

## **ANNESSO TECNICO 6.**

**Elaborati di calcolo  
Scenari incidentali ragionevolmente credibili**

***Ipotesi N. 3***

**TRR S.r.l.**

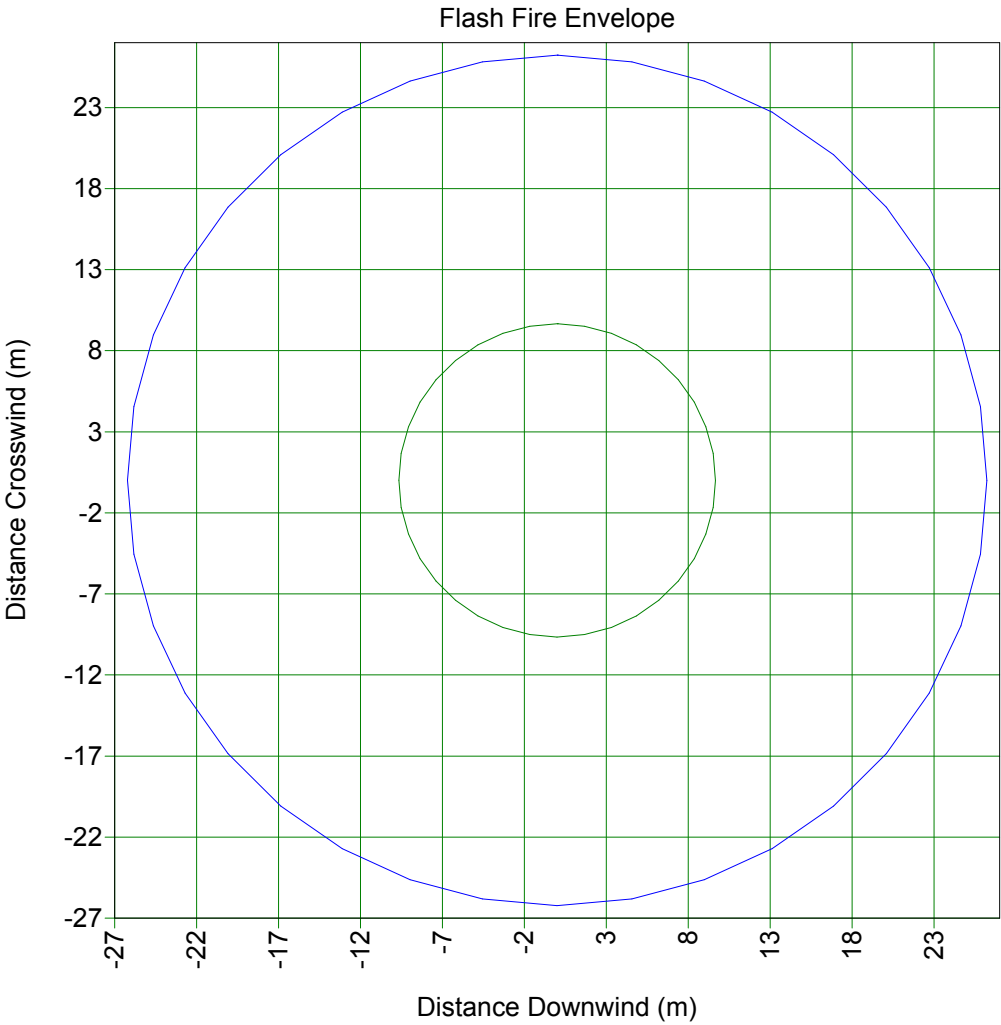
**Il Direttore Generale**

**Ing. Alfredo Romano**  



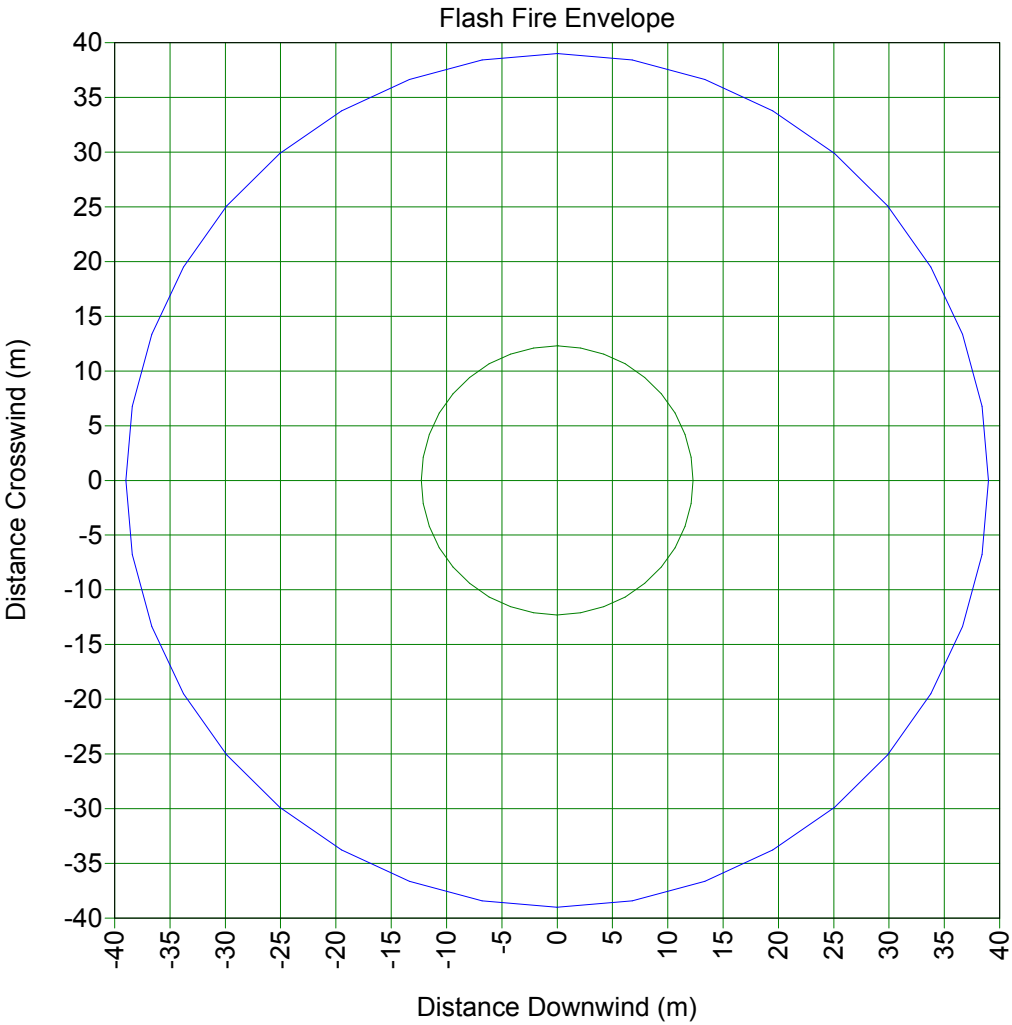

Study Folder: 70977-Fase  
2-lp3  
Audit No: 54015  
Model: 10mm  
Weather: Category 5/D  
Material: METHANE  
Concentration

2.2e+004 ppm  
4.4e+004 ppm



Study Folder: 70977-Fase  
2-lp3  
Audit No: 54015  
Model: 10mm  
Weather: Category 2/F  
Material: METHANE  
Concentration

2.2e+004 ppm  
4.4e+004 ppm



# JET FIRE REPORT

Study Folder: 70977-Fase 2-Ip3

Unique Audit Number: 53.995



Phast 6.6



70977-Fase 2-Ip3



Separatore Testa Pozzo

10mm

Base Case

Data



Weather: Global Weathers\Category 2/F

Speed: 2,00 m/s

Stability: F

\70977-Fase 2-Ip3\Separatore Testa Pozzo\10mm

## Flame Data

### User-Defined Quantities

|                           |               |
|---------------------------|---------------|
| Model Correlation Type    | API           |
| Material                  | METHANE       |
| Ambient Temperature       | 25,00 degC    |
| Ambient Relative Humidity | 0,75 fraction |
| Ambient Wind Speed        | 2,00 m/s      |
| Maximum Exposure Duration | 20,00 s       |
| Elevation                 | 1,00 m        |
| Expanded Temperature      | -103,54 degC  |
| Release Rate              | 2,10 kg/s     |

### Input

### Output

|                        |               |
|------------------------|---------------|
| Flame Emissive Power   | 114,65 kW/m2  |
| Fraction of Emissivity | 0,15 fraction |
| Expanded Radius        | 0,03 m        |
| Jet Velocity           | 500,00 m/s    |
| Flame Length           | 22,35 m       |
| Maximum Flame Radius   | 1,39 m        |

### Flame Co-ordinates

| X     | Z    | R    | Phi   |
|-------|------|------|-------|
| m     | m    | m    | deg   |
| 0,00  | 1,00 | 0,03 | 90,00 |
| 2,48  | 1,00 | 0,53 | 90,00 |
| 4,97  | 1,00 | 0,88 | 90,00 |
| 7,45  | 1,00 | 1,13 | 90,00 |
| 9,93  | 1,00 | 1,30 | 90,00 |
| 12,41 | 1,00 | 1,38 | 90,00 |
| 14,90 | 1,00 | 1,38 | 90,00 |
| 17,38 | 1,00 | 1,26 | 90,00 |
| 19,86 | 1,00 | 0,99 | 90,00 |
| 22,35 | 1,00 | 0,00 | 90,00 |

# JET FIRE REPORT

Study Folder: 70977-Fase 2-IP3

Unique Audit Number: 53.995



Phast 6.6

## Radiation Intensity Ellipse

### User-Defined Quantities

|                      |          |     |
