

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

Cenário	Liberação de produto desde o km 441+500 até o km 540+760. (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,,1 m/s (100% do diâmetro) 60,7 m/s (20% do diâmetro) 98,8 m/s (5% do diâmetro)
Diâmetro de gota^{A, B}	17,40 mm (100% do diâmetro) 0,109 mm (20% do diâmetro) 0,081 mm (5% do diâmetro)
Tempo de vazamento	300 s (100% do diâmetro) 726 s (20% do diâmetro) 2292 s (5% do diâmetro)
Taxa de vazamento^{A, B}	423,4 kg/s (100% do diâmetro) 335,4 kg/s (20% do diâmetro) 34,1 kg/s (5% do diâmetro)
Temperatura	40°C
Área da poça^{A, B}	2590,1 m ² (100% do diâmetro) 2573,5 m ² (20% do diâmetro) 1386,8 m ² (5% do diâmetro)
Volume de confinamento	4260 m ³
Considerações	
A – Calculado pelo LeakMap	
B – Os valores para ruptura foram retirados do Aglomerado Humano Cachoeira Baixa (km 422,10). Os valores para furo com 20% do diâmetro foram retirados do Aglomerado Humano Cachoeira Baixa (km 422,10). Os valores para furo com 5% do diâmetro foram retirados do Aglomerado Humano Cachoeira Baixa (km 422,10).	



SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL IMPINGEMENT

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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 2574 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) 60,7 m/s

Droplet Diameter(1) 109,2 um

Duration of Discharge(1) 726 s

Final Temperature(1) 40 degC

Release Rate(1) 335,4 kg/s

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

Late Ignition Location No ignition location

Mass Inventory of material to Disperse 1E7 kg

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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)	4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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		DIA	Distance (m)
				NOITE
UFL (190000)	18,75	s	5,19455	6,43503
LFL (43000)	18,75	s	21,4162	23,9764
LFL Frac (43000)	18,75	s	21,4162	23,9764

Concentration(ppm)	Averaging Time		DIA	Heights (m) for above distances
				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 Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

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Explosion Effects: Late Ignition

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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	
			DIA	NOITE
Overpressure	0,05	bar	53,4165	61,372
Overpressure	0,1	bar	31,6157	35,5912
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	23,1554	38,2939
Used Flammable Mass				
Overpressure Radius		m	43,382	51,3021
Distance to:				
- Ignition Source		m	20	20
- Cloud Front/Centre		m	20	20
- Explosion Centre		m	10,0344	10,0698
			Supplementary Data at 0,1 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	23,1554	38,2939
Used Flammable Mass				
Overpressure Radius		m	21,5813	25,5213
Distance to:				
- Ignition Source		m	20	20
- Cloud Front/Centre		m	20	20
- Explosion Centre		m	10,0344	10,0698
			Supplementary Data at 0,3 bar	
			DIA	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	
			DIA	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 Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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

				Distance (m)	
				DIA	NOITE
Furthest Extent	43000	ppm		21,4162	23,9764
Furthest Extent	43000	ppm		21,4162	23,9764

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

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Release Segment 1			
Release Duration	s	726	726
Liquid Rainout	fraction	0,999997	0,999997
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	108,681	112,36
Pool Vaporization Rate	kg/s	4,75118	3,92899
Total Vapor Flowrate	kg/s	4,75218	3,93006
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	618,668	614,988
Pool Vaporization Rate	kg/s	6,67149	5,70223
Total Vapor Flowrate	kg/s	6,67249	5,7033
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	20872,7	20872,7
Pool Vaporization Rate	kg/s	2,56698	2,30904
Total Vapor Flowrate	kg/s	6,67149	5,70223
Maximum Pool Radius	m	28,6212	28,6212

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
		Radiation Level (kW/m2)	
		DIA	NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	121,132	120,594
Radiation Level	18,3	kW/m2	62,4927	61,3752
Radiation Level	36	kW/m2	41,0615	39,9954
Radiation Level	71,2	kW/m2	29,6335	29,6335

**Radiation Effects: Late Pool Fire Distance****Path:** \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Radiation Level (kW/m2)		

Radiation Effects: Late Pool Fire Ellipse**Path:** \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

			DIA	NOITE
				Distance (m)
Radiation Level	3	kW/m2	121,132	120,594
Radiation Level	18,3	kW/m2	62,4927	61,3752
Radiation Level	36	kW/m2	41,0615	39,9954
Radiation Level	71,2	kW/m2	29,6335	29,6335

Weather Conditions**Path:** \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

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REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-VERTICAL

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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 2574 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) 60,7 m/s
Droplet Diameter(1) 109,2 um
Duration of Discharge(1) 726 s
Final Temperature(1) 40 degC
Release Rate(1) 335,4 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]

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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) 4260 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 Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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		DIA	Distance (m)
				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		DIA	Heights (m) for above distances
				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 Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
	Release Segment 1		
Release Duration	s	726	726
Liquid Rainout	fraction	0,00358761	0,0610862
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	249,64	253,606
Pool Vaporization Rate	kg/s	0,0508695	0,539904
Total Vapor Flowrate	kg/s	334,248	315,452
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	103,8	103,604
Pool Vaporization Rate	kg/s	0,122732	1,3274
Total Vapor Flowrate	kg/s	334,319	316,239
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	81,2825	80,6456
Pool Vaporization Rate	kg/s	0,156957	1,71371
Total Vapor Flowrate	kg/s	334,354	316,625
	Release Segment 1 Cloud Segment 4		
Cloud Segment Duration	s	69,28	68,3944
Pool Vaporization Rate	kg/s	0,183387	2,01632
Total Vapor Flowrate	kg/s	334,38	316,928
	Release Segment 1 Cloud Segment 5		
Cloud Segment Duration	s	119,748	115,006
Pool Vaporization Rate	kg/s	0,214932	2,37699
Total Vapor Flowrate	kg/s	334,412	317,289
	Release Segment 1 Cloud Segment 6		
Cloud Segment Duration	s	144,622	141,582
Pool Vaporization Rate	kg/s	0,256073	2,85749
Total Vapor Flowrate	kg/s	334,453	317,769
	Release Segment 1 Cloud Segment 7		
Cloud Segment Duration	s	2417,93	16529,1
Pool Vaporization Rate	kg/s	0,151358	0,795837
Total Vapor Flowrate	kg/s	0,256073	2,85749
Maximum Pool Radius	m	7,88119	33,2381

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	Radiation Level (kW/m2)
DIA	NOITE

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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	97,3305	158,589
Radiation Level	18,3	kW/m2	86,5986	122,402
Radiation Level	36	kW/m2	81,8523	107,198
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		Radiation Level (kW/m2)
		NOITE
DIA		

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Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

				Distance (m)	
				DIA	NOITE
Radiation Level	3	kW/m2		114,908	223,536
Radiation Level	18,3	kW/m2		96,0763	156,042
Radiation Level	36	kW/m2		86,4201	132,674
Radiation Level	71,2	kW/m2		Not Reached	119,943

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

			DIA	NOITE
Wind Speed		m/s	3,71	3,21
Pasquill Stability			B	E
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,38	23,09
Surface Temperature		degC	28,38	23,09
Relative Humidity		fraction	0,7431	0,807

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REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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 2574 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) 60,7 m/s
Droplet Diameter(1) 109,2 um
Duration of Discharge(1) 726 s
Final Temperature(1) 40 degC
Release Rate(1) 335,4 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

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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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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			DIA	Distance (m)
					NOITE
UFL (190000)	18,75	s		0,0869911	0,0855178
LFL (43000)	18,75	s		0,128446	0,0996445
LFL Frac (43000)	18,75	s		0,128446	0,0996445

