Coordinates	Absolute
East(1)	0 m
North(1)	0 m

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	9,43141	12,8691
LFL (43000)	18,75	s	35,6518	41,1955
LFL Frac (43000)	18,75	s	35,6518	41,1955

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	82,8221	108,27
Overpressure	0,1	bar	48,7395	63,912
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	88,4782	195,06
Used Flammable Mass				
Overpressure Radius		m	67,8221	88,2704
Distance to:				
- Ignition Source		m	30	40
- Cloud Front/Centre		m	30	40
- Explosion Centre		m	15	20
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	88,4782	195,06
Used Flammable Mass				
Overpressure Radius		m	33,7395	43,912
Distance to:				
- Ignition Source		m	30	40
- Cloud Front/Centre		m	30	40
- Explosion Centre		m	15	20
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	35,6518	41,1955
Furthest Extent	43000	ppm	35,6518	41,1955

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	534		534	
Liquid Rainout	fraction	0,999997		0,999997	
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	97,0225		100	
Pool Vaporization Rate	kg/s	5,16083		3,71105	
Total Vapor Flowrate	kg/s	5,1621		3,71241	
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	436,978		435,157	
Pool Vaporization Rate	kg/s	9,10137		6,77146	
Total Vapor Flowrate	kg/s	9,10263		6,77282	
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	21066		21064,8	
Pool Vaporization Rate	kg/s	3,65034		2,95123	
Total Vapor Flowrate	kg/s	3,65034		6,77146	
Maximum Pool Radius	m	37,3095		37,3095	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

Radiation Level (kW/m²)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m ²	152,712	151,699
Radiation Level	18,3	kW/m ²	74,9073	74,0147
Radiation Level	36	kW/m ²	49,924	49,3208
Radiation Level	71,2	kW/m ²	38,3219	38,3219



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	152,712	151,699
Radiation Level	18,3	kW/m2	74,9073	74,0147
Radiation Level	36	kW/m2	49,924	49,3208
Radiation Level	71,2	kW/m2	38,3219	38,3219

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Horizontal

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



REPLAN-Taubat -24"- lcool c/ bomba-fenda Estac o da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Estac o REPLAN\REPLAN-Taubat -24"- lcool c/ bomba-fenda Estac o da REPLAN-Vertical

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4373 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 70,8 m/s
Droplet Diameter(1) 71,05 um
Duration of Discharge(1) 534 s
Final Temperature(1) 40 degC
Release Rate(1) 391,2 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - 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	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	534	534
Liquid Rainout	fraction	0,133167	0,159968
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	205,206	234,09
Pool Vaporization Rate	kg/s	1,12967	0,958845
Total Vapor Flowrate	kg/s	340,235	329,579
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	79,56	89,91
Pool Vaporization Rate	kg/s	2,9274	2,48554
Total Vapor Flowrate	kg/s	342,033	331,106
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	62,125	70,0225
Pool Vaporization Rate	kg/s	3,77365	3,22009
Total Vapor Flowrate	kg/s	342,879	331,841
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	52,11	59,6675
Pool Vaporization Rate	kg/s	4,43725	3,80945
Total Vapor Flowrate	kg/s	343,542	332,43
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	88,305	52,56
Pool Vaporization Rate	kg/s	5,2291	4,31423
Total Vapor Flowrate	kg/s	344,334	332,935
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	109,731	175,5
Pool Vaporization Rate	kg/s	6,23957	5,01747
Total Vapor Flowrate	kg/s	345,345	333,638
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	19375	20918,3
Pool Vaporization Rate	kg/s	1,30313	1,44935
Total Vapor Flowrate	kg/s	6,23957	5,01747
Maximum Pool Radius	m	45,8723	50,7779

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

SUMMARY REPORT

Study Folder: SEDA

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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	164,65	208,629
Radiation Level	18,3	kW/m2	107,694	146,77
Radiation Level	36	kW/m2	88,0795	126,127
Radiation Level	71,2	kW/m2	81,1316	118,548

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	237,797	288,73
Radiation Level	18,3	kW/m2	144,798	187,416
Radiation Level	36	kW/m2	116,127	156,922
Radiation Level	71,2	kW/m2	100,972	140,653

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Vertical

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4373 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 70,8 m/s
Droplet Diameter(1) 71,05 um
Duration of Discharge(1) 534 s
Final Temperature(1) 40 degC
Release Rate(1) 391,2 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0864194	0,0848173
LFL (43000)	18,75	s	0,118014	0,0983134
LFL Frac (43000)	18,75	s	0,118014	0,0983134

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,118014	0,0983134
Furthest Extent	43000	ppm	0,118014	0,0983134

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	534	534
Liquid Rainout	fraction	0,231407	0,299945
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	210,976	244,141
Pool Vaporization Rate	kg/s	1,89355	1,69935
Total Vapor Flowrate	kg/s	302,567	275,561
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	77,175	88,01
Pool Vaporization Rate	kg/s	5,16871	4,71901
Total Vapor Flowrate	kg/s	305,842	278,581
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	60,605	68,85
Pool Vaporization Rate	kg/s	6,56084	6,0545
Total Vapor Flowrate	kg/s	307,235	279,916
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	52,245	59,1019
Pool Vaporization Rate	kg/s	7,67058	7,11447
Total Vapor Flowrate	kg/s	308,344	280,976
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	88,515	99,6375
Pool Vaporization Rate	kg/s	9,01851	8,40234
Total Vapor Flowrate	kg/s	309,692	282,264
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	109,969	129,87
Pool Vaporization Rate	kg/s	10,7049	9,39941
Total Vapor Flowrate	kg/s	311,379	8,40234
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	21000,5	20910,4
Pool Vaporization Rate	kg/s	2,1005	2,71512
Total Vapor Flowrate	kg/s	10,7049	9,39941
Maximum Pool Radius	m	60,5137	69,5869

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

SUMMARY REPORT

Study Folder: SEDA

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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	253,723	292,56
Radiation Level	18,3	kW/m2	181,351	211,378
Radiation Level	36	kW/m2	157,715	185,811
Radiation Level	71,2	kW/m2	147,366	174,04

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

**Radiation Effects: Late Pool Fire Ellipse****Path:** \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	347,226	398,426
Radiation Level	18,3	kW/m2	229,219	265,716
Radiation Level	36	kW/m2	194,395	227,353
Radiation Level	71,2	kW/m2	173,563	204,365

Weather Conditions**Path:** \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-fenda Estação da REPLAN-Angular-45

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1370 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 141,5 m/s
Droplet Diameter(1) 18,15 um
Duration of Discharge(1) 1812 s
Final Temperature(1) 40 degC
Release Rate(1) 48,9 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	4,81934	6,20843
LFL (43000)	18,75	s	17,9621	19,8382
LFL Frac (43000)	18,75	s	17,9621	19,8382

