# Jet Fire

## Workspace: 72438-1RiempFSRU-2R

### Study: Riempimento FSRU-ME7

#### Equipment Item: 2Ra Compressore BOG HD

72438-1RiempFSRU-2R\Riempimento FSRU-ME7\2Ra Compressore BOG HD

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

### Scenario (Leak) : 75mm

72438-1RiempFSRU-2R\Riempimento FSRU-ME7\2Ra Compressore BOG HD\75mm

#### 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 | 1,36865 | 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 | 126,304 | kW/m2 |
| Fraction of emissivity | 0,150286 | fraction |
| Jet velocity | 300 | m/s |
| Flame length | 15,6776 | m |
| Frustum length | 12,6761 | m |
| Frustum base width | 0,787933 | m |
| Frustum tip width | 2,88076 | m |
| Frustum lift-off distance | 3,09502 | m |
| Flame length in still air | 19,1436 | m |
| Hole to flame angle | 15,7367 | deg |
| Expanded diameter | 0,0596378 | 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 | 0,0237522 | -1,38321 | 865.119 | 6,96304 | 8,59562 | 10,9983 | 17,9614 | 188,029 |
| 5 | 0,000174704 | 0,039587 | 0,360367 | 1.709.491 | Not reached | Not reached | | n/a | n/a |
| 7 | 0,02405 | 0,0554218 | 1,50883 | 2.677.313 | Not reached | Not reached | | n/a | n/a |
| 12,5 | 6,52536 | 0,0989676 | 3,48789 | 5.800.162 | Not reached | Not reached | | n/a | n/a |
| 37,5 | 98,7381 | 0,296903 | 7,23773 | 25.094.924 | Not reached | Not reached | | n/a | n/a |

## Radiation v Distance Results

### INPUT DATA

| | | |
|---|---|---|
| Maximum distance | 30,5921 | 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 | 2,00251 | 0 |
| 0,624328 | 2,14471 | 0 |
| 1,24866 | 2,28852 | 0 |
| 1,87298 | 2,43211 | 0 |

| | | |
|---|---|---|
| 2,49731 | 2,57347 | 0 |
| 3,12164 | 2,71062 | 0 |
| 3,74597 | 2,84161 | 0 |
| 4,3703 | 2,96469 | 0 |
| 4,99462 | 3,08142 | 0 |
| 5,61895 | 3,24426 | 0 |
| 6,24328 | 3,4328 | 0 |
| 6,86761 | 3,60776 | 0 |
| 7,49194 | 3,76974 | 1,0523E-08 |
| 8,11627 | 3,9115 | 2,16032E-08 |
| 8,74059 | 4,03069 | 3,83361E-08 |
| 9,36492 | 4,12543 | 5,93412E-08 |
| 9,98925 | 4,19426 | 8,07049E-08 |
| 10,6136 | 4,23622 | 9,69567E-08 |
| 11,2379 | 4,2508 | 1,0327E-07 |
| 11,8622 | 4,23803 | 9,77205E-08 |
| 12,4866 | 4,19843 | 8,22013E-08 |
| 13,1109 | 4,13309 | 6,1432E-08 |
| 13,7352 | 4,0454 | 4,10712E-08 |
| 14,3595 | 3,93377 | 2,40983E-08 |
| 14,9839 | 3,80231 | 1,246E-08 |
| 15,6082 | 3,65292 | 0 |
| 16,2325 | 3,49144 | 0 |
| 16,8569 | 3,31961 | 0 |
| 17,4812 | 3,14066 | 0 |
| 18,1055 | 2,95774 | 0 |
| 18,7298 | 2,80989 | 0 |
| 19,3542 | 2,66946 | 0 |
| 19,9785 | 2,56448 | 0 |
| 20,6028 | 2,45826 | 0 |
| 21,2272 | 2,35183 | 0 |
| 21,8515 | 2,24611 | 0 |
| 22,4758 | 2,14193 | 0 |
| 23,1001 | 2,03994 | 0 |
| 23,7245 | 1,93943 | 0 |