Concentration(ppm)	Averaging Time			DIA	Heights (m) for above distances
					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 Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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

				DIA	Distance (m)
					NOITE
Furthest Extent	43000	ppm		0,128446	0,0996445
Furthest Extent	43000	ppm		0,128446	0,0996445

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

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Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

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Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
	Release Segment 1		
Release Duration	s	726	726
Liquid Rainout	fraction	0,0811793	0,103403
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	246,49	254,402
Pool Vaporization Rate	kg/s	0,902808	0,908814
Total Vapor Flowrate	kg/s	309,075	301,627
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	101,332	103,753
Pool Vaporization Rate	kg/s	2,20634	2,22897
Total Vapor Flowrate	kg/s	310,379	302,947
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	78,6	80,7469
Pool Vaporization Rate	kg/s	2,8273	2,87143
Total Vapor Flowrate	kg/s	311	303,59
	Release Segment 1 Cloud Segment 4		
Cloud Segment Duration	s	67,5281	69,6
Pool Vaporization Rate	kg/s	3,30873	3,37841
Total Vapor Flowrate	kg/s	311,481	304,097
	Release Segment 1 Cloud Segment 5		
Cloud Segment Duration	s	116,139	117,748
Pool Vaporization Rate	kg/s	3,88705	3,99022
Total Vapor Flowrate	kg/s	312,06	304,709
	Release Segment 1 Cloud Segment 6		
Cloud Segment Duration	s	140,367	142,123
Pool Vaporization Rate	kg/s	4,65151	4,79029
Total Vapor Flowrate	kg/s	312,824	305,509
	Release Segment 1 Cloud Segment 7		
Cloud Segment Duration	s	16286	19381,1
Pool Vaporization Rate	kg/s	1,06416	1,16632
Total Vapor Flowrate	kg/s	4,65151	4,79029
Maximum Pool Radius	m	37,9392	43,2723

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
--	-----	-------

Radiation Level (kW/m2)

NOITE

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

				Distance (m)	
				DIA	NOITE
Radiation Level	3	kW/m2		202,958	212,416
Radiation Level	18,3	kW/m2		162,464	166,824
Radiation Level	36	kW/m2		145,791	149,039
Radiation Level	71,2	kW/m2		139,632	142,348

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		Radiation Level (kW/m2)	
		DIA	NOITE

**Radiation Effects: Late Pool Fire Ellipse****Path:** \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

				Distance (m)	
				DIA	NOITE
Radiation Level	3	kW/m2		275,643	294,51
Radiation Level	18,3	kW/m2		200,529	209,562
Radiation Level	36	kW/m2		175,3	182,166
Radiation Level	71,2	kW/m2		158,759	164,38

Weather Conditions**Path:** \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

			DIA	NOITE
Wind Speed		m/s	3,71	3,21
Pasquill Stability			B	E
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,38	23,09
Surface Temperature		degC	28,38	23,09
Relative Humidity		fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubat -24"- lcool c/ bomba-furo--ESTA O DE TAUBAT -HORIZONTAL IMPINGEMENT

Base Case

CASE Name: Data

Path: \SEDA\Esta o Taubat \REPLAN-Taubat -24"- lcool c/ bomba-furo--ESTA O DE TAUBAT -

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 1387 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) 98,8 m/s
Droplet Diameter(1) 81,37 um
Duration of Discharge(1) 2292 s
Final Temperature(1) 40 degC
Release Rate(1) 34,1 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]

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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)	
				DIA	NOITE
UFL (190000)	18,75	s		3,43913	3,66634
LFL (43000)	18,75	s		14,1175	13,8292
LFL Frac (43000)	18,75	s		14,1175	13,8292

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

Early Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Explosion Effects: Late Ignition

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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	
			DIA	NOITE
Overpressure	0,05	bar	26,8465	31,5583
Overpressure	0,1	bar	15,868	18,212
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	2,95711	5,3128
Used Flammable Mass				
Overpressure Radius		m	21,8465	26,5583
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5
			Supplementary Data at 0,1 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	2,95711	5,3128
Used Flammable Mass				
Overpressure Radius		m	10,868	13,212
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5
			Supplementary Data at 0,3 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	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	
			DIA	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

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Phast 6.53.1



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

Flash Fire Envelope

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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

				Distance (m)	
				DIA	NOITE
Furthest Extent	43000	ppm		14,1175	13,8292
Furthest Extent	43000	ppm		14,1175	13,8292
				Heights (m) for above distances	
				DIA	NOITE
Furthest Extent	43000	ppm		0	0
Furthest Extent	43000	ppm		0	0

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Release Segment 1			
Release Duration	s	2292	2292
Liquid Rainout	fraction	0,999987	0,999987
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	69,3056	323,101
Pool Vaporization Rate	kg/s	0,716324	1,55923
Total Vapor Flowrate	kg/s	0,717324	1,56023
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	31,195	1968,9
Pool Vaporization Rate	kg/s	1,58883	2,0467
Total Vapor Flowrate	kg/s	1,58983	2,0477
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	25,5	19308
Pool Vaporization Rate	kg/s	1,95679	1,13167
Total Vapor Flowrate	kg/s	1,95779	1,13167
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	s	22,23	
Pool Vaporization Rate	kg/s	2,24491	
Total Vapor Flowrate	kg/s	2,24591	
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	s	18,825	
Pool Vaporization Rate	kg/s	2,48187	
Total Vapor Flowrate	kg/s	2,48287	
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	s	21432,9	
Pool Vaporization Rate	kg/s	1,36689	
Total Vapor Flowrate	kg/s	1,36789	
Maximum Pool Radius	m	21,0103	21,0103

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		Radiation Level (kW/m2)	
		DIA	NOITE

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	91,8201	91,423
Radiation Level	18,3	kW/m2	47,1734	46,2638
Radiation Level	36	kW/m2	29,3268	28,5961
Radiation Level	71,2	kW/m2	22,0209	22,0209

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		Radiation Level (kW/m2)	
		DIA	NOITE

**Radiation Effects: Late Pool Fire Ellipse**

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	91,8201	91,423
Radiation Level	18,3	kW/m2	47,1734	46,2638
Radiation Level	36	kW/m2	29,3268	28,5961
Radiation Level	71,2	kW/m2	22,0209	22,0209

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

			DIA	NOITE
Wind Speed		m/s	3,71	3,21
Pasquill Stability			B	E
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,38	23,09
Surface Temperature		degC	28,38	23,09
Relative Humidity		fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE -ESTAÇÃO DE TAUBATÉ-VERTICAL

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE -ESTAÇÃO DE

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 1387 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) 98,8 m/s
Droplet Diameter(1) 81,37 um
Duration of Discharge(1) 2292 s
Final Temperature(1) 40 degC
Release Rate(1) 34,1 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]

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE -ESTAÇÃO DE TAUBATÉ-

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			DIA	Distance (m)
					NOITE
UFL (190000)	18,75	s		0,0290996	0,0282945
LFL (43000)	18,75	s		0,0400865	0,0375947
LFL Frac (43000)	18,75	s		0,0400865	0,0375947

Concentration(ppm)	Averaging Time			DIA	Heights (m) for above distances
					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 Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-VERTICAL

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

			DIA	Distance (m)
				NOITE
Furthest Extent	43000	ppm	0,0400865	0,0375947
Furthest Extent	43000	ppm	0,0400865	0,0375947

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

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-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 1387 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) 98,8 m/s
Droplet Diameter(1) 81,37 um
Duration of Discharge(1) 2292 s
Final Temperature(1) 40 degC
Release Rate(1) 34,1 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

