# FSRU di PORTO TORRES
# e
# OPERE CONNESSE

## Rapporto Preliminare di Sicurezza ai sensi del D.Lgs. 105/15

## ALLEGATO C.4.2_1

## ELABORATI DI CALCOLO
## 2R-A

Firmato digitalmente da:
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| Rev. | Descrizione | Elaborato | Verificato | Approvato | Data |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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# Input Report

## Workspace: 1RiempFSRU-2R

### Riempimento FSRU-ME7

Study
1RiempFSRU-2R

| Tab | Group | Field | Value |
|---|---|---|---|
| Context of calculations | Selection of context | Weathers to use for this study | Weather folder |
| | | Parameters to use for this study | Parameter set ME4 |
| | | Obstructions to use for this study | Multi-Energy obstruction set |
| Bund, building and terrain | Terrain and bund definition | Type of terrain for dispersion | Default terrain |
| | | Type of pool substrate and bunds | No bund |
| Toxic parameters | Indoor toxic calculations | Specify the downwind building type | Unselected |
| | | Building type (downwind building type) | Buildings\Building type |

# 2Ra Compressore BOG HD

Pressure vessel

1RiempFSRU-2R\Riempimento FSRU-ME7

| Tab | Group | Field | Value | Units |
|---|---|---|---|---|
| Material | Material | Material | GAS NATURALE | |
| | | Specify volume inventory? | Yes | |
| | | Mass inventory | 954,895 | kg |
| | | Volume inventory | 169,28 | m3 |
| | | Material to track | GAS NATURALE | |
| | Phase | Specified condition | Pressure/temperature | |
| | | Temperature | -110 | degC |
| | | Pressure (gauge) | 2,96 | bar |
| | | Fluid state | Vapour | |
| | | Liquid mole fraction | 0 | fraction |
| Scenario | Pipe dimensions | Pipe length | | m |
| | Release location | Elevation | 17 | m |
| | | Tank head | 0 | m |
| | Direction | Outdoor release direction | Horizontal | |
| | | Outdoor release angle | 0 | deg |
| Discharge parameters | Model settings | Atmospheric expansion method | DNV recommended | |
| | | Phase change upstream of orifice? | Disallow liquid phase change only (metastable liquid) | |
| | Droplet break-up mechanism | Droplet break-up mechanism - instantaneous | Use flashing correlation | |
| | | Droplet break-up mechanism - continuous | Do not force correlation | |
| Short pipe | Pipe | Pipe roughness | 0,045 | mm |

| | | | | |
|---|---|---|---|---|
| | characteristics | | | |
| | Frequencies | Frequency of bends in pipe | 0 | /m |
| | | Frequency of couplings in pipe | 0 | /m |
| | | Frequency of junctions in pipe | 0 | /m |
| | Frequencies of valves | Frequency of excess flow valves | 0 | /m |
| | | Frequency of non-return valves | 0 | /m |
| | | Frequency of shut-off valves | 0 | /m |
| | Velocity head losses | Excess flow valve velocity head losses | 0 | |
| | | Non-return valve velocity head losses | 0 | |
| | | Shut-off valve velocity head losses | 0 | |
| Time varying releases | Modelling of time-varying leaks and line ruptures | Vacuum relief valve | Operating | |
| | | Vacuum relief valve set point | 0 | bar |
| | Inventory data for time-varying releases | Tank volume | 169,28 | m3 |
| | | Tank vapour volume | 169,28 | m3 |
| | | Tank liquid volume | 0 | m3 |
| | | Tank liquid level | 0 | m |
| | | Maximum vapour release height | 0 | m |

| | | | | |
|---|---|---|---|---|
| | | Minimum mass inventory | 0,1 | kg |
| | | Maximum mass inventory | 1E+09 | kg |
| | Safety system modelling for time-varying releases | Safety system modelling (isolation and blowdown) | No | |
| Dispersion | User-defined dispersion scope (N.B Based on the material to track) | Concentrations of interest | | ppm |
| | | Distances of interest | | m |
| | | Averaging time for concentrations and distances of interest | | |
| | | Specify user-defined averaging time | No | |
| | | User defined averaging time | | s |
| Bund, building and terrain | Terrain and bund definition | Type of terrain for dispersion | Default terrain | |
| | | Type of pool substrate and bunds | No bund | |
| | Building definition | Release building | | |
| | | In-building release? | Outdoor | |
| | | Building wake effect | None | |
| | | Wind or release angle from North | 0 | deg |
| | | Handling of | Trapped | |

