

Jet Fire

Workspace: 72341-3InvioGN

Study: Invio GN a metanodotto

Equipment Item: 10R Bracci scarico GN

72341-3InvioGN\Invio GN a metanodotto\10R Bracci scarico GN

Material	GAS NATURALE	
East	0	m
North	0	m

Scenario (Leak) : 60mm

72341-3InvioGN\Invio GN a metanodotto\10R Bracci scarico GN\60mm

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	10	m
Release angle from horizontal	0	deg

Jet Fire Parameters

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

Calculated inputs

Mass flow rate	25,5506	kg/s
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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	257,881	kW/m2
Fraction of emissivity	0,217423	fraction
Jet velocity	300	m/s
Flame length	47,5797	m
Frustum length	35,4535	m
Frustum base width	5,45248	m
Frustum tip width	11,4381	m
Frustum lift-off distance	13,3727	m
Flame length in still air	68,6811	m
Hole to flame angle	29,1594	deg
Expanded diameter	0,374222	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	6,63703	s
Height of interest	10,7	m

OUTPUT DATA

Radiation intensity

Incident radiati	Lethality [%]	View factor	Probability	Dose [(W/m2)^ProbabilityN.s]	Ellipse half-	Ellipse half-	Ellipse centre downw	Effect downwind	Ellipse area
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on [kW/ m ²]					length [m]	width [m]	ind distance [m]	distance [m]	[m ²]
3	0	0,0116 333	- 4,207 06	287.091	63,03 26	74,64 35	36,0515	99,0841	1478 1,1
5	0	0,0193 888	- 2,463 49	567.297	49,94 47	58,15 12	35,2533	85,198	9124, 27
7	0	0,0271 443	- 1,315 02	888.470	43,00 54	49,13 82	34,5168	77,5222	6638, 84
12,5	0,00072 6171	0,0484 72	0,664 04	1.924.791	33,48 42	36,23 16	32,7979	66,2821	3811, 34
37,5	27,8896	0,1454 16	4,413 88	8.327.783	21,22 69	17,53 62	28,6111	49,8379	1169, 42

Radiation v Distance Results

INPUT DATA

Maximum distance	99,0841	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	13,3439	1,95416E-05
2,02213	16,5298	0,000359632
4,04425	21,3396	0,00602924
6,06638	29,2364	0,0755332
8,0885	43,5892	0,471088
10,1106	85,849	0,987484
12,1328	221,048	1
14,1549	257,881	1

16,177	257,881	1
18,1991	257,881	1
20,2213	257,881	1
22,2434	232,895	1
24,2655	182,534	0,999999
26,2876	152,871	0,999987
28,3098	132,822	0,999904
30,3319	118,206	0,99957
32,354	106,934	0,998607
34,3761	97,7826	0,996375
36,3983	89,9315	0,991791
38,4204	82,7469	0,982797
40,4425	75,6859	0,964917
42,4646	68,2731	0,927718
44,4868	60,2494	0,849028
46,5089	51,8544	0,698504
48,531	42,9118	0,449866
50,5531	34,6868	0,197026
52,5753	27,7462	0,0532277
54,5974	24,3165	0,0194759
56,6195	21,5034	0,00648982
58,6416	19,4686	0,00237413
60,6638	17,2919	0,000622651
62,6859	15,3635	0,00014069
64,708	13,6683	2,77849E-05
66,7301	12,1896	4,89819E-06
68,7523	10,904	7,85654E-07
70,7744	9,78702	1,16586E-07
72,7965	8,81552	1,62437E-08
74,8186	7,96864	0
76,8408	7,22828	0
78,8629	6,57896	0
80,885	6,00752	0
82,9071	5,50274	0
84,9293	5,05549	0



86,9514	4,65915	0
88,9735	4,304	0
90,9956	3,98604	0
93,0178	3,70044	0
95,0399	3,44319	0
97,062	3,21075	0
99,0841	3,00015	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	10	m
Release angle from horizontal	0	deg

Jet Fire Parameters

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

Calculated inputs

Mass flow rate	25,5506	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	278,879	kW/m2
Fraction of emissivity	0,213921	fraction
Jet velocity	300	m/s
Flame length	51,7108	m
Frustum length	38,6789	m

Frustum base width	5,45248	m
Frustum tip width	9,1006	m
Frustum lift-off distance	13,3727	m
Flame length in still air	68,6811	m
Hole to flame angle	15,0237	deg
Expanded diameter	0,374222	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	6,63703	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	0,0107574	-4,20706	287.091	55,2001	74,8674	38,9325	94,4793	12983,2
5	0	0,0179289	-2,46349	567.297	45,6533	58,3248	37,8606	83,5139	8365,18
7	0	0,0251005	-1,31502	888.470	40,6752	49,3002	37,0647	77,7398	6299,82
12,5	0,000726171	0,0448223	0,66404	1.924.791	33,9307	36,4224	35,6045	69,5351	3882,5
37,5	27,8896	0,1344	4,413	8.327.783	25,22	18,31	32,6014	57,8258	1451,

Radiation v Distance Results

INPUT DATA

Maximum distance	101,459	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	10,139	2,20712E-07
2,07059	13,1942	1,65256E-05
4,14118	18,1513	0,00109652
6,21177	27,4102	0,0488681
8,28236	49,5496	0,642415
10,3529	107,204	0,998646
12,4235	244,019	1
14,4941	278,879	1
16,5647	278,879	1
18,6353	278,879	1
20,7059	278,879	1
22,7765	278,879	1
24,8471	278,879	1
26,9177	278,879	1
28,9883	278,879	1
31,0588	247,506	1
33,1294	216,142	1
35,2	193,781	1
37,2706	176,535	0,999999
39,3412	162,635	0,999995
41,4118	150,984	0,999985
43,4824	140,664	0,999957

45,553	130,51	0,999879
47,6236	118,342	0,999576
49,6942	100,06	0,997143
51,7647	72,5862	0,952352
53,8353	51,9704	0,701159
55,9059	45,0619	0,516304
57,9765	36,9234	0,261406
60,0471	29,8429	0,086019
62,1177	24,217	0,0188231
64,1883	19,8439	0,00290379
66,2589	16,4451	0,000337347
68,3295	13,7838	3,13843E-05
70,4	11,6788	2,46559E-06
72,4706	9,99517	1,70796E-07
74,5412	8,63335	1,07965E-08
76,6118	7,52248	0
78,6824	6,60293	0
80,753	5,83646	0
82,8236	5,19199	0
84,8942	4,64561	0
86,9648	4,17885	0
89,0354	3,77731	0
91,1059	3,42963	0
93,1765	3,12675	0
95,2471	2,86144	0
97,3177	2,62783	0
99,3883	2,42113	0
101,459	2,23742	0

