

Jet Fire

Workspace: 72341-2FSRURegas

Study: FSRU in rigassificazione

Equipment Item: 8R Linee mandata pompe HP Booster

72341-2FSRURegas\FSRU in rigassificazione\8R Linee mandata pompe HP
Booster

Material	GAS NATURALE	
East	0	m
North	0	m

Scenario (Leak) : 40mm

72341-2FSRURegas\FSRU in rigassificazione\8R Linee mandata pompe HP
Booster\40mm

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 Parameters

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

Calculated inputs

Mass flow rate	80,4406	kg/s
Temperature after atmospheric expansion	-160,955	degC
Liquid fraction	0,950844	fraction
Velocity after atmospheric expansion (input)	241,934	m/s
Rainout fraction time averaged	0	fraction

OUTPUT DATA

Flame emissive power	135,737	kW/m ²
Fraction of emissivity	0,206126	fraction
Jet velocity	241,934	m/s
Flame length	104,677	m
Frustum length	103,107	m
Frustum base width	0,737515	m
Frustum tip width	31,5424	m
Frustum lift-off distance	1,57016	m
Flame length in still air	94,1315	m
Hole to flame angle	0	deg
Expanded diameter	0,108668	m
Plane angular rotation	0	deg

Flame on ground impingement with partial truncation

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	10,4687	s
Height of interest	1,7	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	0,0221015	-3,0404	452.833	96,284	117,846	90,3264	186,61	35646,7
5	0	0,0368359	-1,29683	894.807	84,9072	93,6303	82,0838	166,991	24975,3
7	1,31621E-05	0,0515702	-0,148367	1.401.399	78,7027	79,8453	77,4224	156,125	19741,9
12,5	0,0764091	0,0920897	1,8307	3.036.007	69,3708	58,7325	70,952	140,323	12799,8
37,5	71,9223	0,276269	5,58053	13.135.557	55,148	24,7434	62,1795	117,327	4286,85

Radiation v Distance Results

INPUT DATA

Maximum distance	208,246	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/m ²]	Lethality level [fraction]
0	9,23599	1,32236E-05
4,24993	26,197	0,259858
8,49985	42,701	0,847047
12,7498	55,7832	0,973569
16,9997	66,6826	0,994539
21,2496	75,8501	0,998582

25,4996	83,8071	0,999558
29,7495	93,3999	0,99989
33,9994	97,0628	0,999935
38,2493	102,761	0,999971
42,4993	105,15	0,999979
46,7492	112,303	0,999992
50,9991	117,889	0,999996
55,249	122,501	0,999998
59,499	127,842	0,999999
63,7489	135,737	1
67,9988	135,737	1
72,2488	135,737	1
76,4987	135,737	1
80,7486	135,737	1
84,9985	135,737	1
89,2485	135,737	1
93,4984	135,737	1
97,7483	135,737	1
101,998	135,737	1
106,248	123,575	0,999998
110,498	62,7349	0,990278
114,748	44,2449	0,873912
118,998	33,738	0,586946
123,248	27,0032	0,294485
127,498	21,9832	0,107053
131,748	18,0562	0,0278074
135,998	14,9734	0,00533907
140,248	12,5379	0,000791698
144,498	10,5988	9,48457E-05
148,747	9,04135	9,56681E-06
152,997	7,77909	8,42629E-07
157,247	6,74659	6,67954E-08
161,497	5,89429	0
165,747	5,18505	0
169,997	4,5898	0



174,247	4,08649	0
178,497	3,6578	0
182,747	3,2902	0
186,997	2,97301	0
191,247	2,6977	0
195,497	2,45743	0
199,747	2,24666	0
203,996	2,06088	0
208,246	1,8964	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 Parameters

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

Calculated inputs

Mass flow rate	80,4406	kg/s
Temperature after atmospheric expansion	-160,955	degC
Liquid fraction	0,950844	fraction
Velocity after atmospheric expansion (input)	241,934	m/s
Rainout fraction time averaged	0	fraction

OUTPUT DATA

Flame emissive power	186,85	kW/m2
Fraction of emissivity	0,206126	fraction
Jet velocity	241,934	m/s
Flame length	81,3686	m
Frustum length	80,1481	m

Frustum base width	1,19005	m
Frustum tip width	28,3709	m
Frustum lift-off distance	1,22053	m
Flame length in still air	94,1315	m
Hole to flame angle	0	deg
Expanded diameter	0,108668	m
Plane angular rotation	0	deg

Flame on ground impingement with partial truncation

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	10,4687	s
Height of interest	1,7	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	0,0160556	-3,0404	452.833	90,7428	7,14657	77,9813	168,724	2037,32
5	0	0,0267594	-1,29683	894.807	77,5542	91,6393	70,8568	148,411	22327,3
7	1,31621E-05	0,0374631	-0,148367	1.401.399	70,8974	78,7406	66,3406	137,238	17538
12,5	0,0764091	0,0668984	1,8307	3.036.007	61,5379	60,1639	59,6479	121,186	11631,3

37,5 71,922 0,2006 5,580 13.135.557 47,79 30,42 50,4061 98,2027 4567,
3 95 53 66 08 91

Radiation v Distance Results

INPUT DATA

Maximum distance	168,724	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	19,3306	0,0463569
3,44335	44,7181	0,881276
6,8867	66,4912	0,994384
10,33	83,2415	0,99952
13,7734	97,3333	0,999937
17,2167	109,472	0,999989
20,6601	120,119	0,999997
24,1034	129,613	0,999999
27,5468	138,221	1
30,9901	146,163	1
34,4335	152,041	1
37,8768	160,875	1
41,3202	168,127	1
44,7635	172,961	1
48,2069	186,85	1
51,6502	186,85	1
55,0936	186,85	1
58,5369	186,85	1
61,9803	186,85	1
65,4236	186,85	1
68,867	186,85	1

72,3103	186,85	1
75,7537	186,85	1
79,197	186,85	1
82,6404	180,074	1
86,0837	96,3908	0,999928
89,5271	67,4281	0,995105
92,9704	50,1888	0,94241
96,4138	41,6494	0,826068
99,8571	34,2545	0,607017
103,3	28,5219	0,361833
106,744	23,9322	0,170445
110,187	20,2433	0,0637798
113,631	17,261	0,0193305
117,074	14,8337	0,00486848
120,517	12,8435	0,00104637
123,961	11,1995	0,000196887
127,404	9,83097	3,31725E-05
130,847	8,68292	5,10185E-06
134,291	7,71361	7,29534E-07
137,734	6,8892	9,83284E-08
141,177	6,18342	1,26433E-08
144,621	5,57563	0
148,064	5,0491	0
151,507	4,5905	0
154,951	4,18901	0
158,394	3,83582	0
161,837	3,52372	0
165,281	3,24676	0
168,724	3	0