SUMMARY REPORT

Unique Audit Number: 635.644



Study Folder: SEDA

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-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		DIA	Distance (m)
				NOITE
UFL (190000)	18,75	s	0,0417213	0,0409464
LFL (43000)	18,75	s	3,45806	2,06321
LFL Frac (43000)	18,75	s	3,45806	2,06321

Concentration(ppm)	Averaging Time		DIA	Heights (m) for above distances
				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 Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

Early Pool Fire Status	DIA	NOITE
	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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

			DIA	Distance (m)
				NOITE
Furthest Extent	43000	ppm	3,45806	2,06321
Furthest Extent	43000	ppm	3,45806	2,06321

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

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

		DIA	NOITE
	Release Segment 1		
Release Duration	s	2292	2292
Liquid Rainout	fraction	0,0141054	0,0353142
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	685,131	716,901
Pool Vaporization Rate	kg/s	0,0581132	0,106484
Total Vapor Flowrate	kg/s	33,6771	33,0023
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	308,695	315,115
Pool Vaporization Rate	kg/s	0,129128	0,243488
Total Vapor Flowrate	kg/s	33,7481	33,1393
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	246,975	249,624
Pool Vaporization Rate	kg/s	0,161151	0,307612
Total Vapor Flowrate	kg/s	33,7802	33,2034
	Release Segment 1 Cloud Segment 4		
Cloud Segment Duration	s	216,53	216,05
Pool Vaporization Rate	kg/s	0,185053	0,356321
Total Vapor Flowrate	kg/s	33,8041	33,2521
	Release Segment 1 Cloud Segment 5		
Cloud Segment Duration	s	376,65	370,711
Pool Vaporization Rate	kg/s	0,212446	0,412861
Total Vapor Flowrate	kg/s	33,8315	33,3086
	Release Segment 1 Cloud Segment 6		
Cloud Segment Duration	s	479,614	466,889
Pool Vaporization Rate	kg/s	0,247235	0,485917
Total Vapor Flowrate	kg/s	33,8662	33,3817
	Release Segment 1 Cloud Segment 7		
Cloud Segment Duration	s	2320,6	6928,76
Pool Vaporization Rate	kg/s	0,146993	0,229903
Total Vapor Flowrate	kg/s	0,247235	0,485917
Maximum Pool Radius	m	7,77244	12,9755

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	Radiation Level (kW/m2)
DIA	NOITE

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	149,398	120,992
Radiation Level	18,3	kW/m2	141,527	110,025
Radiation Level	36	kW/m2	139,362	105,603
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

		Radiation Level (kW/m2)
		NOITE
	DIA	

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	173,399	159,933
Radiation Level	18,3	kW/m2	154,794	130,35
Radiation Level	36	kW/m2	145,166	117,308
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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 2590 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) 3,1 m/s
Droplet Diameter(1) 1,738E4 um
Duration of Discharge(1) 300 s
Final Temperature(1) 40 degC
Release Rate(1) 423,4 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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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			DIA	Distance (m)
					NOITE
UFL (190000)	18,75	s		3,00007	4,07172
LFL (43000)	18,75	s		20,7052	17,9214
LFL Frac (43000)	18,75	s		20,7052	17,9214

Concentration(ppm)	Averaging Time			DIA	Heights (m) for above distances
					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 Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

	DIA	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 Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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	
			DIA	NOITE
Overpressure	0,05	bar	63,5914	55,6632
Overpressure	0,1	bar	36,6602	30,2035
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	43,6524	36,8808
Used Flammable Mass				
Overpressure Radius		m	53,5914	50,6632
Distance to:				
- Ignition Source		m	20	10
- Cloud Front/Centre		m	20	10
- Explosion Centre		m	10	5
			Supplementary Data at 0,1 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	43,6524	36,8808
Used Flammable Mass				
Overpressure Radius		m	26,6602	25,2035
Distance to:				
- Ignition Source		m	20	10
- Cloud Front/Centre		m	20	10
- Explosion Centre		m	10	5
			Supplementary Data at 0,3 bar	
			DIA	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	
			DIA	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

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

Flash Fire Envelope

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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

				Distance (m)	
				DIA	NOITE
Furthest Extent	43000	ppm		20,7052	17,9214
Furthest Extent	43000	ppm		20,7052	17,9214
				Heights (m) for above distances	
				DIA	NOITE
Furthest Extent	43000	ppm		0	0
Furthest Extent	43000	ppm		0	0

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		DIA	NOITE
Release Segment 1			
Release Duration	s	300	300
Liquid Rainout	fraction	0,991969	0,995754
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	59,29	59,6756
Pool Vaporization Rate	kg/s	3,28547	2,84725
Total Vapor Flowrate	kg/s	6,68594	4,64482
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	241,577	241,191
Pool Vaporization Rate	kg/s	6,37996	5,5786
Total Vapor Flowrate	kg/s	9,78044	7,37617
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	21299,1	21299,1
Pool Vaporization Rate	kg/s	2,38233	2,13327
Total Vapor Flowrate	kg/s	6,37996	5,5786
Maximum Pool Radius	m	28,7133	28,7133

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		DIA	NOITE
		Radiation Level (kW/m2)	
		DIA	NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		Distance (m)		
		DIA	NOITE	
Radiation Level	3	kW/m2	121,535	120,936
Radiation Level	18,3	kW/m2	62,7295	61,5506
Radiation Level	36	kW/m2	41,2509	40,1246
Radiation Level	71,2	kW/m2	29,7796	29,7207



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		Radiation Level (kW/m2)
	DIA	NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	121,535	120,936
Radiation Level	18,3	kW/m2	62,7295	61,5506
Radiation Level	36	kW/m2	41,2509	40,1246
Radiation Level	71,2	kW/m2	29,7796	29,7207

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

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

Cenário	Liberação de produto desde o km 441+500 até o km 540+760. (\varnothing 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}	3,3 m/s (100% do diâmetro) 55,6 m/s (20% do diâmetro) 75,3 m/s (5% do diâmetro)
Diâmetro de gota^{A, B}	24,30 mm (100% do diâmetro) 0,086 mm (20% do diâmetro) 0,047 mm (5% do diâmetro)
Tempo de vazamento	414 s (100% do diâmetro) 546 s (20% do diâmetro) 3018 s (5% do diâmetro)
Taxa de vazamento^{A, B}	454,0 kg/s (100% do diâmetro) 307,2 kg/s (20% do diâmetro) 26,0 kg/s (5% do diâmetro)
Temperatura	40°C
Área da poça^{A, B}	2203,7 m ² (100% do diâmetro) 2098,7 m ² (20% do diâmetro) 1255,5 m ² (5% do diâmetro)
Volume de confinamento	4260 m ³
Considerações	
A – Calculado pelo LeakMap	
B – Os valores para ruptura foram retirados do Aglomerado Humano Cachoeira Baixa (km 422,10). Os valores para furo com 20% do diâmetro foram retirados do Aglomerado Humano Cachoeira Baixa (km 422,10). Os valores para furo com 5% do diâmetro foram retirados do Aglomerado Humano Cachoeira Baixa (km 422,10).	



SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL IMPINGEMENT

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE -ESTAÇÃO DE TAUBATÉ-

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 2099 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) 55,6 m/s
Droplet Diameter(1) 85,52 um
Duration of Discharge(1) 456 s
Final Temperature(1) 40 degC
Release Rate(1) 307,2 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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-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)
				DIA NOITE
UFL (190000)	18,75	s		4,83521 5,86874
LFL (43000)	18,75	s		19,9643 21,7027
LFL Frac (43000)	18,75	s		19,9643 21,7027

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

Early Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

	DIA	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 Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-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	
			DIA	NOITE
Overpressure	0,05	bar	35,3	56,9017
Overpressure	0,1	bar	20,0734	33,3322
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	7,88952	29,2609
Used Flammable Mass				
Overpressure Radius		m	30,3	46,9017
Distance to:				
- Ignition Source		m	10	20
- Cloud Front/Centre		m	10	20
- Explosion Centre		m	5	10

			Supplementary Data at 0,1 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	7,88952	29,2609
Used Flammable Mass				
Overpressure Radius		m	15,0734	23,3322
Distance to:				
- Ignition Source		m	10	20
- Cloud Front/Centre		m	10	20
- Explosion Centre		m	5	10

			Supplementary Data at 0,3 bar	
			DIA	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	
			DIA	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 Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

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

				Distance (m)	
				DIA	NOITE
Furthest Extent	43000	ppm		19,9643	21,7027
Furthest Extent	43000	ppm		19,9643	21,7027
				Heights (m) for above distances	
				DIA	NOITE
Furthest Extent	43000	ppm		0	0
Furthest Extent	43000	ppm		0	0

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

		DIA	NOITE
Release Segment 1			
Release Duration	s	456	456
Liquid Rainout	fraction	0,999997	0,999997
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	75,69	77,44
Pool Vaporization Rate	kg/s	3,53501	2,92357
Total Vapor Flowrate	kg/s	3,53601	2,92457
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	380,31	378,56
Pool Vaporization Rate	kg/s	5,5916	4,73768
Total Vapor Flowrate	kg/s	5,5926	4,73868
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	21144	21144
Pool Vaporization Rate	kg/s	2,01225	1,80182
Total Vapor Flowrate	kg/s	2,01225	1,80182
Maximum Pool Radius	m	25,8464	25,8464

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

		DIA	NOITE
			Radiation Level (kW/m2)

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	110,561	110,075
Radiation Level	18,3	kW/m2	56,9606	55,9168
Radiation Level	36	kW/m2	36,7888	35,8015
Radiation Level	71,2	kW/m2	26,8588	26,8588

SUMMARY REPORT

Study Folder: SEDA

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Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

	DIA	NOITE
Radiation Level (kW/m2)		

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

			DIA	NOITE
			Distance (m)	
Radiation Level	3	kW/m2	110,561	110,075
Radiation Level	18,3	kW/m2	56,9606	55,9168
Radiation Level	36	kW/m2	36,7888	35,8015
Radiation Level	71,2	kW/m2	26,8588	26,8588

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubat -24"- lcool s/ bomba-fenda--ESTA O DE TAUBAT -VERTICAL

Base Case

CASE Name: Data

Path: \SEDA\Esta o Taubat \REPLAN-Taubat -24"- lcool s/ bomba-fenda--ESTA O DE TAUBAT -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 2099 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) 55,6 m/s
Droplet Diameter(1) 85,52 um
Duration of Discharge(1) 456 s
Final Temperature(1) 40 degC
Release Rate(1) 307,2 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: 635.644

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-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)
				DIA
				NOITE
UFL (190000)	18,75	s		No Hazard
LFL (43000)	18,75	s		No Hazard
LFL Frac (43000)	18,75	s		No Hazard

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

Early Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-VERTICAL

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-VERTICAL

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

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Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-VERTICAL

		DIA	NOITE
	Release Segment 1		
Release Duration	s	456	456
Liquid Rainout	fraction	0,00707029	0,143096
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	162,563	180,231
Pool Vaporization Rate	kg/s	0,0556567	0,756559
Total Vapor Flowrate	kg/s	305,084	263,998
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	65,4475	70,2
Pool Vaporization Rate	kg/s	0,139036	1,93398
Total Vapor Flowrate	kg/s	305,167	265,175
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	50,88	54,945
Pool Vaporization Rate	kg/s	0,179508	2,49882
Total Vapor Flowrate	kg/s	305,208	265,74
	Release Segment 1 Cloud Segment 4		
Cloud Segment Duration	s	43,3125	46,1869
Pool Vaporization Rate	kg/s	0,211106	2,94633
Total Vapor Flowrate	kg/s	305,239	266,187
	Release Segment 1 Cloud Segment 5		
Cloud Segment Duration	s	73,8075	41,4681
Pool Vaporization Rate	kg/s	0,248996	3,32763
Total Vapor Flowrate	kg/s	305,277	266,569
	Release Segment 1 Cloud Segment 6		
Cloud Segment Duration	s	88,2	133,929
Pool Vaporization Rate	kg/s	0,298503	3,98931
Total Vapor Flowrate	kg/s	305,327	267,23
	Release Segment 1 Cloud Segment 7		
Cloud Segment Duration	s	3067,06	18234,3
Pool Vaporization Rate	kg/s	0,166576	1,00549
Total Vapor Flowrate	kg/s	0,298503	3,98931
Maximum Pool Radius	m	8,59748	39,1843

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-VERTICAL

	Radiation Level (kW/m2)
DIA	NOITE

SUMMARY REPORT

Study Folder: SEDA

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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	95,5492	177,402
Radiation Level	18,3	kW/m2	82,1162	126,813
Radiation Level	36	kW/m2	75,2114	107,595
Radiation Level	71,2	kW/m2		99,6575

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-VERTICAL

		Radiation Level (kW/m2)
		NOITE
DIA		

SUMMARY REPORT

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Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-VERTICAL

				Distance (m)	
				DIA	NOITE
Radiation Level	3	kW/m2		110,005	234,385
Radiation Level	18,3	kW/m2		89,6892	156,467
Radiation Level	36	kW/m2		79,3923	130,507
Radiation Level	71,2	kW/m2		Not Reached	114,929

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-VERTICAL

			DIA	NOITE
Wind Speed		m/s	3,71	3,21
Pasquill Stability			B	E
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,38	23,09
Surface Temperature		degC	28,38	23,09
Relative Humidity		fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-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 2099 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) 55,6 m/s
Droplet Diameter(1) 85,52 um
Duration of Discharge(1) 456 s
Final Temperature(1) 40 degC
Release Rate(1) 307,2 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

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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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-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		DIA	Distance (m)
				NOITE
UFL (190000)	18,75	s	0,0870612	0,0855317
LFL (43000)	18,75	s	0,129634	0,099662
LFL Frac (43000)	18,75	s	0,129634	0,099662

Concentration(ppm)	Averaging Time		DIA	Heights (m) for above distances
				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 Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

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

			DIA	Distance (m)
				NOITE
Furthest Extent	43000	ppm	0,129634	0,099662
Furthest Extent	43000	ppm	0,129634	0,099662

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

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

		DIA	NOITE
	Release Segment 1		
Release Duration	s	456	456
Liquid Rainout	fraction	0,0796904	0,158118
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	163,84	176,89
Pool Vaporization Rate	kg/s	0,532227	0,835617
Total Vapor Flowrate	kg/s	283,251	259,462
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	65,6825	69,6
Pool Vaporization Rate	kg/s	1,33937	2,13718
Total Vapor Flowrate	kg/s	284,058	260,763
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	51,04	53,6656
Pool Vaporization Rate	kg/s	1,73015	2,75428
Total Vapor Flowrate	kg/s	284,449	261,38
	Release Segment 1 Cloud Segment 4		
Cloud Segment Duration	s	43,4375	45,8044
Pool Vaporization Rate	kg/s	2,03608	3,24209
Total Vapor Flowrate	kg/s	284,755	261,868
	Release Segment 1 Cloud Segment 5		
Cloud Segment Duration	s	73,0056	41,1456
Pool Vaporization Rate	kg/s	2,40064	3,66108
Total Vapor Flowrate	kg/s	285,12	262,287
	Release Segment 1 Cloud Segment 6		
Cloud Segment Duration	s	88,3063	132,984
Pool Vaporization Rate	kg/s	2,87925	4,39738
Total Vapor Flowrate	kg/s	285,598	263,023
	Release Segment 1 Cloud Segment 7		
Cloud Segment Duration	s	13645,1	18779,2
Pool Vaporization Rate	kg/s	0,728863	1,08246
Total Vapor Flowrate	kg/s	2,87925	4,39738
Maximum Pool Radius	m	29,0239	41,182

