

Jet Fire

Workspace: 72341-3InvioGN

Study: Invio GN a metanodotto

Equipment Item: 11R Metanodotto piattaforma Alt A

72341-3InvioGN\Invio GN a metanodotto\11R Metanodotto piattaforma Alt A

Material	GAS NATURALE	
East	0	m
North	0	m

Scenario (Leak) : 130mm

72341-3InvioGN\Invio GN a metanodotto\11R Metanodotto piattaforma Alt A\130mm

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	1	m
Release angle from horizontal	90	deg

Jet Fire Parameters

Jet fire method	Cone model	
Crosswind angle	0	deg
Rate modification factor	3	

Calculated inputs

Mass flow rate	119,946	kg/s
Temperature after atmospheric expansion	-5,13687	degC
Liquid fraction	0	fraction
Velocity after atmospheric expansion (input)	300	m/s
Rainout fraction time averaged	0	fraction

OUTPUT DATA

Flame emissive power	208,503	kW/m2
Fraction of emissivity	0,189687	fraction
Jet velocity	300	m/s
Flame length	96,0214	m
Frustum length	79,0865	m
Frustum base width	9,53058	m
Frustum tip width	28,2281	m
Frustum lift-off distance	17,0204	m
Flame length in still air	133,519	m
Hole to flame angle	6,33079	deg
Expanded diameter	0,810815	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	13,1955	s
Height of interest	10,7	m

OUTPUT DATA

Radiation intensity

Incident	Lethality [%]	View factor	Probit	Dose [(W/m2)^Pro	Ellipse	Ellipse	Ellipse centre	Effect downw	Ellipse
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radiation [kW/ m2]				bitN.s]	half- length [m]	half- width [m]	downwind distance [m]	ind distance [m]	area [m2]
3	0	0,0143 883	- 2,447 8	570.784	132,6	132,7 13	7,74683	140,347	5528 5
5	0	0,0239 805	- 0,704 224	1.127.880	95,49 29	95,00 22	7,82894	103,322	2850 0,7
7	0,00026 1239	0,0335 727	0,444 24	1.766.425	73,58 9	72,41 94	7,38911	80,9781	1674 2,4
12,5	0,49875 1	0,0599 512	2,423 3	3.826.804	40,07 21	39,20 71	4,19428	44,2664	4935, 78
37,5	87,963	0,1798 54	6,173 14	16.557.013	5,817 02	4,157 39	1,25648	7,0735	75,97 52

Radiation v Distance Results

INPUT DATA

Maximum distance	140,347	m
Observer type radiation modelling flag	Planar	
Observer direction	Variable	
Height of interest	10,7	m

OUTPUT DATA

Downwind distance [m]	Maximum incident radiation [kW/m2]	Lethality level [fraction]
0	52,3656	0,989635
2,86422	43,4349	0,952996
5,72845	38,2994	0,893459
8,59267	35,8339	0,845665
11,4569	31,699	0,725589
14,3211	27,787	0,559596
17,1853	24,5906	0,394671
20,0496	22,0493	0,261248

22,9138	20,0089	0,165789
25,778	18,3469	0,102593
28,6422	16,9603	0,0623737
31,5065	15,7825	0,0374704
34,3707	14,7908	0,0226253
37,2349	14,0686	0,0148826
40,0991	13,4023	0,00967282
42,9634	12,7733	0,00615928
45,8276	12,1825	0,00385491
48,6918	11,6256	0,00236984
51,556	11,0991	0,00143005
54,4203	10,6002	0,000846535
57,2845	10,1264	0,000491345
60,1487	9,67592	0,000279523
63,0129	9,24719	0,000155824
65,8771	8,85405	8,7125E-05
68,7414	8,46541	4,67477E-05
71,6056	8,09495	2,4579E-05
74,4698	7,7418	1,26662E-05
77,334	7,40527	6,40023E-06
80,1983	7,08463	3,17268E-06
83,0625	6,77922	1,5437E-06
85,9267	6,48422	7,29591E-07
88,7909	6,20791	3,42895E-07
91,6552	5,94483	1,58449E-07
94,5194	5,69441	7,20395E-08
97,3836	5,45609	3,22496E-08
100,248	5,22933	1,42256E-08
103,112	5,01552	0
105,976	4,81009	0
108,841	4,6147	0
111,705	4,42886	0
114,569	4,25208	0
117,433	4,08391	0
120,297	3,92393	0



