FSRU di PORTO TORRES
e
OPERE CONNESSE

Rapporto Preliminare di Sicurezza ai sensi del D.Lgs. 105/15

ALLEGATO C.4.2_1

ELABORATI DI CALCOLO
12R

Firmato digitalmente da:
Giovanni Romano
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Rev.	Descrizione	Elaborato	Verificato	Approvato	Data
0	Emissione per permessi	A.VISIGOTI	V.ROMANO	G.ROMANO	AGOSTO 2024

Input Report

Workspace: 3InvioGN-12R

Invio GN a metanodotto

Study
3InvioGN-12R

Tab	Group	Field	Value
Context of calculations	Selection of context	Weathers to use for this study	Weather folder
		Parameters to use for this study	Parameter set
		Obstructions to use for this study	Multi-Energy obstruction set
Bund, building and terrain	Terrain and bund definition	Type of terrain for dispersion	Default terrain
		Type of pool substrate and bunds	No bund
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected
		Building type (downwind building type)	Buildings\Building type

12Ra Manichette GN a metanodotto

Pressure vessel

3InvioGN-12R\Invio GN a metanodotto

Tab	Group	Field	Value	Units
Material	Material	Material	GAS NATURALE	
		Specify volume inventory?	Yes	
		Mass inventory	1402,77	kg
		Volume inventory	24,39	m3
		Material to track	GAS NATURALE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	50	degC
		Pressure (gauge)	75	bar
		Fluid state	Vapour	
		Liquid mole fraction	0	fraction
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	5	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	DNV recommended	
		Phase change upstream of orifice?	Disallow liquid phase change only (metastable liquid)	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Do not force correlation	
Short pipe	Pipe	Pipe roughness	0,045	mm

	characteristics			
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Inventory data for time-varying releases	Tank volume	24,39	m3
		Tank vapour volume	24,39	m3
		Tank liquid volume	0	m3
		Tank liquid level	0	m
		Maximum vapour release height	0	m

		Minimum mass inventory	0,1	kg
		Maximum mass inventory	1E+09	kg
	Safety system modelling for time-varying releases	Safety system modelling (isolation and blowdown)	No	
Dispersion	User-defined dispersion scope (N.B Based on the material to track)	Concentrations of interest		ppm
		Distances of interest		m
		Averaging time for concentrations and distances of interest		
		Specify user-defined averaging time	No	
		User defined averaging time		s
Bund, building and terrain	Terrain and bund definition	Type of terrain for dispersion	Default terrain	
		Type of pool substrate and bunds	No bund	
	Building definition	Release building		
		In-building release?	Outdoor	
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of	Trapped	

		droplets		
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	Multi-Energy: Uniform confined	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use explosion mass modification factor	Yes	
		Explosion mass modification factor	3	
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Martinsen time varying	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Selection for jet fire method	Automatic selection / DNV recommended	

	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	3; 5; 7; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Horizontal options	Use standard method	
		Correlation	Recommended	
		Flame-shape adjustment if grounded	Yes	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	3; 5; 7; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	

		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

50mm

Leak

3InvioGN-12R\Invio GN a metanodotto\12Ra Manichette GN a metanodotto

Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	50	mm
		Use specified discharge coefficient?	Yes	
		Discharge coefficient	0,62	fraction
	Release location	Elevation	5	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	GAS NATURALE	
		Type of risk effects to model	Flammable only	
	Phase	Phase to be released	Vapour	
Discharge parameters	Model settings	Atmospheric expansion method	DNV recommended	
		Phase change upstream of orifice?	Disallow liquid phase change only (metastable liquid)	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Do not force correlation	
Dispersion	User-defined dispersion scope (N.B Based on the material to track)	Concentrations of interest		ppm
		Distances of interest		m
		Averaging time for		

		concentrations and distances of interest		
		Specify user-defined averaging time	No	
		User defined averaging time		s
Bund, building and terrain	Terrain and bund definition	Type of terrain for dispersion	Default terrain	
		Type of pool substrate and bunds	No bund	
Explosion parameters	Explosion method	Explosion method	Multi-Energy: Uniform confined	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use explosion mass modification factor	Yes	
		Explosion mass modification factor	3	
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Martinsen time varying	

		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Selection for jet fire method	Automatic selection / DNV recommended	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	3; 5; 7; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
		Flame-shape adjustment if grounded	Yes	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input	5	

		radiation levels		
		Intensity levels	3; 5; 7; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

