

# Jet Fire

## Workspace: 72438-1RiempFSRU-6R

### Study: Riempimento FSRU-ME4

### Equipment Item: 6R Linee ricircolo GNL durante riempimento FSRU

72438-1RiempFSRU-6R\Riempimento FSRU-ME4\6R Linee ricircolo GNL durante riempimento FSRU

Material	GAS NATURALE	
East	0	m
North	0	m

### Scenario (User defined source) : 65mm-Q25,4

72438-1RiempFSRU-6R\Riempimento FSRU-ME4\6R Linee ricircolo GNL durante riempimento FSRU\65mm-Q25,4

#### 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	0	deg

#### Jet Fire Parameters

Jet fire method	Cone model
Wind orientation about the z-axis (anti-clockwise from the East)	0 deg



Rotation about the z-axis (anti-clockwise from the east)	0	deg
Rate modification factor	3	

### Calculated inputs

Mass flow rate	25,4	kg/s
Temperature after atmospheric expansion	-160,343	degC
Liquid fraction	1	fraction
Velocity after atmospheric expansion (input)	<b>66,2627</b>	m/s
Rainout fraction time averaged	0	fraction

### OUTPUT DATA

Flame emissive power	90,6285	kW/m <sup>2</sup>
Fraction of emissivity	0,279538	fraction
Jet velocity	66,2627	m/s
Flame length	72,532	m
Frustum length	71,4441	m
Frustum base width	1,51867	m
Frustum tip width	27,236	m
Frustum lift-off distance	1,08798	m
Flame length in still air	65,2247	m
Hole to flame angle	0	deg
Expanded diameter	0,0327438	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	20	s

Height of interest **1,7** m

## OUTPUT DATA

### Radiation intensity

Incident radiation [kW/m <sup>2</sup> ]	Lethality [%]	View factor	Probit	Dose [(W/m <sup>2</sup> ) <sup>Probit</sup> N.s]	Ellipse half-length [m]	Ellipse half-width [m]	Ellipse centre downwind distance [m]	Effect downwind distance [m]	Ellipse area [m <sup>2</sup> ]
3	0	0,0331022	-1,38321	865.119	67,6806	77,6974	61,3517	129,032	16520,4
5	0,000174704	0,0551703	0,360367	1.709.491	58,9016	61,8618	55,7714	114,673	11447,2
7	0,02405	0,0772384	1,50883	2.677.313	54,3383	52,7856	52,3224	106,661	9010,97
12,5	6,52536	0,137926	3,48789	5.800.162	47,8389	38,3721	47,0372	94,8761	5766,94
37,5	98,7381	0,413777	7,23773	25.094.924	39,3599	14,3083	39,3245	78,6843	1769,26

### Radiation v Distance Results

#### INPUT DATA

Maximum distance	142,895	m
Observer type radiation modelling flag	Planar	
Observer direction	Variable	
Height of interest	<b>1,7</b>	m

#### OUTPUT DATA

Downwind distance [m]	Maximum incident radiation [kW/m <sup>2</sup> ]	Lethality level [fraction]
0	22,1664	0,67118
2,91622	90,6285	1
5,83245	90,6285	1

8,74867	90,6285	1
11,6649	90,6285	1
14,5811	90,6285	1
17,4973	90,6285	1
20,4136	90,6285	1
23,3298	90,6285	1
26,246	90,6285	1
29,1622	90,6285	1
32,0785	90,6285	1
34,9947	90,6285	1
37,9109	90,6285	1
40,8271	90,6285	1
43,7434	90,6285	1
46,6596	90,6285	1
49,5758	90,6285	1
52,492	90,6285	1
55,4083	90,6285	1
58,3245	90,6285	1
61,2407	90,6285	1
64,1569	90,6285	1
67,0732	90,6285	1
69,9894	90,6285	1
72,9056	90,6285	1
75,8218	58,0578	0,999904
78,7381	37,1828	0,986404
81,6543	28,1681	0,89635
84,5705	22,766	0,703422
87,4867	19,0509	0,47058
90,403	16,0428	0,254504
93,3192	13,6082	0,110823
96,2354	11,6248	0,0392158
99,1516	10,0004	0,0114949
102,068	8,6621	0,00285503
104,984	7,5524	0,000614878
107,9	6,62625	0,000117356