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	34,414	39,4882
Overpressure	0,1	bar	19,6326	22,1569
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	7,2175	11,6342
Used Flammable Mass				
Overpressure Radius		m	29,414	34,4882
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5

			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	7,2175	11,6342
Used Flammable Mass				
Overpressure Radius		m	14,6326	17,1569
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5

			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0

			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

SUMMARY REPORT

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	17,9621	19,8382
Furthest Extent	43000	ppm	17,9621	19,8382

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	1812		1812	
Liquid Rainout	fraction	0,999986		0,999986	
		Release Segment 1		Cloud Segment 1	
Cloud Segment Duration	s	244,923		268,96	
Pool Vaporization Rate	kg/s	1,90322		1,32689	
Total Vapor Flowrate	kg/s	1,90422		1,32789	
		Release Segment 1		Cloud Segment 2	
Cloud Segment Duration	s	1567,08		1545,17	
Pool Vaporization Rate	kg/s	2,37909		1,84364	
Total Vapor Flowrate	kg/s	2,38009		1,84464	
		Release Segment 1		Cloud Segment 3	
Cloud Segment Duration	s	19788		19785,9	
Pool Vaporization Rate	kg/s	1,17346		0,961521	
Total Vapor Flowrate	kg/s	1,17346		1,84364	
Maximum Pool Radius	m	20,8834		20,8834	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

		Distance (m)	
		REPLAN - DIA	REPLAN - NOITE
Radiation Level	3 kW/m2	90,6724	90,029
Radiation Level	18,3 kW/m2	43,6412	43,0352
Radiation Level	36 kW/m2	26,7921	26,4824
Radiation Level	71,2 kW/m2	21,894	21,894



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	90,6724	90,029
Radiation Level	18,3	kW/m2	43,6412	43,0352
Radiation Level	36	kW/m2	26,7921	26,4824
Radiation Level	71,2	kW/m2	21,894	21,894

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Horizontal

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



REPLAN-Taubat -24"- lcool c/ bomba-furo Est o da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Est o REPLAN\REPLAN-Taubat -24"- lcool c/ bomba-furo Est o da REPLAN-Vertical

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1370 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 141,5 m/s
Droplet Diameter(1) 18,15 um
Duration of Discharge(1) 1812 s
Final Temperature(1) 40 degC
Release Rate(1) 48,9 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0290996	0,0276244
LFL (43000)	18,75	s	0,0400865	0,0356883
LFL Frac (43000)	18,75	s	0,0400865	0,0356883

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,0400865	0,0356883
Furthest Extent	43000	ppm	0,0400865	0,0356883

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

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Phast 6.53.1



Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

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Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	1812	1812
Liquid Rainout	fraction	0,000475803	0,0384197
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s		597,803
Pool Vaporization Rate	kg/s		0,0971197
Total Vapor Flowrate	kg/s		47,1184
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s		250,463
Pool Vaporization Rate	kg/s		0,231358
Total Vapor Flowrate	kg/s		47,2526
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s		196,64
Pool Vaporization Rate	kg/s		0,296308
Total Vapor Flowrate	kg/s		47,3176
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s		167,875
Pool Vaporization Rate	kg/s		0,3468
Total Vapor Flowrate	kg/s		47,3681
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s		284,909
Pool Vaporization Rate	kg/s		0,406593
Total Vapor Flowrate	kg/s		47,4279
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s		354,982
Pool Vaporization Rate	kg/s		0,486318
Total Vapor Flowrate	kg/s		47,5076
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s		9340,34
Pool Vaporization Rate	kg/s		0,245113
Total Vapor Flowrate	kg/s		0,486318
Maximum Pool Radius	m	1,50778	15,2667

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

SUMMARY REPORT

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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	72,1216	135,343
Radiation Level	18,3	kW/m2	70,3059	121,622
Radiation Level	36	kW/m2		116,802
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	77,1374	178,673
Radiation Level	18,3	kW/m2	71,578	142,868
Radiation Level	36	kW/m2	71,2635	129,67
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Vertical

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1370 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 141,5 m/s
Droplet Diameter(1) 18,15 um
Duration of Discharge(1) 1812 s
Final Temperature(1) 40 degC
Release Rate(1) 48,9 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes	No
Use Fractions	No
Source 1 (Source in Use)	Yes
Source 2 (Source in Use)	No
Source 3 (Source in Use)	No
Source 4 (Source in Use)	No
Source 5 (Source in Use)	No
Source 6 (Source in Use)	No
Source 7 (Source in Use)	No
Source 1 (Strength)	5
Source 1 (Volume)	2850 m3

Geometry

Geometry shape	Point
Coordinates	Absolute
East(1)	0 m
North(1)	0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	2,8205	2,63652
LFL (43000)	18,75	s	5,25504	4,54902
LFL Frac (43000)	18,75	s	5,25504	4,54902

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	5,25504	4,54902
Furthest Extent	43000	ppm	5,25504	4,54902

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

SUMMARY REPORT

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Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	1812	1812
Liquid Rainout	fraction	0,0260486	0,0358253
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	573,602	599,026
Pool Vaporization Rate	kg/s	0,106026	0,0914668
Total Vapor Flowrate	kg/s	47,7322	47,2396
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	250,087	252,155
Pool Vaporization Rate	kg/s	0,244096	0,217605
Total Vapor Flowrate	kg/s	47,8703	47,3657
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	198,711	196,96
Pool Vaporization Rate	kg/s	0,308156	0,278613
Total Vapor Flowrate	kg/s	47,9344	47,4268
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	171,302	168,125
Pool Vaporization Rate	kg/s	0,356759	0,32588
Total Vapor Flowrate	kg/s	47,983	47,474
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	296,258	289,174
Pool Vaporization Rate	kg/s	0,413329	0,382291
Total Vapor Flowrate	kg/s	48,0396	47,5304
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	371,332	353,695
Pool Vaporization Rate	kg/s	0,486524	0,457012
Total Vapor Flowrate	kg/s	48,1127	47,6052
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	5943,8	8904,3
Pool Vaporization Rate	kg/s	0,21756	0,234706
Total Vapor Flowrate	kg/s	0,486524	0,457012
Maximum Pool Radius	m	11,9947	14,7357

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	116,16	137,66
Radiation Level	18,3	kW/m2	104,426	124,327
Radiation Level	36	kW/m2	100,601	119,715
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	150,486	179,619
Radiation Level	18,3	kW/m2	121,423	144,897
Radiation Level	36	kW/m2	110,083	132,023
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-furo Estação da REPLAN-Angular-45

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



REPLAN-Taubat -24"- lcool c/ bomba-ruptura Estac o da REPLAN

Base Case

CASE Name: Data

Path: \SEDA\Estac o REPLAN\REPLAN-Taubat -24"- lcool c/ bomba-ruptura Estac o da REPLAN