| | | | | |
|---|---|---|---|---|
| | | droplets | | |
| | | Indoor mass modification factor | 3 | |
| Explosion parameters | Explosion method (Consequence calculations only) | Explosion method | Multi-Energy: Uniform confined | |
| | Ignition | Supply late ignition location | No ignition location | |
| | | Location of late ignition | | m |
| | Vapour liquid method | Use explosion mass modification factor | Yes | |
| | | Explosion mass modification factor | 3 | |
| Fireball | Result types to calculate | Calculate probit | No | |
| | | Calculate dose | No | |
| | | Calculate lethality | No | |
| | Radiation levels | Number of input radiation levels | 3 | |
| | | Intensity levels | 4; 12,5; 37,5 | kW/m2 |
| | | Probit levels | 2,73; 3,72; 7,5 | |
| | | Dose levels | 1,27E+06; 5,8E+06; 2,51E+07 | |
| | | Lethality levels | 0,01; 0,1; 0,99 | fraction |
| | Parameters | Mass modification factor | 3 | |
| | | Fireball maximum exposure duration | 20 | s |
| | Calculation method | Fireball model | Martinsen time varying | |
| | | TNO model flame temperature | 1726,85 | degC |
| Jet fire | Jet fire method | Selection for jet fire method | Automatic selection / DNV recommended | |

| | | | | |
|---|---|---|---|---|
| | Result types to calculate | Calculate probit | No | |
| | | Calculate dose | No | |
| | | Calculate lethality | No | |
| | Radiation levels | Number of input radiation levels | 5 | |
| | | Intensity levels | 3; 5; 7; 12,5; 37,5 | kW/m2 |
| | | Probit levels | 2,73; 3,72; 7,5 | |
| | | Dose levels | 1,27E+06; 5,8E+06; 2,51E+07 | |
| | | Lethality levels | 0,01; 0,1; 0,99 | fraction |
| | Parameters | Rate modification factor | 3 | |
| | | Jet fire maximum exposure duration | 20 | s |
| | Cone model data | Horizontal options | Use standard method | |
| | | Correlation | Recommended | |
| | | Flame-shape adjustment if grounded | Yes | |
| | Surface emissive power | Calculation method for surface emissive power | Calculate SEP | |
| | | Flame emissive power | | kW/m2 |
| | | Emissivity fraction | | fraction |
| Pool fire | Result types to calculate | Calculate probit | No | |
| | | Calculate dose | No | |
| | | Calculate lethality | No | |
| | Radiation levels | Number of input radiation levels | 5 | |
| | | Intensity levels | 3; 5; 7; 12,5; 37,5 | kW/m2 |
| | | Probit levels | 2,73; 3,72; 7,5 | |
| | | Dose levels | 1,27E+06; 5,8E+06; 2,51E+07 | |

| | | | | |
|---|---|---|---|---|
| | | Lethality levels | 0,01; 0,1; 0,99 | fraction |
| | Parameters | Radiative fraction for general fires | 0,4 | fraction |
| | | Pool fire maximum exposure duration | 20 | s |
| Geometry | Geometry | East | 0 | m |
| | | North | 0 | m |

# 75mm

Leak

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

| Tab | Group | Field | Value | Units |
|---|---|---|---|---|
| Scenario | Hole | Orifice diameter | 75 | mm |
| | | Use specified discharge coefficient? | Yes | |
| | | Discharge coefficient | 0,62 | fraction |
| | Release location | Elevation | 17 | m |
| | | Tank head | 0 | m |
| | Direction | Outdoor release direction | Horizontal | |
| | | Outdoor release angle | 0 | deg |
| Material | Material | Material characteristics | Flammable only | |
| | | Material to track | GAS NATURALE | |
| | | Type of risk effects to model | Flammable only | |
| | Phase | Phase to be released | Vapour | |
| Discharge parameters | Model settings | Atmospheric expansion method | DNV recommended | |
| | | Phase change upstream of orifice? | Disallow liquid phase change only (metastable liquid) | |
| | Droplet break-up mechanism | Droplet break-up mechanism - continuous | Do not force correlation | |
| Dispersion | User-defined dispersion scope (N.B Based on the material to track) | Concentrations of interest | | ppm |
| | | Distances of interest | | m |
| | | Averaging time for | | |