|----------------------|----------|-----|
| Observer Inclination | Variable | deg |
| Observer Orientation | Variable | deg |
| Exposure Duration    | 20,00    | s   |
| Effect Height        | 0,00     | m   |

### Calculated Quantities

|                                  |             |                   |
|----------------------------------|-------------|-------------------|
| <b>Incident Radiation Level:</b> | <b>3,00</b> | <b>kW/m2</b>      |
| Lethality Level                  | 0,00        | %                 |
| View Factor                      | 0,03        |                   |
| Dose Level                       | 865.118,83  | (W/m2)^Probit N.s |

|                         |        |    |
|-------------------------|--------|----|
| Downwind semi-axis (A)  | 13,69  | m  |
| Crosswind semi-axis (B) | 19,28  | m  |
| Offset Ratio (D)        | 0,87   |    |
| Effect Distance         | 25,67  | m  |
| Area                    | 829,62 | m2 |

|                                  |              |                   |
|----------------------------------|--------------|-------------------|
| <b>Incident Radiation Level:</b> | <b>5,00</b>  | <b>kW/m2</b>      |
| Lethality Level                  | 0,00         | %                 |
| View Factor                      | 0,04         |                   |
| Dose Level                       | 1.709.490,54 | (W/m2)^Probit N.s |

|                         |        |    |
|-------------------------|--------|----|
| Downwind semi-axis (A)  | 12,59  | m  |
| Crosswind semi-axis (B) | 14,52  | m  |
| Offset Ratio (D)        | 0,92   |    |
| Effect Distance         | 24,24  | m  |
| Area                    | 574,70 | m2 |

|                                  |              |                   |
|----------------------------------|--------------|-------------------|
| <b>Incident Radiation Level:</b> | <b>7,00</b>  | <b>kW/m2</b>      |
| Lethality Level                  | 0,02         | %                 |
| View Factor                      | 0,06         |                   |
| Dose Level                       | 2.677.313,40 | (W/m2)^Probit N.s |

|                         |        |    |
|-------------------------|--------|----|
| Downwind semi-axis (A)  | 12,02  | m  |
| Crosswind semi-axis (B) | 11,91  | m  |
| Offset Ratio (D)        | 0,96   |    |
| Effect Distance         | 23,59  | m  |
| Area                    | 449,68 | m2 |