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

	Radiation Level (kW/m2)
DIA	NOITE

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

			DIA	Distance (m)
				NOITE
Radiation Level	3	kW/m2	198,641	218,179
Radiation Level	18,3	kW/m2	160,005	165,327
Radiation Level	36	kW/m2	143,759	145,623
Radiation Level	71,2	kW/m2	138,217	136,964

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

	DIA	Radiation Level (kW/m2)
		NOITE

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

				Distance (m)	
				DIA	NOITE
Radiation Level	3	kW/m2		242,023	277,703
Radiation Level	18,3	kW/m2		182,658	196,337
Radiation Level	36	kW/m2		161,019	169,797
Radiation Level	71,2	kW/m2		149,403	153,009

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

			DIA	NOITE
Wind Speed		m/s	3,71	3,21
Pasquill Stability			B	E
Surface Roughness Length		in	4,62348	4,62348
Surface Roughness Parameter			0,09	0,09
Atmospheric Temperature		degC	23,38	23,09
Surface Temperature		degC	28,38	23,09
Relative Humidity		fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-HORIZONTAL IMPINGEMENT

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-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 1256 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) 75,3 m/s
Droplet Diameter(1) 46,63 um
Duration of Discharge(1) 3018 s
Final Temperature(1) 40 degC
Release Rate(1) 26 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: 635.644

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-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)	
				DIA	NOITE
UFL (190000)	18,75	s		3,15931	3,30159
LFL (43000)	18,75	s		12,9406	12,7263
LFL Frac (43000)	18,75	s		12,9406	12,7263

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

Early Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

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Explosion Effects: Late Ignition

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-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	
			DIA	NOITE
Overpressure	0,05	bar	24,7919	30,2285
Overpressure	0,1	bar	14,8459	17,5504
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	2,19879	4,55403
Used Flammable Mass				
Overpressure Radius		m	19,7919	25,2285
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5

			Supplementary Data at 0,1 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	2,19879	4,55403
Used Flammable Mass				
Overpressure Radius		m	9,84587	12,5504
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5

			Supplementary Data at 0,3 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	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	
			DIA	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 Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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

				Distance (m)	
				DIA	NOITE
Furthest Extent	43000	ppm		12,9406	12,7263
Furthest Extent	43000	ppm		12,9406	12,7263
				Heights (m) for above distances	
				DIA	NOITE
Furthest Extent	43000	ppm		0	0
Furthest Extent	43000	ppm		0	0

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

		DIA	NOITE
	Release Segment 1		
Release Duration	s	3018	3018
Liquid Rainout	fraction	0,999988	0,999987
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	73,1025	414,123
Pool Vaporization Rate	kg/s	0,596727	1,39558
Total Vapor Flowrate	kg/s	0,597727	1,39658
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	34,02	2603,88
Pool Vaporization Rate	kg/s	1,27534	1,77232
Total Vapor Flowrate	kg/s	1,27634	1,77332
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	27,4375	18582
Pool Vaporization Rate	kg/s	1,57654	1,02917
Total Vapor Flowrate	kg/s	1,57754	1,02917
	Release Segment 1 Cloud Segment 4		
Cloud Segment Duration	s	24,2	
Pool Vaporization Rate	kg/s	1,81292	
Total Vapor Flowrate	kg/s	1,81392	
	Release Segment 1 Cloud Segment 5		
Cloud Segment Duration	s	40,7556	
Pool Vaporization Rate	kg/s	2,09344	
Total Vapor Flowrate	kg/s	2,09444	
	Release Segment 1 Cloud Segment 6		
Cloud Segment Duration	s	21400,5	
Pool Vaporization Rate	kg/s	1,25879	
Total Vapor Flowrate	kg/s	1,25979	
Maximum Pool Radius	m	19,9909	19,9909

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

	Radiation Level (kW/m2)
DIA	NOITE

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	81,4436	81,1246
Radiation Level	18,3	kW/m2	41,7673	40,9467
Radiation Level	36	kW/m2	25,3554	24,6347
Radiation Level	71,2	kW/m2	19,3931	19,4009

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

		Radiation Level (kW/m2)
		NOITE
DIA		

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	87,8131	87,4339
Radiation Level	18,3	kW/m2	45,0847	44,2046
Radiation Level	36	kW/m2	27,6602	27,0454
Radiation Level	71,2	kW/m2	21,0015	21,0015

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubat -24"- lcool s/ bomba-furo--ESTA O DE TAUBAT -VERTICAL

Base Case

CASE Name: Data

Path: \SEDA\Esta o Taubat \REPLAN-Taubat -24"- lcool s/ bomba-furo--ESTA O DE TAUBAT -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 1256 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) 75,3 m/s
Droplet Diameter(1) 46,63 um
Duration of Discharge(1) 3018 s
Final Temperature(1) 40 degC
Release Rate(1) 26 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: 635.644

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-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			DIA	Distance (m)
					NOITE
UFL (190000)	18,75	s		0,0290996	0,0282945
LFL (43000)	18,75	s		0,0400865	0,0375947
LFL Frac (43000)	18,75	s		0,0400865	0,0375947

Concentration(ppm)	Averaging Time			DIA	Heights (m) for above distances
					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 Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-VERTICAL

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

			DIA	Distance (m)
				NOITE
Furthest Extent	43000	ppm	0,0400865	0,0375947
Furthest Extent	43000	ppm	0,0400865	0,0375947

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

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-VERTICAL

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-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 1256 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) 75,3 m/s
Droplet Diameter(1) 46,63 um
Duration of Discharge(1) 3018 s
Final Temperature(1) 40 degC
Release Rate(1) 26 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: 635.644

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-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		DIA	Distance (m)
				NOITE
UFL (190000)	18,75	s	0,0417211	0,0409462
LFL (43000)	18,75	s	1,35591	0,0833892
LFL Frac (43000)	18,75	s	1,35591	0,0833892

Concentration(ppm)	Averaging Time		DIA	Heights (m) for above distances
				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 Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

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

			DIA	Distance (m)
				NOITE
Furthest Extent	43000	ppm	1,35591	0,0833892
Furthest Extent	43000	ppm	1,35591	0,0833892

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

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

		DIA	NOITE
	Release Segment 1		
Release Duration	s	3018	3018
Liquid Rainout	fraction	0,0242532	0,00686607
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	879,122	901,501
Pool Vaporization Rate	kg/s	0,0924351	0,023053
Total Vapor Flowrate	kg/s	25,4619	25,8445
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	404,308	407,13
Pool Vaporization Rate	kg/s	0,201345	0,0511384
Total Vapor Flowrate	kg/s	25,5708	25,8726
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	326,585	325,55
Pool Vaporization Rate	kg/s	0,249396	0,0638932
Total Vapor Flowrate	kg/s	25,6188	25,8854
	Release Segment 1 Cloud Segment 4		
Cloud Segment Duration	s	547,587	284,259
Pool Vaporization Rate	kg/s	0,298055	0,0733741
Total Vapor Flowrate	kg/s	25,6675	25,8949
	Release Segment 1 Cloud Segment 5		
Cloud Segment Duration	s	887,935	494,826
Pool Vaporization Rate	kg/s	0,362928	0,0841649
Total Vapor Flowrate	kg/s	25,7323	25,9056
	Release Segment 1 Cloud Segment 6		
Cloud Segment Duration	s	4148,24	
Pool Vaporization Rate	kg/s	0,182066	
Total Vapor Flowrate	kg/s	0,362928	25,8215
Maximum Pool Radius	m	9,76501	5,3434