| | | | | |
|---|---|---|---|---|
| | | concentrations and distances of interest | | |
| | | Specify user-defined averaging time | No | |
| | | User defined averaging time | | s |
| Bund, building and terrain | Terrain and bund definition | Type of terrain for dispersion | Default terrain | |
| | | Type of pool substrate and bunds | No bund | |
| Explosion parameters | Explosion method | Explosion method | Multi-Energy: Uniform confined | |
| | Ignition | Supply late ignition location | No ignition location | |
| | | Location of late ignition | | m |
| | Vapour liquid method | Use explosion mass modification factor | Yes | |
| | | Explosion mass modification factor | 3 | |
| Fireball | Result types to calculate | Calculate probit | No | |
| | | Calculate dose | No | |
| | | Calculate lethality | No | |
| | Radiation levels | Number of input radiation levels | 3 | |
| | | Intensity levels | 4; 12,5; 37,5 | kW/m2 |
| | | Probit levels | 2,73; 3,72; 7,5 | |
| | | Dose levels | 1,27E+06; 5,8E+06; 2,51E+07 | |
| | | Lethality levels | 0,01; 0,1; 0,99 | fraction |
| | Parameters | Mass modification factor | 3 | |
| | | Fireball maximum exposure duration | 20 | s |
| | Calculation method | Fireball model | Martinsen time varying | |

| | | | | |
|---|---|---|---|---|
| | | TNO model flame temperature | 1726,85 | degC |
| Jet fire | Jet fire method | Selection for jet fire method | Automatic selection / DNV recommended | |
| | Result types to calculate | Calculate probit | No | |
| | | Calculate dose | No | |
| | | Calculate lethality | No | |
| | Radiation levels | Number of input radiation levels | 5 | |
| | | Intensity levels | 3; 5; 7; 12,5; 37,5 | kW/m2 |
| | | Probit levels | 2,73; 3,72; 7,5 | |
| | | Dose levels | 1,27E+06; 5,8E+06; 2,51E+07 | |
| | | Lethality levels | 0,01; 0,1; 0,99 | fraction |
| | Parameters | Rate modification factor | 3 | |
| | | Jet fire maximum exposure duration | 20 | s |
| | Cone model data | Correlation | Recommended | |
| | | Horizontal options | Use standard method | |
| | | Flame-shape adjustment if grounded | Yes | |
| | Surface emissive power | Calculation method for surface emissive power | Calculate SEP | |
| | | Flame emissive power | | kW/m2 |
| | | Emissivity fraction | | fraction |
| Pool fire | Result types to calculate | Calculate probit | No | |
| | | Calculate dose | No | |
| | | Calculate lethality | No | |
| | Radiation levels | Number of input | 5 | |

| | | | | |
|---|---|---|---|---|
| | | radiation levels | | |
| | | Intensity levels | 3; 5; 7; 12,5; 37,5 | kW/m2 |
| | | Probit levels | 2,73; 3,72; 7,5 | |
| | | Dose levels | 1,27E+06; 5,8E+06; 2,51E+07 | |
| | | Lethality levels | 0,01; 0,1; 0,99 | fraction |
| | Parameters | Radiative fraction for general fires | 0,4 | fraction |
| | | Pool fire maximum exposure duration | 20 | s |

# Discharge Report

## Workspace: 1RiempFSRU-2R

### Study: Riempimento FSRU-ME7

### Equipment Item: 2Ra Compressore BOG HD

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

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

### Scenario (Leak) : 75mm

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

**Weather: Category 2/F**

**INPUT DATA**

**Inventory data**

| | | |
|---|---|---|
| Mass in vessel | **954,895** | kg |

**Stagnation Data (upstream end for long pipe)**

| | | |
|---|---|---|
| Initial pressure (gauge) | **2,96** | bar |
| Initial temperature | **-110** | degC |
| Fluid state | **Pressurized gas** | |

**Scenario data**

| | | |
|---|---|---|
| Phase to be released | Vapour | |
| Hole diameter | **75** | mm |
| Discharge coefficient | **0,62** | fraction |