# JET FIRE REPORT

Unique Audit Number: 53.995



Study Folder: 70977-Fase 2-Ip3

Phast 6.6

|                           |              |                   |
|---------------------------|--------------|-------------------|
| Incident Radiation Level: | 12,50        | kW/m2             |
| Lethality Level           | 6,53         | %                 |
| View Factor               | 0,11         |                   |
| Dose Level                | 5.800.161,90 | (W/m2)^Probit N.s |
| Downwind semi-axis (A)    | 11,27        | m                 |
| Crosswind semi-axis (B)   | 8,17         | m                 |
| Offset Ratio (D)          | 1,01         |                   |
| Effect Distance           | 22,67        | m                 |
| Area                      | 289,23       | m2                |

# JET FIRE REPORT

Study Folder: 70977-Fase 2-Ip3

Unique Audit Number: 53.995

Phast 6.6



## Radiation Distance

### User-Defined Quantities

|                           |          |     |
|---------------------------|----------|-----|
| Maximum Distance          | 44,69    | m   |
| Angle from Wind Direction | 0,00     | deg |
| Height above Origin       | 0,00     | m   |
| Observer Inclination      | Variable | deg |
| Observer Orientation      | Variable | deg |

### Calculated Quantities

| X<br>Coordinates<br>m | Y<br>Coordinates<br>m | Z<br>Coordinates<br>m | Incident<br>Radiation<br>kW/m2 | Lethality<br>Level<br>% | View<br>Factor |
|-----------------------|-----------------------|-----------------------|--------------------------------|-------------------------|----------------|
| 0,00                  |                       |                       | 10,53                          |                         |                |
| 0,91                  |                       |                       | 27,11                          |                         |                |
| 1,82                  |                       |                       | 46,11                          |                         |                |
| 2,74                  |                       |                       | 63,84                          |                         |                |
| 3,65                  |                       |                       | 79,63                          |                         |                |
| 4,56                  |                       |                       | 94,53                          |                         |                |
| 5,47                  |                       |                       | 108,72                         |                         |                |
| 6,38                  |                       |                       | 114,65                         |                         |                |
| 7,30                  |                       |                       | 114,65                         |                         |                |
| 8,21                  |                       |                       | 114,65                         |                         |                |
| 9,12                  |                       |                       | 114,65                         |                         |                |
| 10,03                 |                       |                       | 114,65                         |                         |                |
| 10,95                 |                       |                       | 114,65                         |                         |                |
| 11,86                 |                       |                       | 114,65                         |                         |                |
| 12,77                 |                       |                       | 114,65                         |                         |                |
| 13,68                 |                       |                       | 114,65                         |                         |                |
| 14,59                 |                       |                       | 114,65                         |                         |                |
| 15,51                 |                       |                       | 114,65                         |                         |                |
| 16,42                 |                       |                       | 114,65                         |                         |                |
| 17,33                 |                       |                       | 114,65                         |                         |                |
| 18,24                 |                       |                       | 114,65                         |                         |                |
| 19,15                 |                       |                       | 114,65                         |                         |                |
| 20,07                 |                       |                       | 102,66                         |                         |                |
| 20,98                 |                       |                       | 66,08                          |                         |                |
| 21,89                 |                       |                       | 32,04                          |                         |                |
| 22,80                 |                       |                       | 11,09                          |                         |                |
| 23,71                 |                       |                       | 6,55                           |                         |                |
| 24,63                 |                       |                       | 4,22                           |                         |                |
| 25,54                 |                       |                       | 3,08                           |                         |                |
| 26,45                 |                       |                       | 2,34                           |                         |                |
| 27,36                 |                       |                       | 1,84                           |                         |                |
| 28,27                 |                       |                       | 1,48                           |                         |                |
| 29,19                 |                       |                       | 1,22                           |                         |                |
| 30,10                 |                       |                       | 1,02                           |                         |                |
| 31,01                 |                       |                       | 0,87                           |                         |                |
| 31,92                 |                       |                       | 0,75                           |                         |                |
| 32,84                 |                       |                       | 0,65                           |                         |                |

# JET FIRE REPORT

Unique Audit Number: 53.995



Study Folder: 70977-Fase 2-Ip3

Phast 6.6

| X<br>Coordinates<br>m | Y<br>Coordinates<br>m | Z<br>Coordinates<br>m | Incident<br>Radiation<br>kW/m2 | Lethality<br>Level<br>% | View<br>Factor |
|-----------------------|-----------------------|-----------------------|--------------------------------|-------------------------|----------------|
| 33,75                 |                       |                       | 0,57                           |                         |                |
| 34,66                 |                       |                       | 0,51                           |                         |                |
| 35,57                 |                       |                       | 0,45                           |                         |                |
| 36,48                 |                       |                       | 0,41                           |                         |                |
| 37,40                 |                       |                       | 0,37                           |                         |                |
| 38,31                 |                       |                       | 0,34                           |                         |                |
| 39,22                 |                       |                       | 0,31                           |                         |                |
| 40,13                 |                       |                       | 0,28                           |                         |                |
| 41,04                 |                       |                       | 0,26                           |                         |                |
| 41,96                 |                       |                       | 0,24                           |                         |                |
| 42,87                 |                       |                       | 0,23                           |                         |                |
| 43,78                 |                       |                       | 0,21                           |                         |                |
| 44,69                 |                       |                       | 0,20                           |                         |                |



**Weather:** Global Weathers\Category 5/D

**Speed:** 5,00

m/s

**Stability:** D

\70977-Fase 2-Ip3\Separatore Testa Pozzo\10mm

## Flame Data

### User-Defined Quantities

|                           |            |          |
|---------------------------|------------|----------|
| Model Correlation Type    | <b>API</b> |          |
| Material                  | METHANE    |          |
| Ambient Temperature       | 25,00      | degC     |
| Ambient Relative Humidity | 0,75       | fraction |
| Ambient Wind Speed        | 5,00       | m/s      |
| Maximum Exposure Duration | 20,00      | s        |
| Elevation                 | 1,00       | m        |
| Expanded Temperature      | -103,54    | degC     |
| Release Rate              | 2,10       | kg/s     |

| <b>Input</b>           |        | <b>Output</b> |          |
|------------------------|--------|---------------|----------|
| Flame Emissive Power   |        | 114,65        | kW/m2    |
| Fraction of Emissivity |        | 0,15          | fraction |
| Expanded Radius        |        | 0,03          | m        |
| Jet Velocity           | 500,00 | 500,00        | m/s      |
| Flame Length           |        | 22,35         | m        |
| Maximum Flame Radius   |        | 1,39          | m        |