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4642 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 3,3 m/s
Droplet Diameter(1) 7105 um
Duration of Discharge(1) 300 s
Final Temperature(1) 40 degC
Release Rate(1) 461,4 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	3,81764	8,53015
LFL (43000)	18,75	s	31,9747	32,9522
LFL Frac (43000)	18,75	s	31,9747	32,9522

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	



Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

Explosion Model Used : Multi Energy
 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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	88,3948	2,92746
Overpressure	0,1	bar	51,5256	1,45638
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	112,003	0,0071146
Used Flammable Mass				
Overpressure Radius		m	73,3672	2,92736
Distance to:				
- Ignition Source		m	30	10
- Cloud Front/Centre		m	30	10
- Explosion Centre		m	15,0276	0,000101176
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	112,003	0,0071146
Used Flammable Mass				
Overpressure Radius		m	36,498	1,45627
Distance to:				
- Ignition Source		m	30	10
- Cloud Front/Centre		m	30	10
- Explosion Centre		m	15,0276	0,000101176
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	
			REPLAN - NOITE	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	31,9747	32,9522
Furthest Extent	43000	ppm	31,9747	32,9522

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	300		300	
Liquid Rainout	fraction	0,995737		0,997465	
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	70,1406		70,1406	
Pool Vaporization Rate	kg/s	3,90024		2,85631	
Total Vapor Flowrate	kg/s	5,86724		4,02599	
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	230,726		230,726	
Pool Vaporization Rate	kg/s	9,40083		6,92807	
Total Vapor Flowrate	kg/s	11,3678		8,09775	
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	21299,1		21299,1	
Pool Vaporization Rate	kg/s	3,75032		3,01631	
Total Vapor Flowrate	kg/s	9,40083		6,92807	
Maximum Pool Radius	m	38,4407		38,4407	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

		Distance (m)	
		REPLAN - DIA	REPLAN - NOITE
Radiation Level	3 kW/m2	156,848	155,806
Radiation Level	18,3 kW/m2	77,0093	76,0917
Radiation Level	36 kW/m2	51,5183	50,8734
Radiation Level	71,2 kW/m2	39,4512	39,4443



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	156,848	155,806
Radiation Level	18,3	kW/m2	77,0093	76,0917
Radiation Level	36	kW/m2	51,5183	50,8734
Radiation Level	71,2	kW/m2	39,4512	39,4443

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura Estação da REPLAN

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

**Dados de Entrada do Trecho REPLAN-Taubaté / Estação Meteorológica de REPLAN –
Álcool não Bombeado**

Cenário	Liberação de produto desde o km 342+700 até o km 441+500. (Ø da linha=24”).
Modelos de Simulação Utilizados	User Defined
Diâmetro do vazamento	609,9 mm (100% do diâmetro) 121,92 mm (20% do diâmetro) 30,48 mm (5% do diâmetro)
Direção do vazamento	Vertical (V) Angular 45° (A) Horizontal Impingement(HI)
Altura da linha	0 m
Substância	Etanol Parado
Velocidade de vazamento^{A, B}	1,5 m/s (100% do diâmetro) 35,8 m/s (20% do diâmetro) 102,5 m/s (5% do diâmetro)
Diâmetro de gota^{A, B}	27,50 mm (100% do diâmetro) 0,072 mm (20% do diâmetro) 0,027 mm (5% do diâmetro)
Tempo de vazamento	3138 s (100% do diâmetro) 624 s (20% do diâmetro) 456 s (5% do diâmetro)
Taxa de vazamento^{A, B}	210,6 kg/s (100% do diâmetro) 197,7 kg/s (20% do diâmetro) 35,4 kg/s (5% do diâmetro)
Temperatura	40°C
Área da poça^{A, B}	4412,1 m ² (100% do diâmetro) 4104,6 m ² (20% do diâmetro) 1320,2 m ² (5% do diâmetro)
Volume de confinamento	2850 m ³
Considerações	
A – Calculado pelo LeakMap	
B – Os valores para ruptura foram retirados do Aglomerado Humano denominado CLC (km 355,65). Os valores para furo com 20% do diâmetro foram retirados do Aglomerado Humano denominado CLC (km 355,65). Os valores para furo com 5% do diâmetro foram retirados do Aglomerado Humano Bairro Tanquinho (km 355,00).	



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REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4105 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 35,8 m/s
Droplet Diameter(1) 71,75 um
Duration of Discharge(1) 624 s
Final Temperature(1) 40 degC
Release Rate(1) 197,7 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

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Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	8,41174	10,8979
LFL (43000)	18,75	s	31,746	34,936
LFL Frac (43000)	18,75	s	31,746	34,936

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	76,4949	91,3771
Overpressure	0,1	bar	45,5919	52,9954
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	65,9541	126,361
Used Flammable Mass				
Overpressure Radius		m	61,4949	76,3771
Distance to:				
- Ignition Source		m	30	30
- Cloud Front/Centre		m	30	30
- Explosion Centre		m	15	15

			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	65,9541	126,361
Used Flammable Mass				
Overpressure Radius		m	30,5919	37,9954
Distance to:				
- Ignition Source		m	30	30
- Cloud Front/Centre		m	30	30
- Explosion Centre		m	15	15

			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0

			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	31,746	34,936
Furthest Extent	43000	ppm	31,746	34,936

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	624		624	
Liquid Rainout	fraction	0,999997		0,999997	
		Release Segment 1		Cloud Segment 1	
Cloud Segment Duration	s	117,181		121,551	
Pool Vaporization Rate	kg/s	4,01807		2,82065	
Total Vapor Flowrate	kg/s	4,01907		2,82165	
		Release Segment 1		Cloud Segment 2	
Cloud Segment Duration	s	506,819		502,449	
Pool Vaporization Rate	kg/s	7,39101		5,41606	
Total Vapor Flowrate	kg/s	7,39201		5,41706	
		Release Segment 1		Cloud Segment 3	
Cloud Segment Duration	s	20976		20976	
Pool Vaporization Rate	kg/s	3,29976		2,6622	
Total Vapor Flowrate	kg/s	3,29976		2,6622	
Maximum Pool Radius	m	36,146		36,146	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

		Distance (m)		REPLAN - DIA		REPLAN - NOITE	
Radiation Level	3	kW/m2	148,439		147,451		
Radiation Level	18,3	kW/m2	72,7378		71,864		
Radiation Level	36	kW/m2	48,2098		47,6949		
Radiation Level	71,2	kW/m2	37,1584		37,1584		



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	148,439	147,451
Radiation Level	18,3	kW/m2	72,7378	71,864
Radiation Level	36	kW/m2	48,2098	47,6949
Radiation Level	71,2	kW/m2	37,1584	37,1584

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Horizontal

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

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REPLAN-Taubat -24"- lcool s/ bomba-fenda Estac o da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Estac o REPLAN\REPLAN-Taubat -24"- lcool s/ bomba-fenda Estac o da REPLAN-Vertical