110,817	5,84812	2,02411E-05
113,733	5,19028	3,21174E-06
116,649	4,63052	4,75833E-07
119,565	4,15133	6,66835E-08
122,481	3,73854	8,93045E-09
125,398	3,38133	0
128,314	3,0704	0
131,23	2,79841	0
134,146	2,55933	0
137,063	2,34831	0
139,979	2,16124	0
142,895	1,99474	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	0	deg

### Jet Fire Parameters

Jet fire method	Cone model	
Wind orientation about the z-axis (anti-clockwise from the East)	0	deg
Rotation about the z-axis (anti-clockwise from the east)	0	deg
Rate modification factor	3	

### Calculated inputs

Mass flow rate	25,4	kg/s
Temperature after atmospheric expansion	-160,343	degC
Liquid fraction	1	fraction
Velocity after atmospheric expansion (input)	<b>66,2627</b>	m/s
Rainout fraction time averaged	0	fraction

### OUTPUT DATA

Flame emissive power	121,682	kW/m2
Fraction of emissivity	0,279538	fraction

Jet velocity	66,2627	m/s
Flame length	56,3811	m
Frustum length	55,5354	m
Frustum base width	2,27635	m
Frustum tip width	24,6495	m
Frustum lift-off distance	0,845717	m
Flame length in still air	65,2247	m
Hole to flame angle	0	deg
Expanded diameter	0,0327438	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	20	s
Height of interest	<b>1,7</b>	m

#### OUTPUT DATA

##### Radiation intensity

Incident radiation [kW/m <sup>2</sup> ]	Lethality [%]	View factor	Probit	Dose [(W/m <sup>2</sup> ) <sup>Probit</sup> N.s]	Ellipse half-length [m]	Ellipse half-width [m]	Ellipse centre downwind distance [m]	Effect downwind distance [m]	Ellipse area [m <sup>2</sup> ]
3	0	0,0246543	-1,38321	865.119	65,8473	77,5759	50,5923	116,44	16047,8
5	0,000174704	0,0410906	0,360367	1.709.491	54,6581	60,5316	47,0863	101,744	10394,1
7	0,02405	0,0575268	1,50883	2.677.313	49,3128	52,1609	44,3066	93,6194	8080,81



12,5	6,52536	0,1027 26	3,487 89	5.800.162	42,23 01	39,78 8	39,6153	81,8454	5278, 66
37,5	98,7381	0,3081 79	7,237 73	25.094.924	32,75 14	18,52 43	32,1837	64,9351	1905, 99

## Radiation v Distance Results

### INPUT DATA

Maximum distance	116,44	m
Observer type radiation modelling flag	Planar	
Observer direction	Variable	
Height of interest	<b>1,7</b>	m

### OUTPUT DATA

Downwind distance [m]	Maximum incident radiation [kW/m2]	Lethality level [fraction]
0	66,662	0,999987
2,37632	121,682	1
4,75263	121,682	1
7,12895	121,682	1
9,50527	121,682	1
11,8816	121,682	1
14,2579	121,682	1
16,6342	121,682	1
19,0105	121,682	1
21,3869	121,682	1
23,7632	121,682	1
26,1395	121,682	1
28,5158	121,682	1
30,8921	121,682	1
33,2684	121,682	1
35,6448	121,682	1
38,0211	121,682	1
40,3974	121,682	1
42,7737	121,682	1



45,15	121,682	1
47,5263	121,682	1
49,9027	121,682	1
52,279	121,682	1
54,6553	121,682	1
57,0316	121,682	1
59,4079	81,2009	0,999999
61,7842	53,3717	0,999712
64,1606	40,4558	0,993732
66,5369	32,6541	0,961255
68,9132	27,6867	0,885355
71,2895	23,596	0,744248
73,6658	20,2401	0,55285
76,0421	17,4667	0,35564
78,4185	15,165	0,196982
80,7948	13,2454	0,094357
83,1711	11,6354	0,0394806
85,5474	10,2775	0,0146173
87,9237	9,12582	0,00485511
90,3	8,14345	0,0014663
92,6764	7,30082	0,000407699
95,0527	6,57437	0,000105605
97,429	5,94472	2,57407E-05
99,8053	5,39629	5,95799E-06
102,182	4,91609	1,319E-06
104,558	4,49423	2,81744E-07
106,934	4,12176	5,83646E-08
109,311	3,79157	1,17881E-08
111,687	3,49773	0
114,063	3,23523	0
116,44	3,00001	0