123,162	3,77169	0
126,026	3,62682	0
128,89	3,48892	0
131,754	3,35763	0
134,619	3,23259	0
137,483	3,11349	0
140,347	3,00001	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	1	m
Release angle from horizontal	90	deg

Jet Fire Parameters

Jet fire method	Cone model	
Crosswind angle	0	deg
Rate modification factor	3	

Calculated inputs

Mass flow rate	119,946	kg/s
Temperature after atmospheric expansion	-5,13687	degC
Liquid fraction	0	fraction
Velocity after atmospheric expansion (input)	300	m/s
Rainout fraction time averaged	0	fraction

OUTPUT DATA

Flame emissive power	282,79	kW/m2
Fraction of emissivity	0,189687	fraction
Jet velocity	300	m/s
Flame length	74,6401	m
Frustum length	63,8489	m

Frustum base width	9,03264	m
Frustum tip width	25,0126	m
Frustum lift-off distance	11,152	m
Flame length in still air	133,519	m
Hole to flame angle	15,827	deg
Expanded diameter	0,810815	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	13,1955	s
Height of interest	10,7	m

OUTPUT DATA

Radiation intensity

Incident radiation [kW/m ²]	Lethality [%]	View factor	Probability	Dose [(W/m ²) ^{ProbitN.s}]	Ellipse half-length [m]	Ellipse half-width [m]	Ellipse centre downwind distance [m]	Effect downwind distance [m]	Ellipse area [m ²]
3	0	0,0106086	-2,4478	570.784	137,988	140,834	11,7555	149,744	61052
5	0	0,017681	-0,704224	1.127.880	105,309	107,187	13,0712	118,38	35461,4
7	0,000261239	0,0247534	0,44424	1.766.425	86,8298	88,0888	13,6187	100,449	24029,2
12,5	0,498751	0,0442025	2,4233	3.826.804	59,4017	59,3702	13,5085	72,9103	11079,4
37,5	87,963	0,132607	6,17314	16.557.013	21,3325	18,6766	5,95902	27,2916	1251,67

Radiation v Distance Results

INPUT DATA

Maximum distance	149,744	m
Observer type radiation modelling flag	Planar	
Observer direction	Variable	
Height of interest	10,7	m

OUTPUT DATA

Downwind distance [m]	Maximum incident radiation [kW/m ²]	Lethality level [fraction]
0	238,783	1
3,05599	253,854	1
6,11198	124,769	1
9,16797	91,4293	0,999988
12,224	72,0823	0,999667
15,2799	60,1903	0,99735
18,3359	51,7756	0,988522
21,3919	45,7221	0,967828
24,4479	41,2396	0,932881
27,5039	37,2605	0,875189
30,5599	34,1048	0,802118
33,6159	31,3973	0,714602
36,6719	29,022	0,617287
39,7279	26,9019	0,515733
42,7839	25,1609	0,425079
45,8398	23,2356	0,32253
48,8958	21,6266	0,240227
51,9518	20,1412	0,171453
55,0078	18,7663	0,117066
58,0638	17,4917	0,0763788
61,1198	16,3093	0,0475846
64,1758	15,2126	0,0283029
67,2318	14,1957	0,0160765

70,2878	13,2531	0,00872699
73,3438	12,3801	0,00453245
76,3997	11,5718	0,00225538
79,4557	10,8239	0,00107712
82,5117	10,132	0,000494634
85,5677	9,49203	0,000218861
88,6237	8,90249	9,38319E-05
91,6797	8,35481	3,8789E-05
94,7357	7,84814	1,55496E-05
97,7917	7,37927	6,05804E-06
100,848	6,9452	2,29863E-06
103,904	6,54313	8,512E-07
106,96	6,17048	3,08235E-07
110,016	5,82485	1,09357E-07
113,072	5,50405	3,80807E-08
116,128	5,20605	1,30378E-08
119,184	4,929	0
122,24	4,6712	0
125,296	4,4311	0
128,352	4,20727	0
131,408	3,99841	0
134,464	3,80334	0
137,52	3,62098	0
140,576	3,45033	0
143,632	3,2905	0
146,688	3,14065	0
149,744	3,00003	0