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4105 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 35,8 m/s
Droplet Diameter(1) 71,75 um
Duration of Discharge(1) 624 s
Final Temperature(1) 40 degC
Release Rate(1) 197,7 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

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Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Vertical

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - 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	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Vertical

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Vertical

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Vertical

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	624	624		
Liquid Rainout	fraction	0,31791	0,3355		
		Release Segment 1		Cloud Segment 1	
Cloud Segment Duration	s	239,476	306,25		
Pool Vaporization Rate	kg/s	1,64689	1,36002		
Total Vapor Flowrate	kg/s	136,496	132,732		
		Release Segment 1		Cloud Segment 2	
Cloud Segment Duration	s	896,9	549,776		
Pool Vaporization Rate	kg/s	3,51297	2,27229		
Total Vapor Flowrate	kg/s	138,362	133,644		
		Release Segment 1		Cloud Segment 3	
Cloud Segment Duration	s	20463,6	791,334		
Pool Vaporization Rate	kg/s	1,69884	2,61449		
Total Vapor Flowrate	kg/s	3,51297	2,27229		
		Release Segment 1		Cloud Segment 4	
Cloud Segment Duration	s		19952,6		
Pool Vaporization Rate	kg/s		1,75858		
Total Vapor Flowrate	kg/s	1,69884	2,61449		
Maximum Pool Radius	m	36,146	36,146		

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Vertical

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Vertical

		Distance (m)	
		REPLAN - DIA	REPLAN - NOITE
Radiation Level	3 kW/m2	145,939	156,318
Radiation Level	18,3 kW/m2	84,1507	92,8773
Radiation Level	36 kW/m2	63,257	71,8412
Radiation Level	71,2 kW/m2	55,2536	63,9078

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Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Vertical

Radiation Level (kW/m2)
REPLAN - DIAREPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Vertical

		Distance (m)		
		REPLAN - DIAREPLAN - NOITE		
Radiation Level	3	kW/m2	174,087	180,827
Radiation Level	18,3	kW/m2	98,3855	105,24
Radiation Level	36	kW/m2	73,8576	81,071
Radiation Level	71,2	kW/m2	62,8061	70,5346

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Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Vertical

		REPLAN - DIA	REPLAN - NOITE
Wind Speed	m/s	2,08	1,92
Pasquill Stability		B	F
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,08	19,7
Surface Temperature	degC	28,08	19,7
Relative Humidity	fraction	0,6686	0,7863

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4105 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 35,8 m/s
Droplet Diameter(1) 71,75 um
Duration of Discharge(1) 624 s
Final Temperature(1) 40 degC
Release Rate(1) 197,7 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

SUMMARY REPORT

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Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes	No
Use Fractions	No
Source 1 (Source in Use)	Yes
Source 2 (Source in Use)	No
Source 3 (Source in Use)	No
Source 4 (Source in Use)	No
Source 5 (Source in Use)	No
Source 6 (Source in Use)	No
Source 7 (Source in Use)	No
Source 1 (Strength)	5
Source 1 (Volume)	2850 m3

Geometry

Geometry shape	Point
Coordinates	Absolute
East(1)	0 m
North(1)	0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0865792	0,0846899
LFL (43000)	18,75	s	0,121991	0,0982217
LFL Frac (43000)	18,75	s	0,121991	0,0982217

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,121991	0,0982217
Furthest Extent	43000	ppm	0,121991	0,0982217

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

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Unique Audit Number: 570.771

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	624	624
Liquid Rainout	fraction	0,518184	0,55376
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	234,09	260,822
Pool Vaporization Rate	kg/s	2,47365	1,85884
Total Vapor Flowrate	kg/s	97,7288	90,0804
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	87,2156	98,28
Pool Vaporization Rate	kg/s	6,63873	4,95245
Total Vapor Flowrate	kg/s	101,894	93,174
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	69,745	76,6631
Pool Vaporization Rate	kg/s	8,40925	6,33732
Total Vapor Flowrate	kg/s	103,664	94,5589
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	59,45	65,9944
Pool Vaporization Rate	kg/s	9,82126	7,44993
Total Vapor Flowrate	kg/s	105,076	95,6715
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	101,749	58,7456
Pool Vaporization Rate	kg/s	11,5294	8,4111
Total Vapor Flowrate	kg/s	106,785	96,6327
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	124,051	193,37
Pool Vaporization Rate	kg/s	13,7278	9,89472
Total Vapor Flowrate	kg/s	108,983	98,1163
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	20923,7	20846,1
Pool Vaporization Rate	kg/s	2,76321	2,95373
Total Vapor Flowrate	kg/s	13,7278	9,89472
Maximum Pool Radius	m	69,2033	72,3746

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	206,546	216,911
Radiation Level	18,3	kW/m2	130,195	138,122
Radiation Level	36	kW/m2	105,544	113,145
Radiation Level	71,2	kW/m2	94,3044	101,91

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	321,786	337,038
Radiation Level	18,3	kW/m2	189,413	199,804
Radiation Level	36	kW/m2	151	160,308
Radiation Level	71,2	kW/m2	127,002	136,36

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-fenda Estação da REPLAN-Angular-45

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present

Area of Dike 1320 m²

[Type of Bund Surface Concrete]

Bund Height 0,03 m

[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy

Jet Fire Method Shell

Dispersion

Number of Release Segments 1

Fluid Phase(1) Liquid

Discharge Velocity(1) 102,5 m/s

Droplet Diameter(1) 27,08 um

Duration of Discharge(1) 3138 s

Final Temperature(1) 40 degC

Release Rate(1) 35,4 kg/s

Pre-Dilution Air Rates(1) 0 kg/s

Late Ignition Location No ignition location

Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	4,45559	5,65567
LFL (43000)	18,75	s	16,764	18,2163
LFL Frac (43000)	18,75	s	16,764	18,2163

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

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Phast 6.53.1



Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	30,8138	39,2938
Overpressure	0,1	bar	17,8416	22,0602
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	4,87842	11,4386
Used Flammable Mass				
Overpressure Radius		m	25,8138	34,2938
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	4,87842	11,4386
Used Flammable Mass				
Overpressure Radius		m	12,8416	17,0602
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	16,764	18,2163
Furthest Extent	43000	ppm	16,764	18,2163

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	3138	3138
Liquid Rainout	fraction	0,999987	0,999986
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	64	439,951
Pool Vaporization Rate	kg/s	0,606492	1,28286
Total Vapor Flowrate	kg/s	0,607492	1,28386
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	28,16	2700,85
Pool Vaporization Rate	kg/s	1,37515	1,66861
Total Vapor Flowrate	kg/s	1,37615	1,66961
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	22,8656	18459,2
Pool Vaporization Rate	kg/s	1,70442	0,950963
Total Vapor Flowrate	kg/s	1,70542	1,66861
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	20,115	
Pool Vaporization Rate	kg/s	1,95581	
Total Vapor Flowrate	kg/s	1,95681	0,950963
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	16,765	
Pool Vaporization Rate	kg/s	2,16296	
Total Vapor Flowrate	kg/s	2,16396	
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	21448,1	
Pool Vaporization Rate	kg/s	1,28436	
Total Vapor Flowrate	kg/s	1,28536	
Maximum Pool Radius	m	20,4996	20,4996