Discharge Report

Workspace: 3InvioGN-12R

Study: Invio GN a metanodotto

Equipment Item: 12Ra Manichette GN a metanodotto

3InvioGN-12R\Invio GN a metanodotto\12Ra Manichette GN a metanodotto

Material	**GAS NATURALE**	
East	0	m
North	0	m

Scenario (Leak) : 50mm

3InvioGN-12R\Invio GN a metanodotto\12Ra Manichette GN a metanodotto\50mm

Weather: Category 2/F

INPUT DATA

Inventory data

Mass in vessel	**1402,77**	kg

Stagnation Data (upstream end for long pipe)

Initial pressure (gauge)	**75**	bar
Initial temperature	**50**	degC
Fluid state	**Pressurized gas**	

Scenario data

Phase to be released	Vapour	
Hole diameter	**50**	mm
Discharge coefficient	**0,62**	fraction

OUTPUT DATA

Mass flow rate	17,2154	kg/s
Release duration	81,4832	s

Orifice or pipe exit data (before atmospheric expansion)

Pressure	41,119	bar
Temperature	5,2336	degC
Liquid mass fraction	**0**	fraction
Velocity at vena contracta (at exit for pipe releases)	387,063	m/s
Discharge coefficient	0,62	

Final Data (after atmospheric expansion)

Temperature	-7,03143	degC
Liquid mass fraction	0	fraction
Droplet diameter	0	um
Expanded diameter	**0,296312**	m
Velocity	300	m/s

Weather: Category 5/D

INPUT DATA

Inventory data

Mass in vessel	**1402,77**	kg

Stagnation Data (upstream end for long pipe)

Initial pressure (gauge)	**75**	bar
Initial temperature	**50**	degC
Fluid state	**Pressurized gas**	

Scenario data

Phase to be released	Vapour	
Hole diameter	**50**	mm
Discharge coefficient	**0,62**	fraction

OUTPUT DATA

Mass flow rate	17,2154	kg/s
Release duration	81,4832	s

Orifice or pipe exit data (before atmospheric expansion)

Pressure	41,119	bar
Temperature	5,2336	degC
Liquid mass fraction	**0**	fraction
Velocity at vena contracta (at exit for pipe releases)	387,063	m/s
Discharge coefficient	0,62	

Final Data (after atmospheric expansion)

Temperature	-7,03143	degC
Liquid mass fraction	0	fraction
Droplet diameter	0	um
Expanded diameter	**0,296312**	m
Velocity	300	m/s

Dispersion Report

Workspace: 3InvioGN-12R

Study: Invio GN a metanodotto

Equipment Item: 12Ra Manichette GN a metanodotto

3InvioGN-12R\Invio GN a metanodotto\12Ra Manichette GN a metanodotto

Material	**GAS NATURALE**	
East	0	m
North	0	m

Scenario (Leak) : 50mm

3InvioGN-12R\Invio GN a metanodotto\12Ra Manichette GN a metanodotto\50mm

Material to track	**GAS NATURALE**

Weather: Category 2/F

Wind speed [m/s]	**2**
Pasquill stability	**F stable - night with moderate clouds and light/moderate wind**
Atmospheric temperature [degC]	**25**
Relative humidity [fraction]	**0,75**
Solar radiation flux [kW/m2]	0,5
Mixing layer height [m]	100

Observer Release Data and Observer Mass Data

					Masses or mass rates		
Observer number	**Release type**	**Start time [s]**	**Start downwind distance [m]**	**Unit**	**Release**	**Rainout**	**Final**
1	Continuous	0	0	kg/s	17,2154	0	17,2154
2	Continuous	81,4832	0	kg/s	17,2154	0	17,2154

Weather: Category 5/D

Wind speed [m/s]	**5**
Pasquill stability	**D neutral - little sun and high wind or overcast/windy night**
Atmospheric temperature [degC]	25
Relative humidity [fraction]	0,75
Solar radiation flux [kW/m2]	0,5
Mixing layer height [m]	800

Observer Release Data and Observer Mass Data

					Masses or mass rates		
Observer number	**Release type**	**Start time [s]**	**Start downwind distance [m]**	**Unit**	**Release**	**Rainout**	**Final**
1	Continuous	0	0	kg/s	17,2154	0	17,2154
2	Continuous	81,4832	0	kg/s	17,2154	0	17,2154

