

# Jet Fire

## Workspace: 72438-2FSRURegas-9R

### Study: FSRU in rigassificazione-ME7

### Equipment Item: 9Ra Compressore BOG LD

72438-2FSRURegas-9R\FSRU in rigassificazione-ME7\9Ra Compressore BOG LD

Material	<b>GAS NATURALE</b>	
East	0	m
North	0	m

### Scenario (Leak) : 75mm

72438-2FSRURegas-9R\FSRU in rigassificazione-ME7\9Ra Compressore BOG LD\75mm

#### Weather: Category 2/F

Wind speed [m/s]	<b>2</b>
Pasquill stability	<b>F stable - night with moderate clouds and light/moderate wind</b>
Atmospheric temperature [degC]	<b>25</b>
Relative humidity [fraction]	<b>0,75</b>
Solar radiation flux [kW/m2]	<b>0,5</b>

### Jet fire model results

#### INPUT DATA

##### Scenario

Elevation	<b>12,5</b>	m
Release angle from horizontal	<b>0</b>	deg

#### Jet Fire Parameters

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

## Calculated inputs

Mass flow rate	4,07992	kg/s
Temperature after atmospheric expansion	20,43	degC
Liquid fraction	0	fraction
Velocity after atmospheric expansion (input)	<b>300</b>	m/s
Rainout fraction time averaged	<b>0</b>	fraction

## OUTPUT DATA

Flame emissive power	175,866	kW/m2
Fraction of emissivity	0,189007	fraction
Jet velocity	300	m/s
Flame length	23,9585	m
Frustum length	18,86	m
Frustum base width	1,6388	m
Frustum tip width	4,9215	m
Frustum lift-off distance	5,34372	m
Flame length in still air	30,8542	m
Hole to flame angle	19,7086	deg
Expanded diameter	0,151586	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	<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	0,0170584	-1,38321	865.119	20,8638	25,4762	18,8527	39,7165	1669,85
5	0,000174704	0,0284307	0,360367	1.709.491	14,8829	17,5	17,0714	31,9543	818,233
7	0,02405	0,039803	1,50883	2.677.313	10,5656	12,2979	16,4552	27,0208	408,204
12,5	6,52536	0,0710768	3,48789	5.800.162	Not reached	Not reached		n/a	n/a
37,5	98,7381	0,21323	7,23773	25.094.924	Not reached	Not reached		n/a	n/a

## Radiation v Distance Results

### INPUT DATA

Maximum distance	46,1977	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	3,87192	1,77468E-08
0,942811	4,33468	1,47453E-07
1,88562	4,83733	1,0057E-06
2,82843	5,34532	5,13277E-06
3,77124	5,85402	2,05446E-05
4,71405	6,34688	6,52805E-05



5,65687	6,80726	0,000167631
6,59968	7,22065	0,000355631
7,54249	7,57664	0,00063883
8,4853	7,97142	0,00115341
9,42811	8,64339	0,00279113
10,3709	9,29339	0,00580345
11,3137	9,86269	0,010145
12,2565	10,3979	0,016154
13,1994	10,7338	0,0210748
14,1422	11,0298	0,026238
15,085	11,2313	0,0302303
16,0278	11,3384	0,032517
16,9706	11,3518	0,0328122
17,9134	11,273	0,0311085
18,8562	11,1046	0,0276734
19,799	10,8503	0,0230099
20,7418	10,5159	0,0177746
21,6847	10,1278	0,0128597
22,6275	9,64014	0,00822344
23,5703	9,12025	0,00482582
24,5131	8,56267	0,00252847
25,4559	7,98116	0,00116952
26,3987	7,38935	0,000472554
27,3415	6,79996	0,000165293
28,2843	6,28999	5,75984E-05
29,2271	5,86077	2,08965E-05
30,1699	5,55925	9,4465E-06
31,1128	5,26165	3,99697E-06
32,0556	4,96891	1,57572E-06
32,9984	4,68389	5,80211E-07
33,9412	4,4088	2,00146E-07
34,884	4,14525	6,48907E-08
35,8268	3,89078	1,94982E-08
36,7696	3,65405	0
37,7124	3,43077	0



38,6552	3,22092	0
39,5981	3,02426	0
40,5409	2,8404	0
41,4837	2,6688	0
42,4265	2,50886	0
43,3693	2,35995	0
44,3121	2,2214	0
45,2549	2,09254	0
46,1977	1,97271	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	12,5	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	4,07992	kg/s
Temperature after atmospheric expansion	20,43	degC
Liquid fraction	0	fraction
Velocity after atmospheric expansion (input)	300	m/s
Rainout fraction time averaged	0	fraction

### OUTPUT DATA

Flame emissive power	167,287	kW/m2
Fraction of emissivity	0,180826	fraction

Jet velocity	300	m/s
Flame length	26,6252	m
Frustum length	21,3543	m
Frustum base width	1,6388	m
Frustum tip width	4,33051	m
Frustum lift-off distance	5,34372	m
Flame length in still air	30,8542	m
Hole to flame angle	10,586	deg
Expanded diameter	0,151586	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	<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>ProbitN.s</sup> ]	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	0,0179332	-1,38321	865.119	21,6557	25,5799	19,296	40,9516	1740,29
5	0,000174704	0,0298887	0,360367	1.709.491	16,1246	17,8245	18,304	34,4287	902,936
7	0,02405	0,0418441	1,50883	2.677.313	11,6464	12,9625	17,6906	29,337	474,275
12,5	6,52536	0,0747217	3,48789	5.800.162	1,05183	0,276114	17,5857	18,6376	0,912401

37,5 98,7381 0,2241 7,237 25.094.924 Not Not n/a n/a  
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## Radiation v Distance Results

### INPUT DATA

Maximum distance	52,6691	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	3,94953	2,60201E-08
1,07488	4,461	2,4697E-07
2,14976	4,98573	1,6664E-06
3,22464	5,51831	8,43223E-06
4,29952	6,03734	3,22054E-05
5,3744	6,52005	9,44074E-05
6,44928	6,94618	0,000217849
7,52416	7,67992	0,000749851
8,59904	8,55602	0,00250773
9,67393	9,36501	0,00625053
10,7488	10,0974	0,0125235
11,8237	10,7393	0,0211634
12,8986	11,286	0,0313843
13,9734	11,7354	0,0420337
15,0483	12,0856	0,0518495
16,1232	12,3345	0,0596646
17,1981	12,4789	0,0645227
18,273	12,5139	0,0657382
19,3479	12,4338	0,0629786
20,4227	12,2328	0,0563871





21,4976	11,9078	0,0466955
22,5725	11,459	0,0352323
23,6474	10,8921	0,0237355
24,7223	10,2196	0,0139179
25,7971	9,46116	0,00689267
26,872	8,64282	0,00278919
27,9469	7,79478	0,000891834
29,0218	7,12754	0,000302351
30,0967	6,71292	0,00013951
31,1715	6,29186	5,78379E-05
32,2464	5,86384	2,10583E-05
33,3213	5,4392	6,74234E-06
34,3962	5,01295	1,82317E-06
35,4711	4,62304	4,62638E-07
36,5459	4,25424	1,04814E-07
37,6208	3,912	2,16564E-08
38,6957	3,59062	0
39,7706	3,29522	0
40,8455	3,02505	0
41,9203	2,77882	0
42,9952	2,55499	0
44,0701	2,35185	0
45,145	2,16766	0
46,2199	2,0007	0
47,2947	1,84934	0
48,3696	1,71207	0
49,4445	1,58748	0
50,5194	1,47428	0
51,5943	1,37132	0
52,6691	1,27756	0