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

SUMMARY REPORT

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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	89,1697	88,5355
Radiation Level	18,3	kW/m2	42,8905	42,297
Radiation Level	36	kW/m2	26,2574	25,9644
Radiation Level	71,2	kW/m2	21,5102	21,5102

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

**Radiation Effects: Late Pool Fire Ellipse****Path:** \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	89,1697	88,5355
Radiation Level	18,3	kW/m2	42,8905	42,297
Radiation Level	36	kW/m2	26,2574	25,9644
Radiation Level	71,2	kW/m2	21,5102	21,5102

Weather Conditions**Path:** \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Horizontal

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

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Phast 6.53.1



REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1320 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 102,5 m/s
Droplet Diameter(1) 27,08 um
Duration of Discharge(1) 3138 s
Final Temperature(1) 40 degC
Release Rate(1) 35,4 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0290996	0,0276244
LFL (43000)	18,75	s	0,0400865	0,0356883
LFL Frac (43000)	18,75	s	0,0400865	0,0356883

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,0400865	0,0356883
Furthest Extent	43000	ppm	0,0400865	0,0356883

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

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Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	3138	3138
Liquid Rainout	fraction	0,0194888	0,0160521
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	928,726	985,96
Pool Vaporization Rate	kg/s	0,0943632	0,0518634
Total Vapor Flowrate	kg/s	34,8045	34,8836
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	421,837	431,562
Pool Vaporization Rate	kg/s	0,207865	0,119013
Total Vapor Flowrate	kg/s	34,918	34,9508
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	340,703	340,183
Pool Vaporization Rate	kg/s	0,25841	0,150603
Total Vapor Flowrate	kg/s	34,9685	34,9824
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	297,894	294,384
Pool Vaporization Rate	kg/s	0,295722	0,174597
Total Vapor Flowrate	kg/s	35,0058	35,0064
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	520,85	508,27
Pool Vaporization Rate	kg/s	0,337798	0,202592
Total Vapor Flowrate	kg/s	35,0479	35,0343
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	667,33	636,742
Pool Vaporization Rate	kg/s	0,390055	0,238747
Total Vapor Flowrate	kg/s	35,1002	35,0705
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	4850,02	4696,42
Pool Vaporization Rate	kg/s	0,187642	0,156789
Total Vapor Flowrate	kg/s	0,390055	0,238747
Maximum Pool Radius	m	10,5955	10,3638

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	66,4422	90,2147
Radiation Level	18,3	kW/m2	57,1009	81,5488
Radiation Level	36	kW/m2	54,818	79,7178
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

		Radiation Level (kW/m2)	
		REPLAN - DIA	REPLAN - NOITE

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Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	99,9433	123,759
Radiation Level	18,3	kW/m2	73,8369	98,1523
Radiation Level	36	kW/m2	63,4495	88,1966
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Vertical

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

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REPLAN-Taubat -24"- lcool s/ bomba-furo Est o da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Est o REPLAN\REPLAN-Taubat -24"- lcool s/ bomba-furo Est o da REPLAN-Angular-45

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1320 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 102,5 m/s
Droplet Diameter(1) 27,08 um
Duration of Discharge(1) 3138 s
Final Temperature(1) 40 degC
Release Rate(1) 35,4 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

SUMMARY REPORT

Study Folder: SEDA

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0417217	0,0402761
LFL (43000)	18,75	s	3,01882	1,72142
LFL Frac (43000)	18,75	s	3,01882	1,72142

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	3,01882	1,72142
Furthest Extent	43000	ppm	3,01882	1,72142

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

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Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

Late Pool Fire Status

REPLAN - DIAREPLAN - NOITE
Hazard Hazard

SUMMARY REPORT

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

		REPLAN - DIA	REPLAN - NOITE
Release Segment 1			
Release Duration	s	3138	3138
Liquid Rainout	fraction	0,0227807	0,015701
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	928,726	982,823
Pool Vaporization Rate	kg/s	0,108566	0,0508699
Total Vapor Flowrate	kg/s	34,7021	34,8951
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	420	430,938
Pool Vaporization Rate	kg/s	0,240197	0,11654
Total Vapor Flowrate	kg/s	34,8338	34,9607
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	338,43	339,756
Pool Vaporization Rate	kg/s	0,298652	0,147453
Total Vapor Flowrate	kg/s	34,8922	34,9916
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	295,32	294,047
Pool Vaporization Rate	kg/s	0,341679	0,170933
Total Vapor Flowrate	kg/s	34,9352	35,0151
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	517,524	507,74
Pool Vaporization Rate	kg/s	0,390311	0,198328
Total Vapor Flowrate	kg/s	34,9839	35,0425
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	663,262	636,147
Pool Vaporization Rate	kg/s	0,450907	0,233712
Total Vapor Flowrate	kg/s	35,0445	35,0779
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	s	5620,31	4564,96
Pool Vaporization Rate	kg/s	0,205564	0,155032
Total Vapor Flowrate	kg/s	0,450907	0,233712
Maximum Pool Radius	m	11,4867	10,2449

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

SUMMARY REPORT

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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	91,184	99,2061
Radiation Level	18,3	kW/m2	81,2687	90,6185
Radiation Level	36	kW/m2	78,6566	88,8217
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

SUMMARY REPORT

Study Folder: SEDA

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Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	127,263	132,396
Radiation Level	18,3	kW/m2	99,2693	107,043
Radiation Level	36	kW/m2	88,2537	97,14
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-furo Estação da REPLAN-Angular-45

			REPLAN - DIA		REPLAN - NOITE	
Wind Speed		m/s	2,08		1,92	
Pasquill Stability			B		F	
Surface Roughness Length		in	4,62348		4,62348	
Surface Roughness Parameter			0,09		0,09	
Atmospheric Temperature		degC	23,08		19,7	
Surface Temperature		degC	28,08		19,7	
Relative Humidity		fraction	0,6686		0,7863	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4412 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 1,5 m/s
Droplet Diameter(1) 2,751E4 um
Duration of Discharge(1) 456 s
Final Temperature(1) 40 degC
Release Rate(1) 210,6 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	3,37477	5,67545
LFL (43000)	18,75	s	16,4139	24,4823
LFL Frac (43000)	18,75	s	16,4139	24,4823

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA		REPLAN - NOITE	
Early Pool Fire Status	Hazard		Hazard	

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	41,324	1,12738
Overpressure	0,1	bar	23,0701	0,560847
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	13,5927	0,000406373
Used Flammable Mass				
Overpressure Radius		m	36,324	1,12737
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	1,29695e-005