Jet Fire

Workspace: 3InvioGN-12R

Study: Invio GN a metanodotto

Equipment Item: 12Ra Manichette GN a metanodotto

3InvioGN-12R\Invio GN a metanodotto\12Ra Manichette GN a metanodotto

Material	**GAS NATURALE**	
East	0	m
North	0	m

Scenario (Leak) : 50mm

3InvioGN-12R\Invio GN a metanodotto\12Ra Manichette GN a metanodotto\50mm

Weather: Category 2/F

Wind speed [m/s]	**2**
Pasquill stability	**F stable - night with moderate clouds and light/moderate wind**
Atmospheric temperature [degC]	**25**
Relative humidity [fraction]	**0,75**
Solar radiation flux [kW/m2]	0,5

Jet fire model results

INPUT DATA

Scenario

Elevation	**5**	m
Release angle from horizontal	**0**	deg

Jet fire method

Selection for jet fire method	Automatic selection / DNV recommended

Jet Fire Parameters

Wind orientation about the z-axis (anti-clockwise from the East)	**0**	deg

Rotation about the z-axis (anti-clockwise from the east)	**0**	deg
Rate modification factor	3	

Automatic selection of method

Jet fire method used in calculations	Cone model

Calculated inputs

Mass flow rate	17,2154	kg/s
Temperature after atmospheric expansion	-7,03143	degC
Liquid fraction	0	fraction
Velocity after atmospheric expansion (input)	**300**	m/s
Rainout fraction time averaged	**0**	fraction

OUTPUT DATA

Flame emissive power	244,187	kW/m2
Fraction of emissivity	0,214758	fraction
Jet velocity	300	m/s
Flame length	40,7525	m
Frustum length	30,6645	m
Frustum base width	4,19981	m
Frustum tip width	9,4924	m
Frustum lift-off distance	10,9768	m
Flame length in still air	57,6369	m
Hole to flame angle	26,973	deg
Expanded diameter	0,296312	m
Plane angular rotation	0	deg

Radiation Intensity Ellipse Results

INPUT DATA

For ellipses 'observer direction' refers to whether inclination is 'fixed' or 'variable'. Orientation is always variable.

Observer direction	Variable	

Exposure duration	20	s
Height of interest	**1,7**	m

OUTPUT DATA

Radiation intensity

Incident radiation [kW/m2]	Lethality [%]	View factor	Probit	Dose [(W/m2)^ProbitN.s]	Ellipse half-length [m]	Ellipse half-width [m]	Ellipse centre downwind distance [m]	Effect downwind distance [m]	Ellipse area [m2]
3	0	0,0122857	-1,38321	865.119	48,5773	60,3846	33,8331	82,4104	9215,28
5	0,000174704	0,0204761	0,360367	1.709.491	37,7246	46,59	33,0339	70,7584	5521,63
7	0,02405	0,0286666	1,50883	2.677.313	32,1082	39,0767	32,0635	64,1716	3941,69
12,5	6,52536	0,0511903	3,48789	5.800.162	25,2985	28,3296	28,7167	54,0152	2251,57
37,5	98,7381	0,153571	7,23773	25.094.924	15,5531	11,345	23,699	39,2521	554,335

Radiation v Distance Results

INPUT DATA

Maximum distance	82,4104	m
Observer type radiation modelling flag	Planar	
Observer direction	Variable	
Height of interest	**1,7**	m

OUTPUT DATA

Downwind distance [m]	Maximum incident radiation [kW/m2]	Lethality level [fraction]
0	7,03159	0,000254713
1,68184	8,68401	0,00293141

3,36369	12,3462	0,0600499
5,04553	18,2106	0,409904
6,72738	27,3803	0,877829
8,40922	39,3577	0,991864
10,0911	57,2365	0,999884
11,7729	79,1113	0,999999
13,4548	90,1845	1
15,1366	94,5109	1
16,8184	89,1775	1
18,5003	83,3018	1
20,1821	78,1005	0,999999
21,864	73,6245	0,999997
23,5458	69,7427	0,999993
25,2277	66,3023	0,999986
26,9095	63,1637	0,999971
28,5914	60,1811	0,999941
30,2732	57,2385	0,999884
31,955	54,1972	0,999763
33,6369	51,027	0,999497
35,3187	47,3436	0,998791
37,0006	43,3693	0,996872
38,6824	39,0321	0,991211
40,3643	34,449	0,974297
42,0461	29,8455	0,927643
43,728	25,3683	0,81692
45,4098	21,295	0,620307
47,0916	18,5181	0,432254
48,7735	16,971	0,319746
50,4553	15,4484	0,214979
52,1372	13,9401	0,127162
53,819	12,6438	0,0703669
55,5009	11,4558	0,0351583
57,1827	10,3804	0,0159233
58,8646	9,41475	0,00657662
60,5464	8,55203	0,00249538