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

	Radiation Level (kW/m2)
DIA	NOITE

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

			DIA	Distance (m) NOITE
Radiation Level	3	kW/m2	118,37	91,1757
Radiation Level	18,3	kW/m2	109,764	85,6149
Radiation Level	36	kW/m2	106,948	85,0694
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

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

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

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Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	149,185	109,208
Radiation Level	18,3	kW/m2	126,477	95,4408
Radiation Level	36	kW/m2	115,329	88,889
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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 2204 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) 2,428E4 um
Duration of Discharge(1) 414 s
Final Temperature(1) 40 degC
Release Rate(1) 454 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: 635.644

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) 4260 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 Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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		DIA	Distance (m)
UFL (190000)	18,75	s	2,83899	4,24499
LFL (43000)	18,75	s	19,9661	16,8206
LFL Frac (43000)	18,75	s	19,9661	16,8206

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

Early Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard



Explosion Effects: Late Ignition

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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	
			DIA	NOITE
Overpressure	0,05	bar	50,7414	62,141
Overpressure	0,1	bar	27,755	33,426
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable
			Supplementary Data at 0,05 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	27,1426	52,9137
Used Flammable Mass				
Overpressure Radius		m	45,7414	57,141
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5
			Supplementary Data at 0,1 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	27,1426	52,9137
Used Flammable Mass				
Overpressure Radius		m	22,755	28,426
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5
			Supplementary Data at 0,3 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	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	
			DIA	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 Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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

				Distance (m)	
				DIA	NOITE
Furthest Extent	43000	ppm		19,9661	16,8206
Furthest Extent	43000	ppm		19,9661	16,8206
				Heights (m) for above distances	
				DIA	NOITE
Furthest Extent	43000	ppm		0	0
Furthest Extent	43000	ppm		0	0

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		DIA	NOITE
Release Segment 1			
Release Duration	s	414	414
Liquid Rainout	fraction	0,993023	0,994471
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	68,89	69,7225
Pool Vaporization Rate	kg/s	3,65544	3,08072
Total Vapor Flowrate	kg/s	6,8229	5,591
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	346,128	345,296
Pool Vaporization Rate	kg/s	5,76097	4,96404
Total Vapor Flowrate	kg/s	8,92843	7,47432
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	21185	21185
Pool Vaporization Rate	kg/s	2,16977	1,94879
Total Vapor Flowrate	kg/s	5,76097	4,96404
Maximum Pool Radius	m	26,4851	26,4851

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		DIA	NOITE
		Radiation Level (kW/m2)	
		DIA	NOITE

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	113,068	112,524
Radiation Level	18,3	kW/m2	58,3018	57,1945
Radiation Level	36	kW/m2	37,8049	36,7918
Radiation Level	71,2	kW/m2	27,5605	27,5141



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		Radiation Level (kW/m2)
	DIA	NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	113,068	112,524
Radiation Level	18,3	kW/m2	58,3018	57,1945
Radiation Level	36	kW/m2	37,8049	36,7918
Radiation Level	71,2	kW/m2	27,5605	27,5141

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-álcool s/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

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

Cenário	Liberação de produto desde o km 441+500 até o km 540+760. (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}	3,0 m/s (100% do diâmetro) 60,9 m/s (20% do diâmetro) 101,8 m/s (5% do diâmetro)
Diâmetro de gota^{A, B}	23,00 mm (100% do diâmetro) 0,056 mm (20% do diâmetro) 0,020 mm (5% do diâmetro)
Tempo de vazamento	300 s (100% do diâmetro) 696 s (20% do diâmetro) 2160 s (5% do diâmetro)
Taxa de vazamento^{A, B}	400,1 kg/s (100% do diâmetro) 319,8 kg/s (20% do diâmetro) 33,4 kg/s (5% do diâmetro)
Temperatura	40°C
Área da poça^{A, B}	2665,9 m ² (100% do diâmetro) 2532,0 m ² (20% do diâmetro) 1454,2 m ² (5% do diâmetro)
Volume de confinamento	4260 m ³
Considerações	
A – Calculado pelo LeakMap	
B – Os valores para ruptura foram retirados do Aglomerado Humano Cachoeira Baixa (km 422,10). Os valores para furo com 20% do diâmetro foram retirados do Aglomerado Humano Cachoeira Baixa (km 422,10). Os valores para furo com 5% do diâmetro foram retirados do Aglomerado Humano Cachoeira Baixa (km 422,10).	



SUMMARY REPORT

Study Folder: SEDA

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REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL IMPINGEMENT

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

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 2532 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) 60,9 m/s
Droplet Diameter(1) 55,77 um
Duration of Discharge(1) 696 s
Final Temperature(1) 40 degC
Release Rate(1) 319,8 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

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) 4260 m3

Geometry

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

SUMMARY REPORT

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Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-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		DIA	NOITE	Distance (m)
UFL (76800)	18,75	s	16,5405	20,3065	
LFL (10500)	18,75	s	70,2736	79,2022	
LFL Frac (10500)	18,75	s	70,2736	79,2022	

Concentration(ppm)	Averaging Time		DIA	NOITE	Heights (m) for above distances
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 Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-HORIZONTAL

	DIA	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 Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-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	
			DIA	NOITE
Overpressure	0,05	bar	146,22	161,986
Overpressure	0,1	bar	90,3288	98,1718
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	233,825	408,165
Used Flammable Mass				
Overpressure Radius		m	111,22	126,986
Distance to:				
- Ignition Source		m	70	70
- Cloud Front/Centre		m	70	70
- Explosion Centre		m	35	35

			Supplementary Data at 0,1 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	233,825	408,165
Used Flammable Mass				
Overpressure Radius		m	55,3288	63,1718
Distance to:				
- Ignition Source		m	70	70
- Cloud Front/Centre		m	70	70
- Explosion Centre		m	35	35

			Supplementary Data at 0,3 bar	
			DIA	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	
			DIA	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 Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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

				Distance (m)	
				DIA	NOITE
Furthest Extent	10500	ppm		70,2736	79,2022
Furthest Extent	10500	ppm		70,2736	79,2022
				Heights (m) for above distances	
				DIA	NOITE
Furthest Extent	10500	ppm		0	0
Furthest Extent	10500	ppm		0	0

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Release Segment 1			
Release Duration	s	696	696
Liquid Rainout	fraction	0,999984	0,999982
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	101,506	104,551
Pool Vaporization Rate	kg/s	15,2647	12,708
Total Vapor Flowrate	kg/s	15,27	12,7138
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	594,494	591,449
Pool Vaporization Rate	kg/s	20,8474	17,9569
Total Vapor Flowrate	kg/s	20,8527	17,9627
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	s	20904	20904
Pool Vaporization Rate	kg/s	7,52192	6,81578
Total Vapor Flowrate	kg/s	7,52192	6,81578
Maximum Pool Radius	m	28,3894	28,3894

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
		Radiation Level (kW/m2)	

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		Distance (m)	
		DIA	NOITE
Radiation Level	3 kW/m2	101,824	98,9115
Radiation Level	18,3 kW/m2	29,402	29,402
Radiation Level	36 kW/m2		
Radiation Level	71,2 kW/m2		