# JET FIRE REPORT

Unique Audit Number: 53.995



Study Folder: 70977-Fase 2-Ip3

Phast 6.6

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## Flame Co-ordinates

| X     | Z    | R    | Phi   |
|-------|------|------|-------|
| m     | m    | m    | deg   |
| 0,00  | 1,00 | 0,03 | 90,00 |
| 2,48  | 1,00 | 0,53 | 90,00 |
| 4,97  | 1,00 | 0,88 | 90,00 |
| 7,45  | 1,00 | 1,13 | 90,00 |
| 9,93  | 1,00 | 1,30 | 90,00 |
| 12,41 | 1,00 | 1,38 | 90,00 |
| 14,90 | 1,00 | 1,38 | 90,00 |
| 17,38 | 1,00 | 1,26 | 90,00 |
| 19,86 | 1,00 | 0,99 | 90,00 |
| 22,35 | 1,00 | 0,00 | 90,00 |

# JET FIRE REPORT

Study Folder: 70977-Fase 2-Ip3

Unique Audit Number: 53.995



Phast 6.6

## Radiation Intensity Ellipse

### User-Defined Quantities

|                      |          |     |
|----------------------|----------|-----|
| Observer Inclination | Variable | deg |
| Observer Orientation | Variable | deg |
| Exposure Duration    | 20,00    | s   |
| Effect Height        | 0,00     | m   |

### Calculated Quantities

|                                  |             |                   |
|----------------------------------|-------------|-------------------|
| <b>Incident Radiation Level:</b> | <b>3,00</b> | <b>kW/m2</b>      |
| Lethality Level                  | 0,00        | %                 |
| View Factor                      | 0,03        |                   |
| Dose Level                       | 865.118,83  | (W/m2)^Probit N.s |

|                         |        |    |
|-------------------------|--------|----|
| Downwind semi-axis (A)  | 13,69  | m  |
| Crosswind semi-axis (B) | 19,28  | m  |
| Offset Ratio (D)        | 0,87   |    |
| Effect Distance         | 25,67  | m  |
| Area                    | 829,62 | m2 |

|                                  |              |                   |
|----------------------------------|--------------|-------------------|
| <b>Incident Radiation Level:</b> | <b>5,00</b>  | <b>kW/m2</b>      |
| Lethality Level                  | 0,00         | %                 |
| View Factor                      | 0,04         |                   |
| Dose Level                       | 1.709.490,54 | (W/m2)^Probit N.s |

|                         |        |    |
|-------------------------|--------|----|
| Downwind semi-axis (A)  | 12,59  | m  |
| Crosswind semi-axis (B) | 14,52  | m  |
| Offset Ratio (D)        | 0,92   |    |
| Effect Distance         | 24,24  | m  |
| Area                    | 574,70 | m2 |

|                                  |              |                   |
|----------------------------------|--------------|-------------------|
| <b>Incident Radiation Level:</b> | <b>7,00</b>  | <b>kW/m2</b>      |
| Lethality Level                  | 0,02         | %                 |
| View Factor                      | 0,06         |                   |
| Dose Level                       | 2.677.313,40 | (W/m2)^Probit N.s |

|                         |        |    |
|-------------------------|--------|----|
| Downwind semi-axis (A)  | 12,02  | m  |
| Crosswind semi-axis (B) | 11,91  | m  |
| Offset Ratio (D)        | 0,96   |    |
| Effect Distance         | 23,59  | m  |
| Area                    | 449,68 | m2 |

# JET FIRE REPORT

Unique Audit Number: 53.995



Study Folder: 70977-Fase 2-Ip3

Phast 6.6

|                           |              |                   |
|---------------------------|--------------|-------------------|
| Incident Radiation Level: | 12,50        | kW/m2             |
| Lethality Level           | 6,53         | %                 |
| View Factor               | 0,11         |                   |
| Dose Level                | 5.800.161,90 | (W/m2)^Probit N.s |
| Downwind semi-axis (A)    | 11,27        | m                 |
| Crosswind semi-axis (B)   | 8,17         | m                 |
| Offset Ratio (D)          | 1,01         |                   |
| Effect Distance           | 22,67        | m                 |
| Area                      | 289,23       | m2                |

# JET FIRE REPORT

Study Folder: 70977-Fase 2-Ip3

Unique Audit Number: 53.995



Phast 6.6

## Radiation Distance

### User-Defined Quantities

|                           |          |     |
|---------------------------|----------|-----|
| Maximum Distance          | 44,69    | m   |
| Angle from Wind Direction | 0,00     | deg |
| Height above Origin       | 0,00     | m   |
| Observer Inclination      | Variable | deg |
| Observer Orientation      | Variable | deg |

### Calculated Quantities

| X<br>Coordinates<br>m | Y<br>Coordinates<br>m | Z<br>Coordinates<br>m | Incident<br>Radiation<br>kW/m2 | Lethality<br>Level<br>% | View<br>Factor |
|-----------------------|-----------------------|-----------------------|--------------------------------|-------------------------|----------------|
| 0,00                  |                       |                       | 10,53                          |                         |                |
| 0,91                  |                       |                       | 27,11                          |                         |                |
| 1,82                  |                       |                       | 46,11                          |                         |                |
| 2,74                  |                       |                       | 63,84                          |                         |                |
| 3,65                  |                       |                       | 79,63                          |                         |                |
| 4,56                  |                       |                       | 94,53                          |                         |                |
| 5,47                  |                       |                       | 108,72                         |                         |                |
| 6,38                  |                       |                       | 114,65                         |                         |                |
| 7,30                  |                       |                       | 114,65                         |                         |                |
| 8,21                  |                       |                       | 114,65                         |                         |                |
| 9,12                  |                       |                       | 114,65                         |                         |                |
| 10,03                 |                       |                       | 114,65                         |                         |                |
| 10,95                 |                       |                       | 114,65                         |                         |                |
| 11,86                 |                       |                       | 114,65                         |                         |                |
| 12,77                 |                       |                       | 114,65                         |                         |                |
| 13,68                 |                       |                       | 114,65                         |                         |                |
| 14,59                 |                       |                       | 114,65                         |                         |                |
| 15,51                 |                       |                       | 114,65                         |                         |                |
| 16,42                 |                       |                       | 114,65                         |                         |                |
| 17,33                 |                       |                       | 114,65                         |                         |                |
| 18,24                 |                       |                       | 114,65                         |                         |                |
| 19,15                 |                       |                       | 114,65                         |                         |                |
| 20,07                 |                       |                       | 102,66                         |                         |                |
| 20,98                 |                       |                       | 66,08                          |                         |                |
| 21,89                 |                       |                       | 32,04                          |                         |                |
| 22,80                 |                       |                       | 11,09                          |                         |                |
| 23,71                 |                       |                       | 6,55                           |                         |                |
| 24,63                 |                       |                       | 4,22                           |                         |                |
| 25,54                 |                       |                       | 3,08                           |                         |                |
| 26,45                 |                       |                       | 2,34                           |                         |                |
| 27,36                 |                       |                       | 1,84                           |                         |                |
| 28,27                 |                       |                       | 1,48                           |                         |                |
| 29,19                 |                       |                       | 1,22                           |                         |                |
| 30,10                 |                       |                       | 1,02                           |                         |                |
| 31,01                 |                       |                       | 0,87                           |                         |                |
| 31,92                 |                       |                       | 0,75                           |                         |                |
| 32,84                 |                       |                       | 0,65                           |                         |                |