62,2283	7,78531	0,000879344
63,9101	7,09946	0,000287686
65,5919	6,48937	8,85495E-05
67,2738	5,9468	2,5872E-05
68,9556	5,4623	7,20148E-06
70,6375	5,02931	1,92368E-06
72,3193	4,64145	4,95706E-07
74,0012	4,29325	1,23839E-07
75,683	3,97992	3,0128E-08
77,3649	3,69732	0
79,0467	3,44181	0
80,7285	3,21029	0
82,4104	3	0

Weather: Category 5/D

Wind speed [m/s]	**5**
Pasquill stability	**D neutral - little sun and high wind or overcast/windy night**
Atmospheric temperature [degC]	25
Relative humidity [fraction]	0,75
Solar radiation flux [kW/m2]	0,5

Jet fire model results

INPUT DATA

Scenario

Elevation	**5**	m
Release angle from horizontal	**0**	deg

Jet fire method

Selection for jet fire method	Automatic selection / DNV recommended

Jet Fire Parameters

Wind orientation about the z-axis (anti-clockwise from the East)	**0**	deg
Rotation about the z-axis (anti-clockwise from the east)	**0**	deg
Rate modification factor	3	

Automatic selection of method

Jet fire method used in calculations	Cone model

Calculated inputs

Mass flow rate	17,2154	kg/s
Temperature after atmospheric expansion	-7,03143	degC
Liquid fraction	0	fraction
Velocity after atmospheric expansion (input)	**300**	m/s

Rainout fraction time averaged	**0**	fraction

OUTPUT DATA

Flame emissive power	253,829	kW/m2
Fraction of emissivity	0,210115	fraction
Jet velocity	300	m/s
Flame length	44,573	m
Frustum length	33,8458	m
Frustum base width	4,19981	m
Frustum tip width	7,83332	m
Frustum lift-off distance	10,9768	m
Flame length in still air	57,6369	m
Hole to flame angle	14,0752	deg
Expanded diameter	0,296312	m
Plane angular rotation	0	deg

Radiation Intensity Ellipse Results

INPUT DATA

For ellipses 'observer direction' refers to whether inclination is 'fixed' or 'variable'. Orientation is always variable.

Observer direction	Variable	
Exposure duration	20	s
Height of interest	**1,7**	m

OUTPUT DATA

Radiation intensity

Incident radiation [kW/m2]	Lethality [%]	View factor	Probit	Dose [(W/m2)^ProbitN.s]	Ellipse half-length [m]	Ellipse half-width [m]	Ellipse centre downwind distance [m]	Effect downwind distance [m]	Ellipse area [m2]
3	0	0,011819	-1,38321	865.119	42,8809	60,2249	37,0982	80,1153	8113,16

5	0,000174704	0,0196983	0,360367	1.709.491	36,4003	46,8983	34,469	70,8693	5363,05
7	0,02405	0,0275776	1,50883	2.677.313	32,7978	39,519	33,0015	65,7992	4071,93
12,5	6,52536	0,0492458	3,48789	5.800.162	27,4938	28,761	30,8209	58,3147	2484,21
37,5	98,7381	0,147737	7,23773	25.094.924	18,7173	12,6877	26,6945	45,4118	746,062

Radiation v Distance Results

INPUT DATA

Maximum distance	87,6129	m
Observer type radiation modelling flag	Planar	
Observer direction	Variable	
Height of interest	**1,7**	m

OUTPUT DATA

Downwind distance [m]	Maximum incident radiation [kW/m2]	Lethality level [fraction]
0	6,76578	0,000154717
1,78802	9,26458	0,00563083
3,57604	13,1529	0,0903959
5,36405	19,3354	0,490739
7,15207	30,0471	0,930755
8,94009	48,8581	0,999158
10,7281	78,9936	0,999999
12,5161	108,508	1
14,3041	122,294	1
16,0922	117,583	1
17,8802	98,3823	1
19,6682	106,029	1
21,4562	101,191	1
23,2442	96,8898	1
25,0323	93,1048	1
26,8203	89,7301	1

