

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 (User defined source) : 300mm-Q99,2

72341-3InvioGN\Invio GN a metanodotto\10R Bracci scarico GN\300mm-Q99,2

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	99,2	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	286,53	kW/m2
Fraction of emissivity	0,219649	fraction
Jet velocity	300	m/s
Flame length	83,1289	m
Frustum length	60,249	m
Frustum base width	12,9153	m
Frustum tip width	21,6387	m
Frustum lift-off distance	26,3496	m
Flame length in still air	123,084	m
Hole to flame angle	35,4594	deg
Expanded diameter	0,737369	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	Lethality [%]	View factor	Probability	Dose [(W/m2)^ProbabilityN.s]	Ellipse half-	Ellipse half-	Ellipse centre downwind	Effect downwind	Ellipse area
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on [kW/ m2]					length [m]	width [m]	ind distance [m]	distance [m]	[m2]
3	0	0,0104 701	- 1,383 21	865.119	125,5 5	141,9 61	60,4464	185,996	5599 3,2
5	0,00017 4704	0,0174 502	0,360 367	1.709.491	98,68 03	110,9 73	59,4318	158,112	3440 3,1
7	0,02405	0,0244 303	1,508 83	2.677.313	84,18 96	93,97	58,454	142,644	2485 4,1
12,5	6,52536	0,0436 255	3,487 89	5.800.162	63,93 05	69,57 65	55,9221	119,853	1397 4
37,5	98,7381	0,1308 76	7,237 73	25.094.924	38,67 39	34,81 46	50,1595	88,8334	4229, 89

Radiation v Distance Results

INPUT DATA

Maximum distance	185,996	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	17,8664	0,38479
3,79584	21,9588	0,659481
7,59167	27,9343	0,891133
11,3875	37,2006	0,98646
15,1833	52,6681	0,999659
18,9792	100,658	1
22,775	210,195	1
26,5709	286,53	1
30,3667	286,53	1
34,1625	286,53	1

37,9584	286,53	1
41,7542	235,721	1
45,55	182,464	1
49,3459	150,263	1
53,1417	128,506	1
56,9376	112,832	1
60,7334	100,189	1
64,5292	89,9345	1
68,3251	80,9068	0,999999
72,1209	72,4811	0,999996
75,9167	64,2488	0,999977
79,7126	56,0537	0,999847
83,5084	47,9966	0,998965
87,3043	40,3895	0,993632
91,1001	33,4657	0,967788
94,8959	27,4783	0,880283
98,6918	22,9656	0,713647
102,488	20,4441	0,566353
106,283	18,3872	0,422758
110,079	16,5033	0,286448
113,875	14,8098	0,175318
117,671	13,3048	0,0969502
121,467	11,9583	0,0481225
125,263	10,7949	0,022074
129,058	9,77041	0,00931061
132,854	8,86812	0,00364005
136,65	8,07247	0,00132967
140,446	7,36952	0,000457316
144,242	6,74698	0,000149152
148,038	6,19418	4,64336E-05
151,833	5,70186	1,38772E-05
155,629	5,26229	4,00478E-06
159,425	4,86861	1,12103E-06
163,221	4,515	3,05684E-07
167,017	4,1965	8,15054E-08



170,813	3,90883	2,13215E-08
174,609	3,6483	0
178,404	3,41177	0
182,2	3,19648	0
185,996	3,00006	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	99,2	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	350	kW/m2
Fraction of emissivity	0,219043	fraction
Jet velocity	300	m/s
Flame length	88,1898	m
Frustum length	62,7715	m

Frustum base width	12,9153	m
Frustum tip width	14,5787	m
Frustum lift-off distance	26,3496	m
Flame length in still air	123,084	m
Hole to flame angle	18,179	deg
Expanded diameter	0,737369	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	Probit	Dose [(W/m ²) ^{Probit} N.s]	Ellipse half-length [m]	Ellipse half-width [m]	Ellipse centre downwind distance [m]	Effect downwind distance [m]	Ellipse area [m ²]
3	0	0,00857143	-1,38321	865.119	108,148	142,411	63,4797	172,628	48385
5	0,000174704	0,0142857	0,360367	1.709.491	88,146	111,434	62,3657	150,512	30858,1
7	0,02405	0,02	1,50883	2.677.313	77,581	94,5057	61,4863	139,067	23033,7
12,5	6,52536	0,0357143	3,48789	5.800.162	63,1409	70,4272	59,7261	122,867	13970,1
37,5	98,7381	0,107143	7,23773	25.094.924	44,3757	37,2221	55,0817	99,4574	5189,14

Radiation v Distance Results

INPUT DATA

Maximum distance	171,976	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	15,2633	0,203158
3,50971	19,3062	0,488682
7,01942	25,4607	0,820195
10,5291	36,7286	0,984875
14,0388	57,5693	0,999893
17,5486	98,7281	1
21,0583	182,618	1
24,568	304,106	1
28,0777	350	1
31,5874	350	1
35,0971	350	1
38,6068	350	1
42,1165	350	1
45,6262	350	1
49,136	350	1
52,6457	299,424	1
56,1554	251,744	1
59,6651	218,963	1
63,1748	194,13	1
66,6845	174,381	1
70,1942	157,983	1
73,7039	143,632	1
77,2136	129,969	1
80,7233	115,299	1

84,2331	97,6747	1
87,7428	76,6401	0,999999
91,2525	54,8327	0,999796
94,7622	46,2323	0,998423
98,2719	39,6248	0,992364
101,782	33,4712	0,967828
105,291	28,051	0,893766
108,801	23,5228	0,740825
112,311	19,8487	0,526396
115,82	16,8834	0,31346
119,33	14,4765	0,155996
122,84	12,5137	0,0657307
126,35	10,9011	0,0238942
129,859	9,56542	0,0076457
133,369	8,4503	0,00219646
136,879	7,51169	0,000576346
140,388	6,71577	0,000140296
143,898	6,03593	3,20972E-05
147,408	5,4513	6,97943E-06
150,918	4,94536	1,4562E-06
154,427	4,50494	2,93866E-07
157,937	4,11942	5,77486E-08
161,447	3,78023	1,11141E-08
164,956	3,48035	0
168,466	3,21529	0
171,976	2,97756	0