**OUTPUT DATA**

| | | |
|---|---|---|
| Mass flow rate | 2,73768 | kg/s |
| Release duration | 348,797 | s |

**Orifice or pipe exit data (before atmospheric expansion)**

| | | |
|---|---|---|
| Pressure | 2,16547 | bar |

| | | |
|---|---|---|
| Temperature | -133,123 | degC |
| Liquid mass fraction | **0** | fraction |
| Velocity at vena contracta (at exit for pipe releases) | 282,429 | m/s |
| Discharge coefficient | 0,62 | |

## Final Data (after atmospheric expansion)

| | | |
|---|---|---|
| Temperature | -138,027 | degC |
| Liquid mass fraction | 0 | fraction |
| Droplet diameter | 0 | um |
| Expanded diameter | **0,0833176** | m |
| Velocity | 300 | m/s |

## Weather: Category 5/D

### INPUT DATA

### Inventory data

| | | |
|---|---|---|
| Mass in vessel | **954,895** | kg |

### Stagnation Data (upstream end for long pipe)

| | | |
|---|---|---|
| Initial pressure (gauge) | **2,96** | bar |
| Initial temperature | **-110** | degC |
| Fluid state | **Pressurized gas** | |

### Scenario data

| | | |
|---|---|---|
| Phase to be released | Vapour | |
| Hole diameter | **75** | mm |
| Discharge coefficient | **0,62** | fraction |

### OUTPUT DATA

| | | |
|---|---|---|
| Mass flow rate | 2,73768 | kg/s |
| Release duration | 348,797 | s |

### Orifice or pipe exit data (before atmospheric expansion)

| | | |
|---|---|---|
| Pressure | 2,16547 | bar |
| Temperature | -133,123 | degC |
| Liquid mass fraction | **0** | fraction |
| Velocity at vena contracta (at exit for pipe releases) | 282,429 | m/s |
| Discharge coefficient | 0,62 | |

### Final Data (after atmospheric expansion)

| | | |
|---|---|---|
| Temperature | -138,027 | degC |
| Liquid mass fraction | 0 | fraction |
| Droplet diameter | 0 | um |
| Expanded diameter | **0,0833176** | m |
| Velocity | 300 | m/s |

# Jet Fire

## Workspace: 1RiempFSRU-2R

### Study: Riempimento FSRU-ME7

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

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

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

#### Scenario (Leak) : 75mm

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 | **17** | m |
| Release angle from horizontal | **0** | deg |

**Jet fire method**

| | |
|---|---|
| Selection for jet fire method | Automatic selection / DNV recommended |

**Jet Fire Parameters**

| | | |
|---|---|---|
| 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 | |

### Automatic selection of method

| | |
|---|---|
| Jet fire method used in calculations | Cone model |

### Calculated inputs

| | | |
|---|---|---|
| Mass flow rate | 2,73768 | kg/s |
| Temperature after atmospheric expansion | -138,027 | degC |
| Liquid fraction | 0 | fraction |
| Velocity after atmospheric expansion (input) | **300** | m/s |
| Rainout fraction time averaged | **0** | fraction |

### OUTPUT DATA

| | | |
|---|---|---|
| Flame emissive power | 156,654 | kW/m2 |
| Fraction of emissivity | 0,176607 | fraction |
| Jet velocity | 300 | m/s |
| Flame length | 20,6205 | m |
| Frustum length | 16,4144 | m |
| Frustum base width | 1,2568 | m |
| Frustum tip width | 4,07285 | m |
| Frustum lift-off distance | 4,37733 | m |
| Flame length in still air | 25,9263 | m |
| Hole to flame angle | 18,0725 | deg |
| Expanded diameter | 0,0833176 | 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 | 0,0191504 | -1,38321 | 865.119 | 11,7944 | 14,639 | 14,7677 | 26,5621 | 542,421 |
| 5 | 0,000174704 | 0,0319174 | 0,360367 | 1.709.491 | Not reached | Not reached | | n/a | n/a |
| 7 | 0,02405 | 0,0446844 | 1,50883 | 2.677.313 | Not reached | Not reached | | n/a | n/a |
| 12,5 | 6,52536 | 0,0797935 | 3,48789 | 5.800.162 | Not reached | Not reached | | n/a | n/a |
| 37,5 | 98,7381 | 0,23938 | 7,23773 | 25.094.924 | Not reached | Not reached | | n/a | n/a |