# JET FIRE REPORT

Unique Audit Number: 53.995



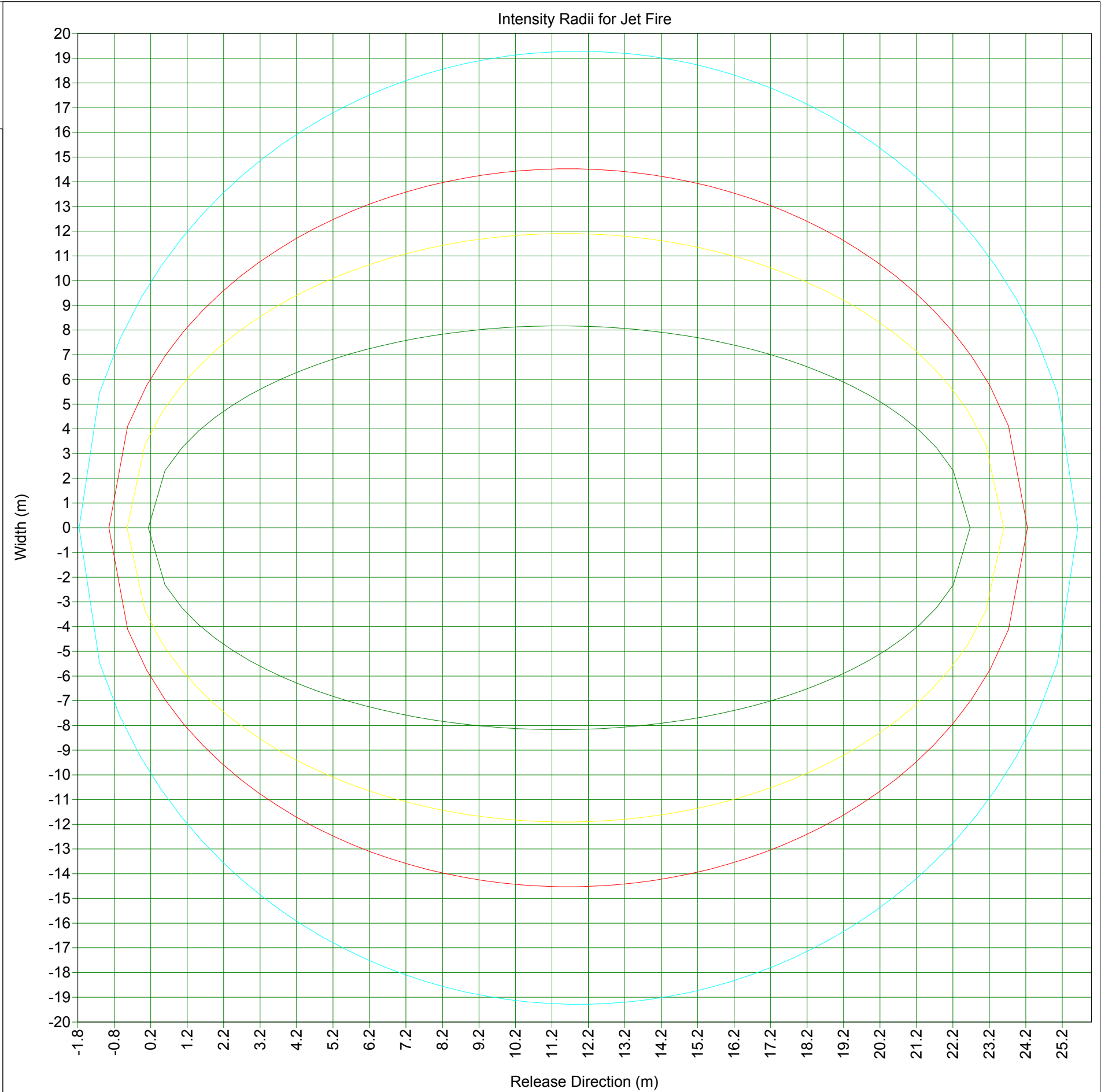
Study Folder: 70977-Fase 2-Ip3

Phast 6.6

| X<br>Coordinates<br>m | Y<br>Coordinates<br>m | Z<br>Coordinates<br>m | Incident<br>Radiation<br>kW/m2 | Lethality<br>Level<br>% | View<br>Factor |
|-----------------------|-----------------------|-----------------------|--------------------------------|-------------------------|----------------|
| 33,75                 |                       |                       | 0,57                           |                         |                |
| 34,66                 |                       |                       | 0,51                           |                         |                |
| 35,57                 |                       |                       | 0,45                           |                         |                |
| 36,48                 |                       |                       | 0,41                           |                         |                |
| 37,40                 |                       |                       | 0,37                           |                         |                |
| 38,31                 |                       |                       | 0,34                           |                         |                |
| 39,22                 |                       |                       | 0,31                           |                         |                |
| 40,13                 |                       |                       | 0,28                           |                         |                |
| 41,04                 |                       |                       | 0,26                           |                         |                |
| 41,96                 |                       |                       | 0,24                           |                         |                |
| 42,87                 |                       |                       | 0,23                           |                         |                |
| 43,78                 |                       |                       | 0,21                           |                         |                |
| 44,69                 |                       |                       | 0,20                           |                         |                |