			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	13,5927	0,000406373
Used Flammable Mass				
Overpressure Radius		m	18,0701	0,560834
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	1,29695e-005

			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0

			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	16,4139	24,4823
Furthest Extent	43000	ppm	16,4139	24,4823

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	456		456	
Liquid Rainout	fraction	0,998681		0,999499	
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	100		102,01	
Pool Vaporization Rate	kg/s	3,39154		2,31057	
Total Vapor Flowrate	kg/s	3,66923		2,41609	
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	356		353,99	
Pool Vaporization Rate	kg/s	7,55174		5,27174	
Total Vapor Flowrate	kg/s	7,82944		5,37725	
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	21144		21144	
Pool Vaporization Rate	kg/s	3,49691		2,80967	
Total Vapor Flowrate	kg/s	3,49691		2,80967	
Maximum Pool Radius	m	37,4755		37,4755	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

		Distance (m)		REPLAN - DIA		REPLAN - NOITE	
Radiation Level	3	kW/m2	153,368	152,35			
Radiation Level	18,3	kW/m2	75,263	74,3669			
Radiation Level	36	kW/m2	50,2064	49,5972			
Radiation Level	71,2	kW/m2	38,5345	38,5337			



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	153,368	152,35
Radiation Level	18,3	kW/m2	75,263	74,3669
Radiation Level	36	kW/m2	50,2064	49,5972
Radiation Level	71,2	kW/m2	38,5345	38,5337

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura Estação da REPLAN

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

Dados de Entrada do Trecho REPLAN-Taubaté / Estação Meteorológica de REPLAN – Gasolina Bombeada

Cenário	Liberação de produto desde o km 342+700 até o km 441+500. (Ø da linha=24”).
Modelos de Simulação Utilizados	User Defined
Diâmetro do vazamento	609,9 mm (100% do diâmetro) 121,92 mm (20% do diâmetro) 30,48 mm (5% do diâmetro)
Direção do vazamento	Vertical (V) Angular 45° (A) Horizontal Impingement(HI)
Altura da linha	0 m
Substância	Gasolina
Velocidade de vazamento^{A, B}	3,3 m/s (100% do diâmetro) 70,6 m/s (20% do diâmetro) 144,6 m/s (5% do diâmetro)
Diâmetro de gota^{A, B}	19,00 mm (100% do diâmetro) 0,042 mm (20% do diâmetro) 0,010 mm (5% do diâmetro)
Tempo de vazamento	300 s (100% do diâmetro) 528 s (20% do diâmetro) 1698 s (5% do diâmetro)
Taxa de vazamento^{A, B}	428,6 kg/s (100% do diâmetro) 371,1 kg/s (20% do diâmetro) 47,5 kg/s (5% do diâmetro)
Temperatura	40°C
Área da poça^{A, B}	4916,0 m ² (100% do diâmetro) 4673,8 m ² (20% do diâmetro) 1414,6 m ² (5% do diâmetro)
Volume de confinamento	2850 m ³
Considerações	
A – Calculado pelo LeakMap	
B – Os valores para ruptura foram retirados do Aglomerado Humano denominado CLC (km 355,65). Os valores para furo com 20% do diâmetro foram retirados do Aglomerado Humano denominado CLC (km 355,65). Os valores para furo com 5% do diâmetro foram retirados do Aglomerado Humano EMBRAPA – MA (km 352,40).	



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REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4674 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 70,6 m/s
Droplet Diameter(1) 41,5 um
Duration of Discharge(1) 528 s
Final Temperature(1) 40 degC
Release Rate(1) 371,1 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	33,8568	53,9088
LFL (10500)	18,75	s	118,617	146,728
LFL Frac (10500)	18,75	s	118,617	146,728

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

Early Pool Fire Status	REPLAN - DIA	REPLAN - NOITE
	Hazard	Hazard

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	166,064	181,572
Overpressure	0,1	bar	110,251	125,504
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	992,014	2532,03
Used Flammable Mass				
Overpressure Radius		m	111,064	111,572
Distance to:				
- Ignition Source		m	110	140
- Cloud Front/Centre		m	110	140
- Explosion Centre		m	55	70
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	992,014	2532,03
Used Flammable Mass				
Overpressure Radius		m	55,2511	55,5037
Distance to:				
- Ignition Source		m	110	140
- Cloud Front/Centre		m	110	140
- Explosion Centre		m	55	70
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	118,617	146,728
Furthest Extent	10500	ppm	118,617	146,728

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	528		528	
Liquid Rainout	fraction	0,999982		0,99998	
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	103,531		97,5156	
Pool Vaporization Rate	kg/s	18,6734		12,7507	
Total Vapor Flowrate	kg/s	18,6803		12,7581	
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	510,509		430,484	
Pool Vaporization Rate	kg/s	30,0798		22,9199	
Total Vapor Flowrate	kg/s	30,0866		22,9273	
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	20178,6		21072	
Pool Vaporization Rate	kg/s	8,84674		8,68515	
Total Vapor Flowrate	kg/s	30,0798		8,68515	
Maximum Pool Radius	m	38,5709		38,5709	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

		Distance (m)		
		REPLAN - DIA	REPLAN - NOITE	
Radiation Level	3	kW/m2	106,8	105,729
Radiation Level	18,3	kW/m2	35,4215	35,7405
Radiation Level	36	kW/m2		
Radiation Level	71,2	kW/m2		



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	116,888	114,919
Radiation Level	18,3	kW/m2	39,5835	39,5835
Radiation Level	36	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

			REPLAN - DIA REPLAN - NOITE	
Wind Speed		m/s	2,08	1,92
Pasquill Stability			B	F
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,08	19,7
Surface Temperature		degC	28,08	19,7
Relative Humidity		fraction	0,6686	0,7863

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REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da REPLAN-Vertical

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4674 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 70,6 m/s
Droplet Diameter(1) 41,5 um
Duration of Discharge(1) 528 s
Final Temperature(1) 40 degC
Release Rate(1) 371,1 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da REPLAN-Vertical

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

Concentration(ppm)		Averaging Time		Distance (m)	
				REPLAN - DIA	REPLAN - 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	
				REPLAN - DIA	REPLAN - NOITE
UFL	(76800)	18,75	s	0	0
LFL	(10500)	18,75	s	0	0
LFL Frac	(10500)	18,75	s	0	0

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Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da REPLAN-Vertical

		REPLAN - DIAREPLAN - NOITE	
Wind Speed	m/s	2,08	1,92
Pasquill Stability		B	F
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,08	19,7
Surface Temperature	degC	28,08	19,7
Relative Humidity	fraction	0,6686	0,7863

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REPLAN-Taubat -24"-gasolina c/ bomba-fenda Estac o da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estac o REPLAN\REPLAN-Taubat -24"-gasolina c/ bomba-fenda Estac o da

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4674 m2
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle 45 deg
Outdoor Release Direction Angled from Horizontal