## Radiation v Distance Results

### INPUT DATA

| | | |
|---|---|---|
| Maximum distance | 39,9638 | m |
| Observer type radiation modelling flag | Planar | |
| Observer direction | Variable | |
| Height of interest | **1,7** | m |

### OUTPUT DATA

| Downwind distance [m] | Maximum incident | Lethality level |
|---|---|---|

| | radiation [kW/m2] | [fraction] |
|---|---|---|
| 0 | 2,41219 | 0 |
| 0,815588 | 2,57275 | 0 |
| 1,63118 | 2,73486 | 0 |
| 2,44676 | 2,89665 | 0 |
| 3,26235 | 3,0561 | 0 |
| 4,07794 | 3,21113 | 0 |
| 4,89353 | 3,35971 | 0 |
| 5,70911 | 3,49992 | 0 |
| 6,5247 | 3,63169 | 0 |
| 7,34029 | 3,75103 | 9,53906E-09 |
| 8,15588 | 3,87475 | 1,80005E-08 |
| 8,97147 | 4,06476 | 4,4944E-08 |
| 9,78705 | 4,24196 | 9,93966E-08 |
| 10,6026 | 4,39901 | 1,92323E-07 |
| 11,4182 | 4,53642 | 3,32281E-07 |
| 12,2338 | 4,64848 | 5,08884E-07 |
| 13,0494 | 4,73368 | 6,95852E-07 |
| 13,865 | 4,79103 | 8,5453E-07 |
| 14,6806 | 4,82004 | 9,46622E-07 |
| 15,4962 | 4,82073 | 9,48924E-07 |
| 16,3118 | 4,79365 | 8,6248E-07 |
| 17,1273 | 4,73982 | 7,1144E-07 |
| 17,9429 | 4,66211 | 5,35345E-07 |
| 18,7585 | 4,55971 | 3,63575E-07 |
| 19,5741 | 4,43619 | 2,236E-07 |
| 20,3897 | 4,29416 | 1,2432E-07 |
| 21,2053 | 4,13648 | 6,23782E-08 |
| 22,0209 | 3,96615 | 2,81978E-08 |
| 22,8365 | 3,7865 | 1,14821E-08 |
| 23,652 | 3,60044 | 0 |
| 24,4676 | 3,41061 | 0 |
| 25,2832 | 3,23688 | 0 |
| 26,0988 | 3,08559 | 0 |
| 26,9144 | 2,94838 | 0 |

| | | |
|---|---|---|
| 27,73 | 2,83711 | 0 |
| 28,5456 | 2,72557 | 0 |
| 29,3612 | 2,61461 | 0 |
| 30,1768 | 2,50493 | 0 |
| 30,9923 | 2,39591 | 0 |
| 31,8079 | 2,29072 | 0 |
| 32,6235 | 2,1884 | 0 |
| 33,4391 | 2,08928 | 0 |
| 34,2547 | 1,99359 | 0 |
| 35,0703 | 1,90151 | 0 |
| 35,8859 | 1,81315 | 0 |
| 36,7015 | 1,72857 | 0 |
| 37,517 | 1,64776 | 0 |
| 38,3326 | 1,57071 | 0 |
| 39,1482 | 1,49735 | 0 |
| 39,9638 | 1,42759 | 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 | **17** | m |
| Release angle from horizontal | **0** | deg |

### Jet fire method

| | |
|---|---|
| Selection for jet fire method | Automatic selection / DNV recommended |

### Jet Fire Parameters

| | | |
|---|---|---|
| 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 | |