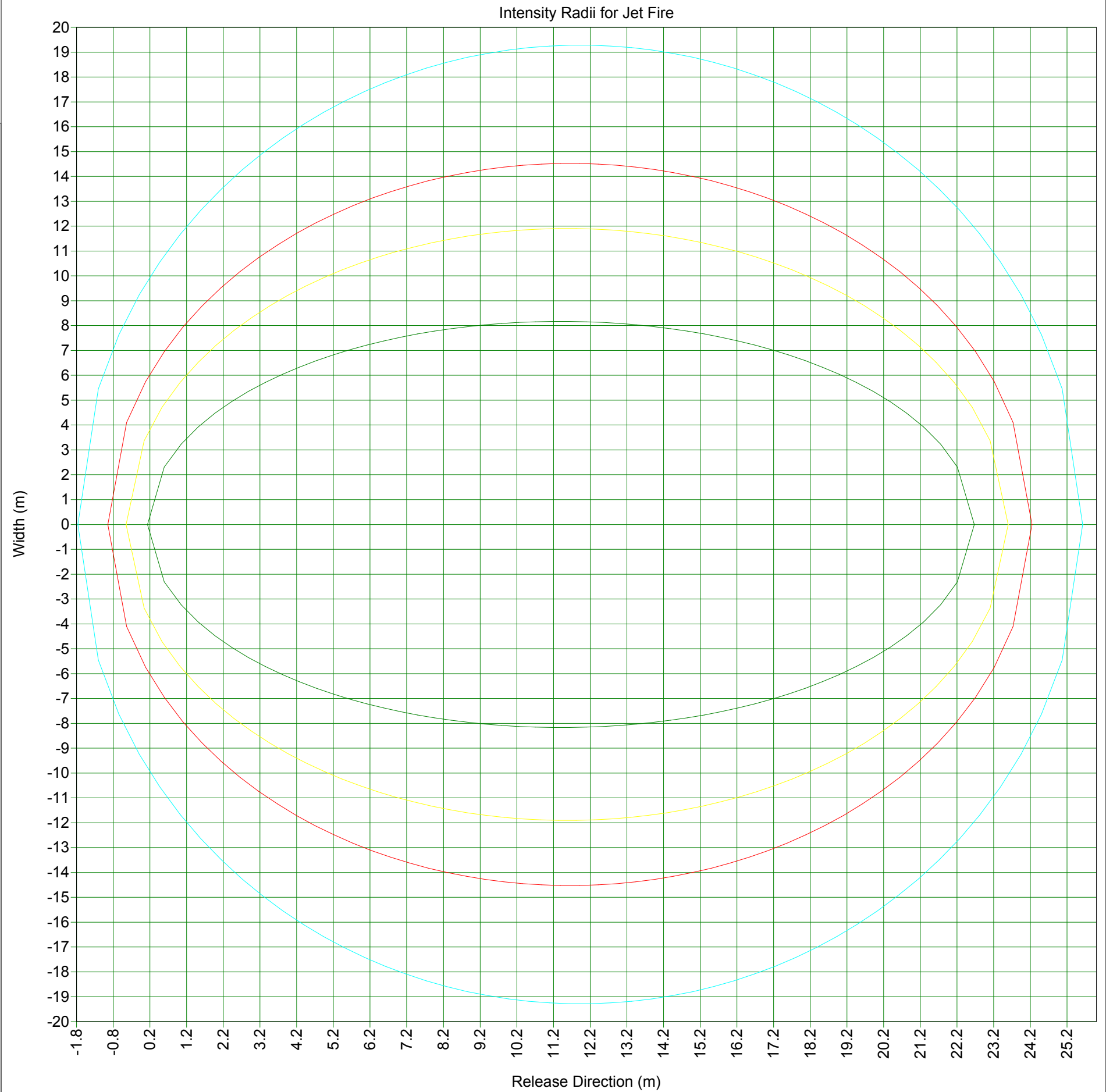
Study Folder: 70977-Fase  
2-lp3  
Audit No: 53995  
Model: 10mm  
Weather: Category 5/D  
Material: METHANE