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 70,6 m/s
Droplet Diameter(1) 41,5 um
Duration of Discharge(1) 528 s
Final Temperature(1) 40 degC
Release Rate(1) 371,1 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0,112034	0,0975749
LFL (10500)	18,75	s	0,200712	0,183615
LFL Frac (10500)	18,75	s	0,200712	0,183615

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

Early Pool Fire Status	REPLAN - DIA	REPLAN - NOITE
	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0,200712	0,183615
Furthest Extent	10500	ppm	0,200712	0,183615

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0



Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

		REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status		Hazard	Hazard

Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

		REPLAN - DIA	REPLAN - NOITE
	Release Segment 1		
Release Duration	s	528	528
Liquid Rainout	fraction	9,96284e-005	0,000241886
Maximum Pool Radius	m	1,07212	1,85612

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

	Radiation Level (kW/m2)
	REPLAN - DIA
	REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

			Distance (m)
		REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	114,318
Radiation Level	18,3	kW/m2	140,046
Radiation Level	36	kW/m2	111,247
Radiation Level	71,2	kW/m2	135,304
			109,813
			133,25
			109,701
			132,798

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Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Radiation Level	3	kW/m2	123,546	152,992
Radiation Level	18,3	kW/m2	115,053	140,14
Radiation Level	36	kW/m2	111,59	135,525
Radiation Level	71,2	kW/m2	110,429	134,114

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Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda Estação da

		REPLAN - DIA	REPLAN - NOITE
Wind Speed	m/s	2,08	1,92
Pasquill Stability		B	F
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,08	19,7
Surface Temperature	degC	28,08	19,7
Relative Humidity	fraction	0,6686	0,7863

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REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal Impingement

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1415 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Horizontal Impingement

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 144,6 m/s
Droplet Diameter(1) 9,892 um
Duration of Discharge(1) 1698 s
Final Temperature(1) 40 degC
Release Rate(1) 47,5 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75 s		4,78879	6,25168
LFL (43000)	18,75 s		17,8328	19,9513
LFL Frac (43000)	18,75 s		17,8328	19,9513

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75 s		0	0
LFL (43000)	18,75 s		0	0
LFL Frac (43000)	18,75 s		0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	25,7704	39,3224
Overpressure	0,1	bar	15,3327	22,0744
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	2,54131	11,4672
Used Flammable Mass				
Overpressure Radius		m	20,7704	34,3224
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5

			Supplementary Data at 0,1 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	2,54131	11,4672
Used Flammable Mass				
Overpressure Radius		m	10,3327	17,0744
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5

			Supplementary Data at 0,3 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0

			Supplementary Data at 0,4 bar	
			REPLAN - DIA	REPLAN - NOITE
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	17,8328	19,9513
Furthest Extent	43000	ppm	17,8328	19,9513

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

		REPLAN - DIA		REPLAN - NOITE	
Release Segment 1					
Release Duration	s	1698		1698	
Liquid Rainout	fraction	0,999986		0,999985	
Release Segment 1 Cloud Segment 1					
Cloud Segment Duration	s	67,6506		256,801	
Pool Vaporization Rate	kg/s	0,807535		1,31161	
Total Vapor Flowrate	kg/s	0,808535		1,31261	
Release Segment 1 Cloud Segment 2					
Cloud Segment Duration	s	29,3719		1441,2	
Pool Vaporization Rate	kg/s	1,85829		1,86132	
Total Vapor Flowrate	kg/s	1,85929		1,86232	
Release Segment 1 Cloud Segment 3					
Cloud Segment Duration	s	22,88		19902	
Pool Vaporization Rate	kg/s	2,33753		0,977512	
Total Vapor Flowrate	kg/s	2,33853		0,977512	
Release Segment 1 Cloud Segment 4					
Cloud Segment Duration	s	21480,1			
Pool Vaporization Rate	kg/s	1,28526			
Total Vapor Flowrate	kg/s	1,28626			
Maximum Pool Radius	m	21,2198		21,2198	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

		Distance (m)		
		REPLAN - DIA	REPLAN - NOITE	
Radiation Level	3	kW/m2	91,9871	91,3356
Radiation Level	18,3	kW/m2	44,2982	43,6857
Radiation Level	36	kW/m2	27,2513	26,933
Radiation Level	71,2	kW/m2	22,2304	22,2304

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Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

Radiation Level (kW/m2)
REPLAN - DIA
REPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

		Distance (m)		
		REPLAN - DIA REPLAN - NOITE		
Radiation Level	3	kW/m2	91,9871	91,3356
Radiation Level	18,3	kW/m2	44,2982	43,6857
Radiation Level	36	kW/m2	27,2513	26,933
Radiation Level	71,2	kW/m2	22,2304	22,2304

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Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Horizontal

		REPLAN - DIA	REPLAN - NOITE
Wind Speed	m/s	2,08	1,92
Pasquill Stability		B	F
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,08	19,7
Surface Temperature	degC	28,08	19,7
Relative Humidity	fraction	0,6686	0,7863

SUMMARY REPORT

Study Folder: SEDA

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REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Vertical

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Vertical

User-Defined Data

Material

Material Identifier ETHANOL

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 1415 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 144,6 m/s
Droplet Diameter(1) 9,892 um
Duration of Discharge(1) 1698 s
Final Temperature(1) 40 degC
Release Rate(1) 47,5 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

Study Folder: SEDA

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Vertical

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0,0290996	0,0276244
LFL (43000)	18,75	s	0,0400865	0,0356883
LFL Frac (43000)	18,75	s	0,0400865	0,0356883

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Vertical

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0,0400865	0,0356883
Furthest Extent	43000	ppm	0,0400865	0,0356883

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

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Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da REPLAN-Vertical

		REPLAN - DIA	REPLAN - NOITE
Wind Speed	m/s	2,08	1,92
Pasquill Stability		B	F
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,08	19,7
Surface Temperature	degC	28,08	19,7
Relative Humidity	fraction	0,6686	0,7863

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 570.771

Phast 6.53.1



REPLAN-Taubat -24"-gasolina c/ bomba-furo Estac o da REPLAN-Angular-45

Base Case

CASE Name: Data

Path: \SEDA\Estac o REPLAN\REPLAN-Taubat -24"-gasolina c/ bomba-furo Estac o da

User-Defined Data

Geometry

Geometry shape	Point
Coordinates	Absolute
East(1)	0 m
North(1)	0 m

Material

Material Identifier	ETHANOL
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Scenario

Building Wake Option	None
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Pipe

Line length	1 m
-------------	-----

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	Bund present
Area of Dike	1415 m2
[Type of Bund Surface	Concrete]
Bund Height	0,03 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Outdoor Release Angle	45 deg
Outdoor Release Direction	Angled from Horizontal