### Automatic selection of method

| | |
|---|---|
| Jet fire method used in calculations | Cone model |

### Calculated inputs

| | | |
|---|---|---|
| Mass flow rate | 2,73768 | kg/s |
| Temperature after atmospheric expansion | -138,027 | degC |
| Liquid fraction | 0 | fraction |
| Velocity after atmospheric expansion (input) | **300** | m/s |

| | | |
|---|---|---|
| Rainout fraction time averaged | **0** | fraction |

**OUTPUT DATA**

| | | |
|---|---|---|
| Flame emissive power | 147,009 | kW/m2 |
| Fraction of emissivity | 0,167819 | fraction |
| Jet velocity | 300 | m/s |
| Flame length | 22,9512 | m |
| Frustum length | 18,626 | m |
| Frustum base width | 1,2568 | m |
| Frustum tip width | 3,60875 | m |
| Frustum lift-off distance | 4,37733 | m |
| Flame length in still air | 25,9263 | m |
| Hole to flame angle | 9,82544 | deg |
| Expanded diameter | 0,0833176 | 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 | 0,0204069 | -1,38321 | 865.119 | 12,6701 | 15,0752 | 15,9622 | 28,6323 | 600,06 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 0,000174704 | 0,0340114 | 0,360367 | 1.709.491 | 2,91429 | 2,98882 | 15,4428 | 18,3571 | 27,3642 |
| 7 | 0,02405 | 0,047616 | 1,50883 | 2.677.313 | Not reached | Not reached | | n/a | n/a |
| 12,5 | 6,52536 | 0,0850286 | 3,48789 | 5.800.162 | Not reached | Not reached | | n/a | n/a |
| 37,5 | 98,7381 | 0,255086 | 7,23773 | 25.094.924 | Not reached | Not reached | | n/a | n/a |

## Radiation v Distance Results

### INPUT DATA

| | | |
|---|---|---|
| Maximum distance | 45,4602 | 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 | 2,39133 | 0 |
| 0,927758 | 2,56278 | 0 |
| 1,85552 | 2,73559 | 0 |
| 2,78328 | 2,90729 | 0 |
| 3,71103 | 3,07524 | 0 |
| 4,63879 | 3,23686 | 0 |
| 5,56655 | 3,38975 | 0 |
| 6,49431 | 3,58244 | 0 |
| 7,42207 | 3,83982 | 1,50956E-08 |
| 8,34983 | 4,08677 | 4,97489E-08 |
| 9,27758 | 4,30966 | 1,32748E-07 |
| 10,2053 | 4,51746 | 3,0863E-07 |
| 11,1331 | 4,70019 | 6,15988E-07 |

| | | |
|---|---|---|
| 12,0609 | 4,85455 | 1,0678E-06 |
| 12,9886 | 4,97776 | 1,62289E-06 |
| 13,9164 | 5,06752 | 2,17795E-06 |
| 14,8441 | 5,12206 | 2,59319E-06 |
| 15,7719 | 5,14019 | 2,74619E-06 |
| 16,6997 | 5,12136 | 2,58748E-06 |
| 17,6274 | 5,06574 | 2,16544E-06 |
| 18,5552 | 4,97788 | 1,62356E-06 |
| 19,4829 | 4,8528 | 1,06134E-06 |
| 20,4107 | 4,69183 | 5,97407E-07 |
| 21,3384 | 4,50704 | 2,96302E-07 |
| 22,2662 | 4,29861 | 1,26687E-07 |
| 23,194 | 4,07132 | 4,63287E-08 |
| 24,1217 | 3,83031 | 1,4383E-08 |
| 25,0495 | 3,59518 | 0 |
| 25,9772 | 3,41114 | 0 |
| 26,905 | 3,27145 | 0 |
| 27,8328 | 3,1269 | 0 |
| 28,7605 | 2,97954 | 0 |
| 29,6883 | 2,83129 | 0 |
| 30,616 | 2,68387 | 0 |
| 31,5438 | 2,53878 | 0 |
| 32,4715 | 2,39507 | 0 |
| 33,3993 | 2,25855 | 0 |
| 34,3271 | 2,12729 | 0 |
| 35,2548 | 2,00181 | 0 |
| 36,1826 | 1,88246 | 0 |
| 37,1103 | 1,76942 | 0 |
| 38,0381 | 1,66274 | 0 |
| 38,9659 | 1,56237 | 0 |
| 39,8936 | 1,46816 | 0 |
| 40,8214 | 1,37992 | 0 |
| 41,7491 | 1,29741 | 0 |
| 42,6769 | 1,22034 | 0 |
| 43,6046 | 1,14844 | 0 |

| | | |
|---|---|---|
| 44,5324 | 1,08139 | 0 |
| 45,4602 | 1,0189 | 0 |