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		Radiation Level (kW/m2)
	DIA	NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

			DIA	NOITE
			Distance (m)	
Radiation Level	3	kW/m2	101,824	98,9115
Radiation Level	18,3	kW/m2	29,402	29,402
Radiation Level	36	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-VERTICAL

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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 2532 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) 60,9 m/s
Droplet Diameter(1) 55,77 um
Duration of Discharge(1) 696 s
Final Temperature(1) 40 degC
Release Rate(1) 319,8 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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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		DIA	Distance (m)
				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		DIA	Heights (m) for above distances
				NOITE
UFL (76800)	18,75	s	0	0
LFL (10500)	18,75	s	0	0
LFL Frac (10500)	18,75	s	0	0

SUMMARY REPORT

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Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



REPLAN-Taubat -24"-gasolina c/ bomba-fenda--ESTA O DE TAUBAT -ANGULAR-45

Base Case

CASE Name: Data

Path: \SEDA\Esta o Taubat \REPLAN-Taubat -24"-gasolina c/ bomba-fenda--ESTA O DE TAUBAT -

User-Defined Data

Dispersion

Droplet Diameter(1)	55,77 um
Duration of Discharge(1)	696 s
Final Temperature(1)	40 degC
Release Rate(1)	319,8 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]
[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)	4260 m3

Geometry

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

Material

Material Identifier	N-HEXANE
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Scenario

Building Wake Option	None
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SUMMARY REPORT

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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	2532 m ²
	[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)	60,9 m/s



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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			DIA	Distance (m)
					NOITE
UFL (76800)	18,75	s		0,123172	0,0994567
LFL (10500)	18,75	s		0,202797	0,194916
LFL Frac (10500)	18,75	s		0,202797	0,194916

Concentration(ppm)	Averaging Time			DIA	Heights (m) for above distances
					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 Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

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

			DIA	Distance (m)
				NOITE
Furthest Extent	10500	ppm	0,202797	0,194916
Furthest Extent	10500	ppm	0,202797	0,194916

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

SUMMARY REPORT

Study Folder: SEDA

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Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-fenda--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

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Phast 6.53.1



REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-HORIZONTAL IMPINGEMENT

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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 1454 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) 101,8 m/s
Droplet Diameter(1) 19,96 um
Duration of Discharge(1) 2160 s
Final Temperature(1) 40 degC
Release Rate(1) 33,4 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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Unique Audit Number: 635.644

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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)
			DIA	NOITE
UFL (190000)	18,75	s	3,40497	3,6997
LFL (43000)	18,75	s	14,0713	14,0202
LFL Frac (43000)	18,75	s	14,0713	14,0202

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

Early Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Explosion Effects: Late Ignition

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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	
			DIA	NOITE
Overpressure	0,05	bar	27,0891	31,564
Overpressure	0,1	bar	15,9887	18,2148
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	3,05675	5,31622
Used Flammable Mass				
Overpressure Radius		m	22,0891	26,564
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5

			Supplementary Data at 0,1 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	3,05675	5,31622
Used Flammable Mass				
Overpressure Radius		m	10,9887	13,2148
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Centre		m	10	10
- Explosion Centre		m	5	5

			Supplementary Data at 0,3 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	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	
			DIA	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

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

Flash Fire Envelope

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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

				Distance (m)	
				DIA	NOITE
Furthest Extent	43000	ppm		14,0713	14,0202
Furthest Extent	43000	ppm		14,0713	14,0202
				Heights (m) for above distances	
				DIA	NOITE
Furthest Extent	43000	ppm		0	0
Furthest Extent	43000	ppm		0	0

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

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Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
	Release Segment 1		
Release Duration	s	2160	2160
Liquid Rainout	fraction	0,999987	0,999986
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	73,5306	311,522
Pool Vaporization Rate	kg/s	0,742357	1,55913
Total Vapor Flowrate	kg/s	0,743357	1,56013
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	33,5919	1848,48
Pool Vaporization Rate	kg/s	1,63021	2,09948
Total Vapor Flowrate	kg/s	1,63121	2,10048
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	27,4375	19440
Pool Vaporization Rate	kg/s	2,00919	1,17378
Total Vapor Flowrate	kg/s	2,01019	1,17378
	Release Segment 1 Cloud Segment 4		
Cloud Segment Duration	s	24,2	
Pool Vaporization Rate	kg/s	2,3095	
Total Vapor Flowrate	kg/s	2,3105	
	Release Segment 1 Cloud Segment 5		
Cloud Segment Duration	s	20,1306	
Pool Vaporization Rate	kg/s	2,55583	
Total Vapor Flowrate	kg/s	2,55683	
	Release Segment 1 Cloud Segment 6		
Cloud Segment Duration	s	21421,1	
Pool Vaporization Rate	kg/s	1,40951	
Total Vapor Flowrate	kg/s	1,41051	
Maximum Pool Radius	m	21,5148	21,5148

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	Radiation Level (kW/m2)
DIA	NOITE

SUMMARY REPORT

Study Folder: SEDA

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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	91,1319	90,7726
Radiation Level	18,3	kW/m2	46,8146	45,9279
Radiation Level	36	kW/m2	29,0675	28,3267
Radiation Level	71,2	kW/m2	21,8454	21,8543

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		Radiation Level (kW/m2)
		NOITE
DIA		

**Radiation Effects: Late Pool Fire Ellipse****Path:** \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	93,7957	93,3894
Radiation Level	18,3	kW/m2	48,2034	47,2797
Radiation Level	36	kW/m2	30,0616	29,345
Radiation Level	71,2	kW/m2	22,5254	22,5254

Weather Conditions**Path:** \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-VERTICAL

Base Case

CASE Name: Data

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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 1454 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) 101,8 m/s
Droplet Diameter(1) 19,96 um
Duration of Discharge(1) 2160 s
Final Temperature(1) 40 degC
Release Rate(1) 33,4 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

Unique Audit Number: 635.644

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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			DIA	Distance (m)
					NOITE
UFL (190000)	18,75	s		0,0290996	0,0282945
LFL (43000)	18,75	s		0,0400865	0,0375947
LFL Frac (43000)	18,75	s		0,0400865	0,0375947

Concentration(ppm)	Averaging Time			DIA	Heights (m) for above distances
					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 Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

Early Pool Fire Status	NOITE Hazard

Flash Fire Envelope

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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

			DIA	Distance (m)
				NOITE
Furthest Extent	43000	ppm	0,0400865	0,0375947
Furthest Extent	43000	ppm	0,0400865	0,0375947

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

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

Late Pool Fire Status	NOITE Hazard
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Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	Release Segment 1	NOITE
Release Duration	s	2160
Liquid Rainout	fraction	0,000975204
Maximum Pool Radius	m	1,98105

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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

Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	NOITE
Radiation Level	3	kW/m2	99,2091	
Radiation Level	18,3	kW/m2	96,817	
Radiation Level	36	kW/m2		
Radiation Level	71,2	kW/m2		

SUMMARY REPORT

Study Folder: SEDA

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Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

Radiation Level (kW/m2)

NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

Distance (m)

NOITE

Radiation Level	3	kW/m2	106,087
Radiation Level	18,3	kW/m2	99,3249
Radiation Level	36	kW/m2	98,1472
Radiation Level	71,2	kW/m2	Not Reached

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-ANGULAR-45

Base Case

CASE Name: Data

Path: \\SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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 1454 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) 101,8 m/s
Droplet Diameter(1) 19,96 um
Duration of Discharge(1) 2160 s
Final Temperature(1) 40 degC
Release Rate(1) 33,4 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

