Jet Fire

Workspace: 72438-1RiempFSRU-13R

Study: Riempimento FSRU-ME4

Equipment Item: 13R Linee BOG a metaniera

72438-1RiempFSRU-13R\Riempimento FSRU-ME4\13R Linee BOG a metaniera

Material	**GAS NATURALE**	
East	0	m
North	0	m

Scenario (Leak) : 80mm

72438-1RiempFSRU-13R\Riempimento FSRU-ME4\13R Linee BOG a metaniera\80mm

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	**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	1,55722	kg/s
Temperature after atmospheric expansion	-134,871	degC
Liquid fraction	0	fraction
Velocity after atmospheric expansion (input)	**300**	m/s
Rainout fraction time averaged	**0**	fraction

OUTPUT DATA

Flame emissive power	131,628	kW/m2
Fraction of emissivity	0,15556	fraction
Jet velocity	300	m/s
Flame length	16,5234	m
Frustum length	13,3264	m
Frustum base width	0,859944	m
Frustum tip width	3,07834	m
Frustum lift-off distance	3,30136	m
Flame length in still air	20,2567	m
Hole to flame angle	16,1237	deg
Expanded diameter	0,0636136	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	**1,7**	m

OUTPUT DATA

Radiation intensity

Incident radiation [kW/m2]	Lethality [%]	View factor	Probit	Dose [(W/m2)^ProbitN.s]	Ellipse half-length [m]	Ellipse half-width [m]	Ellipse centre downwind distance [m]	Effect downwind distance [m]	Ellipse area [m2]
3	0	0,0227915	-1,38321	865.119	8,5216	10,5775	11,698	20,2196	283,174
5	0,000174704	0,0379859	0,360367	1.709.491	Not reached	Not reached		n/a	n/a
7	0,02405	0,0531803	1,50883	2.677.313	Not reached	Not reached		n/a	n/a
12,5	6,52536	0,0949648	3,48789	5.800.162	Not reached	Not reached		n/a	n/a
37,5	98,7381	0,284894	7,23773	25.094.924	Not reached	Not reached		n/a	n/a

Radiation v Distance Results

INPUT DATA

Maximum distance	32,2071	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	2,19609	0
0,657289	2,36212	0
1,31458	2,53058	0

1,97187	2,69913	0
2,62915	2,86521	0
3,28644	3,02625	0
3,94373	3,17976	0
4,60102	3,32352	0
5,25831	3,45566	0
5,9156	3,65107	0
6,57289	3,8752	1,80408E-08
7,23017	4,08848	5,01407E-08
7,88746	4,27421	1,14192E-07
8,54475	4,44197	2,28858E-07
9,20204	4,58272	3,97085E-07
9,85933	4,69423	6,02688E-07
10,5166	4,77484	8,06713E-07
11,1739	4,82343	9,57961E-07
11,8312	4,83945	1,01316E-06
12,4885	4,82295	9,56326E-07
13,1458	4,77458	8,05953E-07
13,8031	4,69565	6,0583E-07
14,4603	4,59054	4,09104E-07
15,1176	4,45697	2,43026E-07
15,7749	4,29998	1,27422E-07
16,4322	4,12165	5,83351E-08
17,0895	3,92984	2,36394E-08
17,7468	3,72635	8,37084E-09
18,4041	3,51514	0
19,0614	3,30005	0
19,7187	3,12728	0
20,3759	2,96598	0
21,0332	2,84436	0
21,6905	2,72161	0
22,3478	2,59896	0
23,0051	2,47749	0
23,6624	2,35813	0
24,3197	2,24165	0

24,977	2,1272	0
25,6343	2,01843	0
26,2915	1,91396	0
26,9488	1,814	0
27,6061	1,71869	0
28,2634	1,62808	0
28,9207	1,54214	0
29,578	1,4608	0
30,2353	1,38395	0
30,8926	1,31145	0
31,5499	1,24313	0
32,2071	1,1788	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	1,55722	kg/s
Temperature after atmospheric expansion	-134,871	degC
Liquid fraction	0	fraction
Velocity after atmospheric expansion (input)	**300**	m/s
Rainout fraction time averaged	**0**	fraction

OUTPUT DATA

Flame emissive power	121,959	kW/m2
Fraction of emissivity	0,146118	fraction

Jet velocity	300	m/s
Flame length	18,3881	m
Frustum length	15,1197	m
Frustum base width	0,859944	m
Frustum tip width	2,73495	m
Frustum lift-off distance	3,30136	m
Flame length in still air	20,2567	m
Hole to flame angle	8,94172	deg
Expanded diameter	0,0636136	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	**1,7**	m

OUTPUT DATA

Radiation intensity

Incident radiation [kW/m2]	Lethality [%]	View factor	Probit	Dose [(W/m2)^ProbitN.s]	Ellipse half-length [m]	Ellipse half-width [m]	Ellipse centre downwind distance [m]	Effect downwind distance [m]	Ellipse area [m2]
3	0	0,0245984	-1,38321	865.119	8,95653	10,5998	12,6982	21,6547	298,254
5	0,000174704	0,0409973	0,360367	1.709.491	0,92663	0,69811	12,3584	13,285	2,03227
7	0,02405	0,0573962	1,50883	2.677.313	Not reached	Not reached		n/a	n/a
12,5	6,52536	0,1024	3,487	5.800.162	Not	Not		n/a	n/a

		93	89		reached	reached			
37,5	98,7381	0,30748	7,23773	25.094.924		Not reached	Not reached	n/a	n/a

Radiation v Distance Results

INPUT DATA

Maximum distance	36,4747	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	2,10016	0
0,744381	2,2706	0
1,48876	2,44303	0
2,23314	2,61439	0
2,97752	2,78147	0
3,72191	2,94117	0
4,46629	3,11059	0
5,21067	3,38104	0
5,95505	3,65153	0
6,69943	3,9201	2,25372E-08
7,44381	4,14865	6,58896E-08
8,18819	4,36602	1,6796E-07
8,93257	4,55726	3,6016E-07
9,67695	4,71896	6,59672E-07
10,4213	4,84815	1,0443E-06
11,1657	4,9422	1,44076E-06
11,9101	4,99891	1,74075E-06
12,6545	5,01654	1,84483E-06
13,3989	4,99394	1,7124E-06

14,1432	4,93074	1,38611E-06
14,8876	4,83571	1,00002E-06
15,632	4,68587	5,84462E-07
16,3764	4,5088	2,98349E-07
17,1208	4,30042	1,27662E-07
17,8651	4,066	4,52014E-08
18,6095	3,81168	1,30756E-08
19,3539	3,54413	0
20,0983	3,32621	0
20,8427	3,16534	0
21,5871	3,01394	0
22,3314	2,85832	0
23,0758	2,70107	0
23,8202	2,54452	0
24,5646	2,3907	0
25,309	2,23835	0
26,0533	2,09527	0
26,7977	1,95863	0
27,5421	1,82902	0
28,2865	1,7068	0
29,0309	1,5921	0
29,7752	1,4849	0
30,5196	1,38503	0
31,264	1,29222	0
32,0084	1,20615	0
32,7528	1,12645	0
33,4971	1,05272	0
34,2415	0,98458	0
34,9859	0,921618	0
35,7303	0,863453	0
36,4747	0,809716	0