Flammable

Method to use for explosions	Multi-Energy
Jet Fire Method	Shell

Dispersion

Number of Release Segments	1
Fluid Phase(1)	Liquid
Discharge Velocity(1)	144,6 m/s
Droplet Diameter(1)	9,892 um
Duration of Discharge(1)	1698 s
Final Temperature(1)	40 degC

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Release Rate(1)	47,5 kg/s
Pre-Dilution Air Rates(1)	0 kg/s
Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	1E7 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]

Multi Energy Explosion

Use Unconfined Volumes	No
Use Fractions	No
Source 1 (Source in Use)	Yes
Source 2 (Source in Use)	No
Source 3 (Source in Use)	No
Source 4 (Source in Use)	No
Source 5 (Source in Use)	No
Source 6 (Source in Use)	No
Source 7 (Source in Use)	No
Source 1 (Strength)	5
Source 1 (Volume)	2850 m3



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	2,90588	2,7822
LFL (43000)	18,75	s	5,55678	4,82848
LFL Frac (43000)	18,75	s	5,55678	4,82848

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (190000)	18,75	s	0	0
LFL (43000)	18,75	s	0	0
LFL Frac (43000)	18,75	s	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	5,55678	4,82848
Furthest Extent	43000	ppm	5,55678	4,82848

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	43000	ppm	0	0
Furthest Extent	43000	ppm	0	0

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Phast 6.53.1



Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-furo Estação da

		REPLAN - DIA	REPLAN - NOITE
Wind Speed	m/s	2,08	1,92
Pasquill Stability		B	F
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,08	19,7
Surface Temperature	degC	28,08	19,7
Relative Humidity	fraction	0,6686	0,7863

SUMMARY REPORT

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REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

Base Case

CASE Name: Data

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

User-Defined Data

Material

Material Identifier N-HEXANE

Scenario

Building Wake Option None

Pipe

Line length 1 m

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 Bund present
Area of Dike 4916 m²
[Type of Bund Surface Concrete]
Bund Height 0,03 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Outdoor Release Direction Vertical

Flammable

Method to use for explosions Multi-Energy
Jet Fire Method Shell

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 3,3 m/s
Droplet Diameter(1) 1,899E4 um
Duration of Discharge(1) 300 s
Final Temperature(1) 40 degC
Release Rate(1) 428,6 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 1E7 kg

Fireball Parameters

[Mass Modification Factor 3]

SUMMARY REPORT

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[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]

Multi Energy Explosion

Use Unconfined Volumes No
Use Fractions No
Source 1 (Source in Use) Yes
Source 2 (Source in Use) No
Source 3 (Source in Use) No
Source 4 (Source in Use) No
Source 5 (Source in Use) No
Source 6 (Source in Use) No
Source 7 (Source in Use) No
Source 1 (Strength) 5
Source 1 (Volume) 2850 m3

Geometry

Geometry shape Point
Coordinates Absolute
East(1) 0 m
North(1) 0 m

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Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

The height for user defined concentrations is the user defined height 0 m

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

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

Concentration(ppm)	Averaging Time		Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	21,9743	43,9501
LFL (10500)	18,75	s	107,956	146,492
LFL Frac (10500)	18,75	s	107,956	146,492

Concentration(ppm)	Averaging Time		Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

Early Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA	REPLAN - NOITE
Early Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

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Explosion Effects: Late Ignition

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

Explosion Model Used : Multi Energy

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	
			REPLAN - DIA	REPLAN - NOITE
Overpressure	0,05	bar	161,064	178,373
Overpressure	0,1	bar	105,251	122,305
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	1368,77	3812,13
Used Flammable Mass				
Overpressure Radius		m	111,064	111,572
Distance to:				
- Ignition Source		m	100	140
- Cloud Front/Centre		m	100	140
- Explosion Centre		m	50	66,8016
			Supplementary Data at 0,1 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	1368,77	3812,13
Used Flammable Mass				
Overpressure Radius		m	55,2511	55,5037
Distance to:				
- Ignition Source		m	100	140
- Cloud Front/Centre		m	100	140
- Explosion Centre		m	50	66,8016
			Supplementary Data at 0,3 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable
- Cloud Front/Centre		m	Not Reachable	Not Reachable
- Explosion Centre		m	0	0
			Supplementary Data at 0,4 bar	
			REPLAN - DIA	
Supplied Flammable Mass		kg	Not Reachable	Not Reachable
Used Flammable Mass				
Overpressure Radius		m	0	0
Distance to:				
- Ignition Source		m	Not Reachable	Not Reachable

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- Cloud Front/Centre	m	Not Reachable	Not Reachable
- Explosion Centre	m	0	0

Flash Fire Envelope

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

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

			Distance (m)	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	107,956	146,492
Furthest Extent	10500	ppm	107,956	146,492

			Heights (m) for above distances	
			REPLAN - DIA	REPLAN - NOITE
Furthest Extent	10500	ppm	0	0
Furthest Extent	10500	ppm	0	0

Late Pool Fire Hazard

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

	REPLAN - DIA	REPLAN - NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

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Pool Vaporization Results

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

		REPLAN - DIA		REPLAN - NOITE	
		Release Segment 1			
Release Duration	s	300		300	
Liquid Rainout	fraction	0,969924		0,985652	
		Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	83,2656		78,7656	
Pool Vaporization Rate	kg/s	14,6742		10,7054	
Total Vapor Flowrate	kg/s	27,5649		16,8547	
		Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	300,739		298,409	
Pool Vaporization Rate	kg/s	28,5378		22,5636	
Total Vapor Flowrate	kg/s	41,4286		28,7129	
		Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	45,3656		17652,4	
Pool Vaporization Rate	kg/s	25,2195		6,74127	
Total Vapor Flowrate	kg/s	28,5378		22,5636	
		Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	14024,5			
Pool Vaporization Rate	kg/s	8,10251			
Total Vapor Flowrate	kg/s	25,2195		6,74127	
Maximum Pool Radius	m	39,5577		39,5577	

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIA REPLAN - NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

		Distance (m)	
		REPLAN - DIA	REPLAN - NOITE
Radiation Level	3 kW/m2	111,711	111,298
Radiation Level	18,3 kW/m2	37,4493	38,057
Radiation Level	36 kW/m2		
Radiation Level	71,2 kW/m2		

SUMMARY REPORT

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Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

Radiation Level (kW/m2)
REPLAN - DIAREPLAN - NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

			Distance (m)	
			REPLAN - DIAREPLAN - NOITE	
Radiation Level	3	kW/m2	119,272	117,247
Radiation Level	18,3	kW/m2	40,5884	40,5615
Radiation Level	36	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Weather Conditions

Path: \SEDA\Estação REPLAN\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura Estação da REPLAN

		REPLAN - DIA	REPLAN - NOITE
Wind Speed	m/s	2,08	1,92
Pasquill Stability		B	F
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,08	19,7
Surface Temperature	degC	28,08	19,7
Relative Humidity	fraction	0,6686	0,7863