| | | |
|---|---|---|
| 24,3488 | 1,84358 | 0 |
| 24,9731 | 1,75122 | 0 |
| 25,5975 | 1,66258 | 0 |
| 26,2218 | 1,57781 | 0 |
| 26,8461 | 1,49697 | 0 |
| 27,4704 | 1,42009 | 0 |
| 28,0948 | 1,34712 | 0 |
| 28,7191 | 1,278 | 0 |
| 29,3434 | 1,21263 | 0 |
| 29,9677 | 1,15086 | 0 |
| 30,5921 | 1,09258 | 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 | 1,36865 | 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 | 116,788 | kW/m2 |
| Fraction of emissivity | 0,140725 | fraction |

| | | |
|---|---|---|
| Jet velocity | 300 | m/s |
| Flame length | 17,4398 | m |
| Frustum length | 14,3746 | m |
| Frustum base width | 0,787933 | m |
| Frustum tip width | 2,55809 | m |
| Frustum lift-off distance | 3,09502 | m |
| Flame length in still air | 19,1436 | m |
| Hole to flame angle | 8,76973 | deg |
| Expanded diameter | 0,0596378 | 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 | 0,0256876 | -1,38321 | 865.119 | 7,16872 | 8,64498 | 11,7398 | 18,9085 | 194,695 |
| 5 | 0,000174704 | 0,0428127 | 0,360367 | 1.709.491 | Not reached | Not reached | | n/a | n/a |
| 7 | 0,02405 | 0,0599377 | 1,50883 | 2.677.313 | Not reached | Not reached | | n/a | n/a |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 12,5 | 6,52536 | 0,107032 | 3,48789 | 5.800.162 | Not reached | Not reached | | n/a | n/a |
| 37,5 | 98,7381 | 0,321095 | 7,23773 | 25.094.924 | Not reached | Not reached | | n/a | n/a |

## Radiation v Distance Results

### INPUT DATA

| | | |
|---|---|---|
| Maximum distance | 34,6031 | 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 | 1,9043 | 0 |
| 0,706185 | 2,0499 | 0 |
| 1,41237 | 2,19682 | 0 |
| 2,11856 | 2,34269 | 0 |
| 2,82474 | 2,48506 | 0 |
| 3,53093 | 2,62157 | 0 |
| 4,23711 | 2,7684 | 0 |
| 4,9433 | 2,99608 | 0 |
| 5,64948 | 3,23068 | 0 |
| 6,35567 | 3,44748 | 0 |
| 7,06185 | 3,64133 | 0 |
| 7,76804 | 3,82437 | 1,39537E-08 |
| 8,47422 | 3,98558 | 3,09547E-08 |
| 9,18041 | 4,12199 | 5,84241E-08 |
| 9,88659 | 4,23102 | 9,47905E-08 |
| 10,5928 | 4,31042 | 1,33173E-07 |
| 11,299 | 4,35835 | 1,62715E-07 |
| 12,0051 | 4,3734 | 1,73151E-07 |

| | | |
|---|---|---|
| 12,7113 | 4,3547 | 1,60272E-07 |
| 13,4175 | 4,30206 | 1,28552E-07 |
| 14,1237 | 4,22174 | 9,10402E-08 |
| 14,8299 | 4,09821 | 5,24283E-08 |
| 15,5361 | 3,95094 | 2,61978E-08 |
| 16,2423 | 3,77764 | 1,09652E-08 |
| 16,9484 | 3,58255 | 0 |
| 17,6546 | 3,37056 | 0 |
| 18,3608 | 3,14695 | 0 |
| 19,067 | 2,96241 | 0 |
| 19,7732 | 2,82315 | 0 |
| 20,4794 | 2,69427 | 0 |
| 21,1856 | 2,56154 | 0 |
| 21,8917 | 2,42707 | 0 |
| 22,5979 | 2,29276 | 0 |
| 23,3041 | 2,16028 | 0 |
| 24,0103 | 2,02852 | 0 |
| 24,7165 | 1,90418 | 0 |
| 25,4227 | 1,78491 | 0 |
| 26,1289 | 1,67128 | 0 |
| 26,835 | 1,56365 | 0 |
| 27,5412 | 1,46222 | 0 |
| 28,2474 | 1,367 | 0 |
| 28,9536 | 1,27793 | 0 |
| 29,6598 | 1,19483 | 0 |
| 30,366 | 1,11747 | 0 |
| 31,0722 | 1,04558 | 0 |
| 31,7783 | 0,978854 | 0 |
| 32,4845 | 0,916982 | 0 |
| 33,1907 | 0,859642 | 0 |
| 33,8969 | 0,806522 | 0 |
| 34,6031 | 0,757316 | 0 |