28,6083	80,4252	0,999999
30,3963	83,7957	1
32,1843	81,0269	0,999999
33,9723	78,2064	0,999999
35,7604	75,1181	0,999998
37,5484	71,4309	0,999995
39,3364	66,6764	0,999987
41,1244	60,2314	0,999942
42,9124	51,7612	0,999578
44,7005	41,6886	0,995327
46,4885	31,8904	0,953973
48,2765	28,7316	0,908015
50,0645	25,2468	0,812544
51,8525	21,8693	0,654357
53,6405	18,7529	0,449223
55,4286	16,0249	0,25328
57,2166	13,7213	0,116253
59,0046	11,7984	0,0437009
60,7926	10,1994	0,0136795
62,5806	8,87118	0,00365291
64,3687	7,75919	0,000845623
66,1567	6,82618	0,000173822
67,9447	6,03943	3,23667E-05
69,7327	5,37206	5,55198E-06
71,5207	4,80263	8,90338E-07
73,3087	4,31406	1,35234E-07
75,0968	3,8925	1,96652E-08
76,8848	3,52679	0
78,6728	3,20792	0
80,4608	2,92852	0
82,2488	2,68258	0
84,0369	2,46514	0
85,8249	2,2721	0
87,6129	2,10005	0

Explosion Report

Workspace: 3InvioGN-12R

Study: Invio GN a metanodotto

Equipment Item: 12Ra Manichette GN a metanodotto

3InvioGN-12R\Invio GN a metanodotto\12Ra Manichette GN a metanodotto

Material	**GAS NATURALE**	
East	0	m
North	0	m

Scenario (Leak) : 50mm

3InvioGN-12R\Invio GN a metanodotto\12Ra Manichette GN a metanodotto\50mm

Weather: Category 2/F

Explosion location criterion	Cloud front (LFL fraction)	
Explosion height criterion	**Effect height**	
Explosion method	Multi-Energy: Uniform confined	
Uniform confined method explosion efficiency	**12,5**	%
Uniform confined method explosion strength	**4**	

Time of explosion [s]	Distance to centre of mass [m]	Distance to explosion centre [m]	Distance to ignition point [m]	Flammable mass [kg]	Overpressures (input) [bar]	Distance to specified overpressures [m]
0,710514	14,5169	10	10	6,60363	0,03 0,07 0,14 0,3 0,6	26,668 17,1467 0 0 0
0,710514	14,5169	20	20	6,60363	0,03 0,07 0,14	36,668 27,1467 0

					0,3 0,6	0 0
1,23779	16,4938	30	30	8,27131	0,03 0,07 0,14 0,3 0,6	47,9672 37,7038 0 0 0
2,731	19,1502	40	40	10,4948	0,03 0,07 0,14 0,3 0,6	59,4512 48,3401 0 0 0
5,90482	19,2559	50	50	10,56	0,03 0,07 0,14 0,3 0,6	69,4914 58,3573 0 0 0
13,7691	19,2974	60	60	10,5583	0,03 0,07 0,14 0,3 0,6	79,4904 68,3569 0 0 0

Weather: Category 5/D

Explosion location criterion	Cloud front (LFL fraction)	
Explosion height criterion	**Effect height**	
Explosion method	Multi-Energy: Uniform confined	
Uniform confined method explosion efficiency	**12,5**	%
Uniform confined method explosion strength	**4**	

Time of explosion [s]	Distance to centre of mass [m]	Distance to explosion centre [m]	Distance to ignition point [m]	Flammable mass [kg]	Overpressures (input) [bar]	Distance to specified overpressures [m]
0,710074	14,1178	10	10	5,83428	0,03 0,07 0,14 0,3 0,6	25,9938 16,8577 0 0 0
0,710074	14,1178	20	20	5,83428	0,03 0,07 0,14 0,3 0,6	35,9938 26,8577 0 0 0
1,36115	15,2159	30	30	6,55602	0,03 0,07 0,14 0,3 0,6	46,6278 37,1295 0 0 0
2,82076	16,1812	40	40	7,17959	0,03 0,07 0,14 0,3 0,6	57,1391 47,3487 0 0 0
7,38396	16,1669	50	50	7,16346	0,03 0,07 0,14 0,3	67,1263 57,3432 0 0

	0,6	0