- Ellipse @12.5 kW/m2
- Ellipse @7 kW/m2
- Ellipse @5 kW/m2
- Ellipse @3 kW/m2



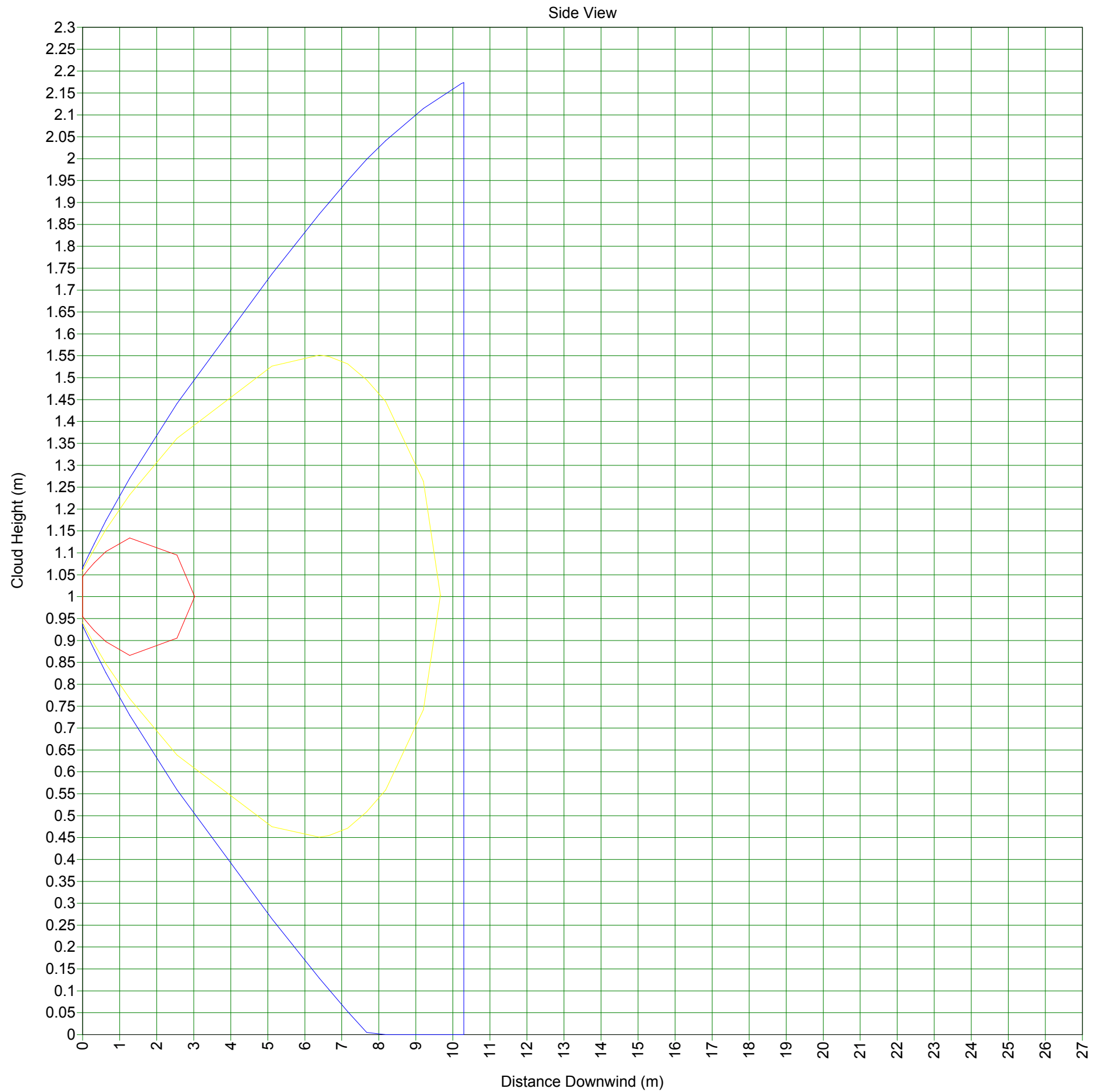
Study Folder: 70977-Fase  
2-lp3  
Audit No: 53995  
Model: 10mm  
Weather: Category 2/F  
Material: METHANE

- Ellipse @12.5 kW/m2
- Ellipse @7 kW/m2
- Ellipse @5 kW/m2
- Ellipse @3 kW/m2



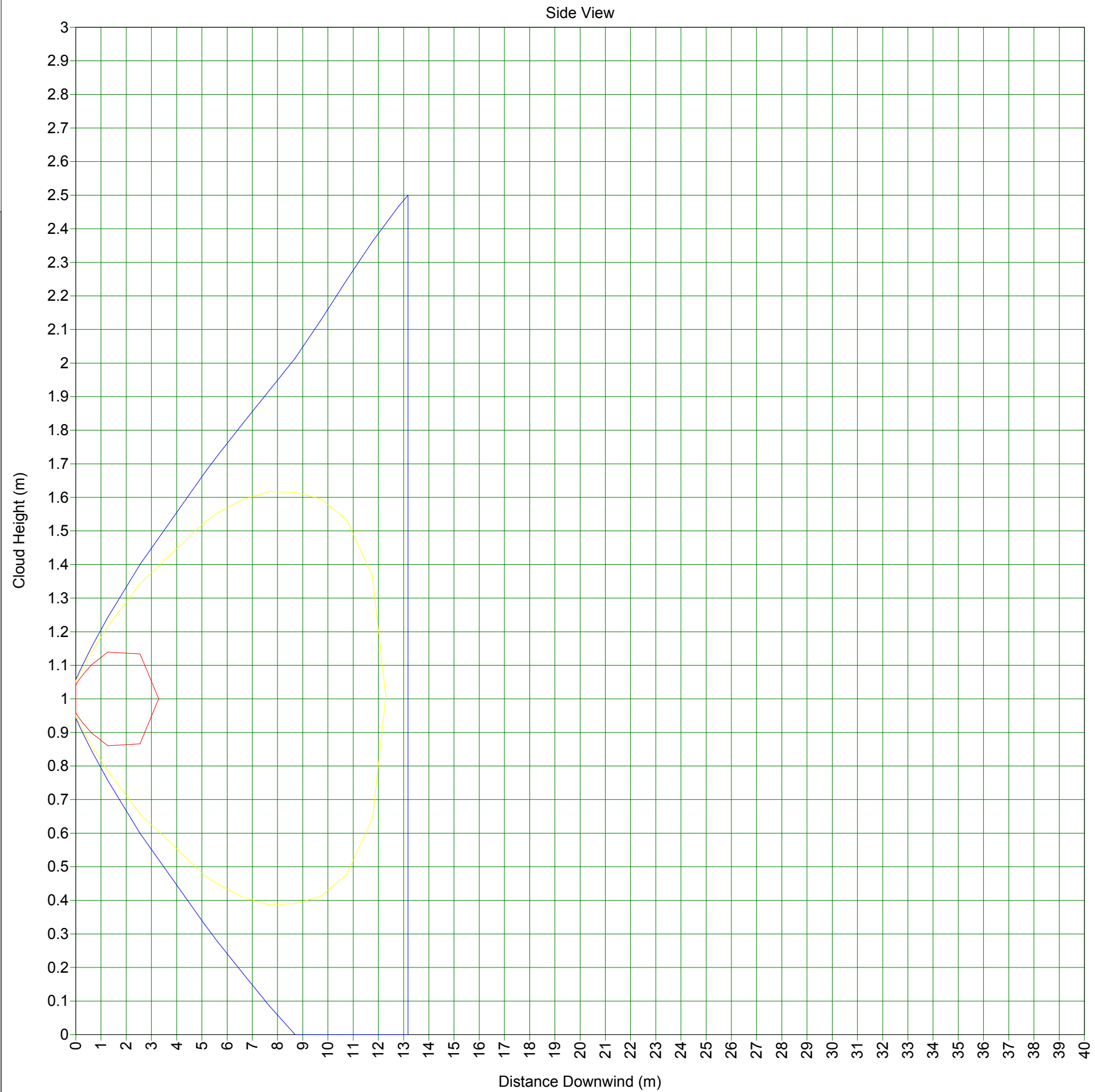
Study Folder: 70977-Fase  
2-lp3  
Audit No: 53995  
Model: 10mm  
Weather: Category 5/D  
Material: METHANE  
Averaging Time:  
Flammable(18.75 s)  
C/L Offset: 0 m  
Concentration  
Time: 0.3647 s

