

Jet Fire

Workspace: 72341-3InvioGN-01

Study: Invio GN a metanodotto

Equipment Item: 11R Metanodotto piattaforma Alt A

72341-3InvioGN-01\Invio GN a metanodotto\11R Metanodotto piattaforma Alt A

Material	GAS NATURALE	
East	0	m
North	0	m

Scenario (Leak) : 130mm

72341-3InvioGN-01\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	20	s
Height of interest	10,7	m

OUTPUT DATA

Radiation intensity

Incident	Lethality [%]	View factor	Probability	Dose [(W/m2)^Pro	Ellipse	Ellipse	Ellipse centre	Effect downw	Ellipse
----------	---------------	-------------	-------------	------------------	---------	---------	----------------	--------------	---------

radiation [kW/ m2]				bitN.s]	half- length [m]	half- width [m]	downwind distance [m]	ind distance [m]	area [m2]
3	0	0,0143 883	- 1,383 21	865.119	132,6	132,7 13	7,74683	140,347	5528 5
5	0,00017 4704	0,0239 805	0,360 367	1.709.491	95,49 29	95,00 22	7,82894	103,322	2850 0,7
7	0,02405	0,0335 727	1,508 83	2.677.313	73,58 9	72,41 94	7,38911	80,9781	1674 2,4
12,5	6,52536	0,0599 512	3,487 89	5.800.162	40,07 21	39,20 71	4,19428	44,2664	4935, 78
37,5	98,7381	0,1798 54	7,237 73	25.094.924	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	0,999634
2,86422	43,4349	0,996921
5,72845	38,2994	0,989548
8,59267	35,8339	0,981357
11,4569	31,699	0,951956
14,3211	27,787	0,887728
17,1853	24,5906	0,787398
20,0496	22,0493	0,664614
22,9138	20,0089	0,537306

25,778	18,3469	0,419832
28,6422	16,9603	0,318978
31,5065	15,7825	0,236923
34,3707	14,7908	0,174193
37,2349	14,0686	0,133799
40,0991	13,4023	0,101294
42,9634	12,7733	0,0751752
45,8276	12,1825	0,0548067
48,6918	11,6256	0,0392352
51,556	11,0991	0,0275674
54,4203	10,6002	0,019002
57,2845	10,1264	0,0128445
60,1487	9,67592	0,00851177
63,0129	9,24719	0,00552856
65,8771	8,85405	0,00358146
68,7414	8,46541	0,00223892
71,6056	8,09495	0,00137174
74,4698	7,7418	0,000823795
77,334	7,40527	0,000485091
80,1983	7,08463	0,000280185
83,0625	6,77922	0,000158806
85,9267	6,48422	8,75959E-05
88,7909	6,20791	4,79072E-05
91,6552	5,94483	2,57477E-05
94,5194	5,69441	1,3607E-05
97,3836	5,45609	7,07538E-06
100,248	5,22933	3,62227E-06
103,112	5,01552	1,83864E-06
105,976	4,81009	9,14084E-07
108,841	4,6147	4,48334E-07
111,705	4,42886	2,17087E-07
114,569	4,25208	1,0384E-07
117,433	4,08391	4,90997E-08
120,297	3,92393	2,29644E-08
123,162	3,77169	1,06307E-08



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	20	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	-1,38321	865.119	137,988	140,834	11,7555	149,744	61052
5	0,000174704	0,017681	0,360367	1.709.491	105,309	107,187	13,0712	118,38	35461,4
7	0,02405	0,0247534	1,50883	2.677.313	86,8298	88,0888	13,6187	100,449	24029,2
12,5	6,52536	0,0442025	3,48789	5.800.162	59,4017	59,3702	13,5085	72,9103	11079,4
37,5	98,7381	0,132607	7,23773	25.094.924	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	1
12,224	72,0823	0,999996
15,2799	60,1903	0,999942
18,3359	51,7756	0,999579
21,3919	45,7221	0,998218
24,4479	41,2396	0,994799
27,5039	37,2605	0,98665
30,5599	34,1048	0,972177
33,6159	31,3973	0,948604
36,6719	29,022	0,913552
39,7279	26,9019	0,865211
42,7839	25,1609	0,809396
45,8398	23,2356	0,727064
48,8958	21,6266	0,640209
51,9518	20,1412	0,546234
55,0078	18,7663	0,450187
58,0638	17,4917	0,357456
61,1198	16,3093	0,272873
64,1758	15,2126	0,199964
67,2318	14,1957	0,140537
70,2878	13,2531	0,0946908

73,3438	12,3801	0,0611721
76,3997	11,5718	0,0379109
79,4557	10,8239	0,0225601
82,5117	10,132	0,0129068
85,5677	9,49203	0,00710934
88,6237	8,90249	0,00378636
91,6797	8,35481	0,00194304
94,7357	7,84814	0,000965033
97,7917	7,37927	0,000464758
100,848	6,9452	0,000217453
103,904	6,54313	9,90332E-05
106,96	6,17048	4,39822E-05
110,016	5,82485	1,90825E-05
113,072	5,50405	8,10231E-06
116,128	5,20605	3,37224E-06
119,184	4,929	1,37801E-06
122,24	4,6712	5,53681E-07
125,296	4,4311	2,19058E-07
128,352	4,20727	8,54536E-08
131,408	3,99841	3,29094E-08
134,464	3,80334	1,25268E-08
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