Unique Audit Number: 635.644

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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			DIA	Distance (m)
					NOITE
UFL (190000)	18,75	s		1,50885	0,0409402
LFL (43000)	18,75	s		3,66641	2,44722
LFL Frac (43000)	18,75	s		3,66641	2,44722

Concentration(ppm)	Averaging Time			DIA	Heights (m) for above distances
					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 Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

Early Pool Fire Status	DIA	NOITE
	Hazard	Hazard

Flash Fire Envelope

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

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

			DIA	Distance (m)
				NOITE
Furthest Extent	43000	ppm	3,66641	2,44722
Furthest Extent	43000	ppm	3,66641	2,44722

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

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	DIA	NOITE
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
	Release Segment 1		
Release Duration	s	2160	2160
Liquid Rainout	fraction	0,00586972	0,0140304
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	647,702	673,402
Pool Vaporization Rate	kg/s	0,0250049	0,042303
Total Vapor Flowrate	kg/s	33,229	32,9737
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	291,72	295,363
Pool Vaporization Rate	kg/s	0,0556027	0,0964917
Total Vapor Flowrate	kg/s	33,2596	33,0279
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	233,64	233,59
Pool Vaporization Rate	kg/s	0,0693093	0,121786
Total Vapor Flowrate	kg/s	33,2733	33,0532
	Release Segment 1 Cloud Segment 4		
Cloud Segment Duration	s	203,348	202,02
Pool Vaporization Rate	kg/s	0,0794561	0,140979
Total Vapor Flowrate	kg/s	33,2834	33,0724
	Release Segment 1 Cloud Segment 5		
Cloud Segment Duration	s	358,312	349,14
Pool Vaporization Rate	kg/s	0,0910534	0,163352
Total Vapor Flowrate	kg/s	33,295	33,0947
	Release Segment 1 Cloud Segment 6		
Cloud Segment Duration	s	620,13	441,5
Pool Vaporization Rate	kg/s	0,106041	0,192419
Total Vapor Flowrate	kg/s	33,31	33,1238
	Release Segment 1 Cloud Segment 7		
Cloud Segment Duration	s		2181,86
Pool Vaporization Rate	kg/s		0,13544
Total Vapor Flowrate	kg/s	0,106041	0,192419
Maximum Pool Radius	m	4,76378	7,83399

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

	Radiation Level (kW/m2)
DIA	NOITE

SUMMARY REPORT

Study Folder: SEDA

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Phast 6.53.1



Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	144,954	113,696
Radiation Level	18,3	kW/m2	139,197	105,813
Radiation Level	36	kW/m2	138,494	103,856
Radiation Level	71,2	kW/m2		

Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		Radiation Level (kW/m2)
		NOITE
	DIA	



Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

			Distance (m)	
			DIA	NOITE
Radiation Level	3	kW/m2	160,055	138,024
Radiation Level	18,3	kW/m2	147,775	118,967
Radiation Level	36	kW/m2	141,661	109,687
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-furo--ESTAÇÃO DE TAUBATÉ-

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



REPLAN-Taubat -24"-gasolina c/ bomba-ruptura--ESTAC O DE TAUBAT 

Base Case

CASE Name: Data

Path: \SEDA\Estac o Taubat \REPLAN-Taubat -24"-gasolina c/ bomba-ruptura--ESTAC O DE TAUBAT 

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 2666 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 m/s
Droplet Diameter(1) 2,298E4 um
Duration of Discharge(1) 300 s
Final Temperature(1) 40 degC
Release Rate(1) 400,1 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]

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

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) 4260 m3

Geometry

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



Consequence Results

Distance to Concentration Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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)	
				DIA	NOITE
UFL	(76800)	18,75	s	8,79453	17,9808
LFL	(10500)	18,75	s	54,3656	77,487
LFL Frac	(10500)	18,75	s	54,3656	77,487

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

Early Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

	DIA	NOITE
Early Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Study Folder: SEDA

Unique Audit Number: 635.644

Phast 6.53.1



Explosion Effects: Late Ignition

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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	
			DIA	NOITE
Overpressure	0,05	bar	149,134	162
Overpressure	0,1	bar	86,0466	98,1859
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,4	bar	Not Reachable	Not Reachable

			Supplementary Data at 0,05 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	336,261	686,179
Used Flammable Mass				
Overpressure Radius		m	125,539	126,986
Distance to:				
- Ignition Source		m	50	70
- Cloud Front/Centre		m	50	70
- Explosion Centre		m	23,5945	35,0141

			Supplementary Data at 0,1 bar	
			DIA	NOITE
Supplied Flammable Mass		kg	336,261	686,179
Used Flammable Mass				
Overpressure Radius		m	62,4521	63,1718
Distance to:				
- Ignition Source		m	50	70
- Cloud Front/Centre		m	50	70
- Explosion Centre		m	23,5945	35,0141

			Supplementary Data at 0,3 bar	
			DIA	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	
			DIA	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 Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

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

				Distance (m)	
				DIA	NOITE
Furthest Extent	10500	ppm		54,3656	77,487
Furthest Extent	10500	ppm		54,3656	77,487
				Heights (m) for above distances	
				DIA	NOITE
Furthest Extent	10500	ppm		0	0
Furthest Extent	10500	ppm		0	0

Late Pool Fire Hazard

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

Late Pool Fire Status	DIA	NOITE
	Hazard	Hazard

SUMMARY REPORT

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Phast 6.53.1



Pool Vaporization Results

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		DIA	NOITE
	Release Segment 1		
Release Duration	s	300	300
Liquid Rainout	fraction	0,966587	0,972339
	Release Segment 1 Cloud Segment 1		
Cloud Segment Duration	s	49,3506	58,5225
Pool Vaporization Rate	kg/s	8,48242	8,76487
Total Vapor Flowrate	kg/s	21,8508	19,8319
	Release Segment 1 Cloud Segment 2		
Cloud Segment Duration	s	20,3719	241,477
Pool Vaporization Rate	kg/s	20,3124	16,9243
Total Vapor Flowrate	kg/s	33,6808	27,9913
	Release Segment 1 Cloud Segment 3		
Cloud Segment Duration	s	18555,5	20753,9
Pool Vaporization Rate	kg/s	6,20148	5,39564
Total Vapor Flowrate	kg/s	19,5698	5,39564
Maximum Pool Radius	m	29,1304	29,1304

Radiation Effects: Early Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

	DIA	Radiation Level (kW/m2) NOITE
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Radiation Effects: Early Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

			DIA	Distance (m) NOITE
Radiation Level	3	kW/m2	103,902	100,887
Radiation Level	18,3	kW/m2	30,2086	30,1637
Radiation Level	36	kW/m2		
Radiation Level	71,2	kW/m2		



Radiation Effects: Late Pool Fire Distance

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		Radiation Level (kW/m2)
	DIA	NOITE

Radiation Effects: Late Pool Fire Ellipse

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

			DIA	NOITE
			Distance (m)	
Radiation Level	3	kW/m2	103,902	100,887
Radiation Level	18,3	kW/m2	30,2086	30,1637
Radiation Level	36	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Weather Conditions

Path: \SEDA\Estação Taubaté\REPLAN-Taubaté-24"-gasolina c/ bomba-ruptura--ESTAÇÃO DE TAUBATÉ

		DIA	NOITE
Wind Speed	m/s	3,71	3,21
Pasquill Stability		B	E
Surface Roughness Length	in	4,62348	4,62348
Surface Roughness Parameter		0,09	0,09
Atmospheric Temperature	degC	23,38	23,09
Surface Temperature	degC	28,38	23,09
Relative Humidity	fraction	0,7431	0,807