— 2.2e+004 ppm  
— 4.4e+004 ppm  
— 1.65e+005 ppm



Study Folder: 70977-Fase  
2-lp3  
Audit No: 53995  
Model: 10mm  
Weather: Category 2/F  
Material: METHANE  
Averaging Time:  
Flammable(18.75 s)  
C/L Offset: 0 m  
Concentration  
Time: 0.6076 s

— 2.2e+004 ppm  
— 4.4e+004 ppm  
— 1.65e+005 ppm



# SUMMARY REPORT

Unique Audit Number: 53.995



Study Folder: 70977-Fase 2-Ip3

Phast 6.6



70977-Fase 2-Ip3



Separatore Testa Pozzo

10mm

## Base Case

CASE Name: Data

Path: \70977-Fase 2-Ip3\Separatore Testa Pozzo\10mm

## User-Defined Data

### Material

|                          |                    |
|--------------------------|--------------------|
| Material Identifier      | METHANE            |
| Type of Vessel           | Pressurized Gas    |
| Pressure Specification   | Pressure specified |
| Storage Pressure - gauge | 154 bar            |
| Temperature              | 25 degC            |
| Mass Inventory           | 600 kg             |

### Scenario

|                      |       |
|----------------------|-------|
| Scenario Type        | Leak  |
| Phase to be Released | Vapor |
| Hole Diameter        | 10 mm |
| Building Wake Effect | None  |

### Location

|                                      |                   |
|--------------------------------------|-------------------|
| [Elevation                           | 1 m]              |
| Use ERPG averaging time              | ERPG not selected |
| Use IDLH averaging time              | IDLH not selected |
| Use STEL averaging time              | STEL not selected |
| Supply a user defined averaging time | Not supplied      |

### Bund

|                        |                   |
|------------------------|-------------------|
| Status of Bund         | No bund present   |
| [Type of Bund Surface  | Concrete]         |
| [Bund Height           | 0 m]              |
| [Bund Failure Modeling | Bund cannot fail] |

### Indoor/Outdoor

|                           |                  |
|---------------------------|------------------|
| Location of release       | Open air release |
| Outdoor Release Direction | Horizontal       |

### Flammable

|                  |           |
|------------------|-----------|
| Explosion Method | TNT       |
| Jet Fire Method  | API Model |

### Dispersion

|                                        |                      |
|----------------------------------------|----------------------|
| Late Ignition Location                 | No ignition location |
| Mass Inventory of material to Disperse | 600 kg               |

### Fireball Parameters

|                                  |                  |
|----------------------------------|------------------|
| [Mass Modification Factor        | 3]               |
| [Calculation method for fireball | DNV Recommended] |
| [TNO model flame temperature     | 1727 degC]       |

# SUMMARY REPORT

Unique Audit Number: 53.995



Study Folder: 70977-Fase 2-Ip3

Phast 6.6

## Toxic Parameters

|                                                               |                             |
|---------------------------------------------------------------|-----------------------------|
| [Indoor Calculations                                          | Unselected]                 |
| [Wind Dependent Exchange Rate                                 | Case Specified]             |
| [Building Exchange Rate                                       | 4 /hr]                      |
| [Tail Time                                                    | 1800 s]                     |
| [Set averaging time equal to exposure time                    | Use a fixed averaging time] |
| [Cut-off fraction of toxic load for exposure time calculation | 0.05 fraction]              |
| [Cut-off concentration for exposure time calculations         | 0 fraction]                 |

## Geometry

|           |          |
|-----------|----------|
| Shape     | Point    |
| Dimension | 2D       |
| System    | Absolute |
| East(1)   | 0 m      |
| North(1)  | 0 m      |

Path: \70977-Fase 2-Ip3\Separatore Testa Pozzo\10mm

## Discharge Data

### User-Defined Quantities

|                |            |
|----------------|------------|
| Material       | METHANE    |
| Temperature    | 25,00 degC |
| Pressure       | 155,01 bar |
| Inventory      | 600,00 kg  |
| Scenario       | Leak       |
| Fixed Duration | n/a s      |

### Calculated Quantities

Weather: Global Weathers\Category 2/F

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

|                   |               |
|-------------------|---------------|
| Liquid Fraction   | 0,00 fraction |
| Final Temperature | -103,54 degC  |
| Final Velocity    | 500,00 m/s    |
| Droplet Diameter  | 0,00 um       |

Continuous Release Data:

|                       |                   |
|-----------------------|-------------------|
| Mass Flowrate         | 2.10142E+000 kg/s |
| Release Duration      | 285,52 s          |
| Orifice Velocity      | 395,68 m/s        |
| Exit Pressure         | 77,60 bar         |
| Exit Temperature      | -23,19 degC       |
| Discharge Coefficient | 0,85              |
| Expanded Radius       | 0,03 m            |

Weather: Global Weathers\Category 5/D

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

|                 |               |
|-----------------|---------------|
| Liquid Fraction | 0,00 fraction |
|-----------------|---------------|

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|                          |                   |
|--------------------------|-------------------|
| FinalTemperature         | -103,54 degC      |
| Final Velocity           | 500,00 m/s        |
| Droplet Diameter         | 0,00 um           |
| Continuous Release Data: |                   |
| Mass Flowrate            | 2.10142E+000 kg/s |
| Release Duration         | 285,52 s          |
| Orifice Velocity         | 395,68 m/s        |
| Exit Pressure            | 77,60 bar         |
| Exit Temperature         | -23,19 degC       |
| Discharge Coefficient    | 0,85              |
| Expanded Radius          | 0,03 m            |

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## Consequence Results

### Distance to Concentration Results

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The height for user defined concentrations is the user defined height 0 m

All toxic results are reported at the toxic effect height 0 m

All flammable results are reported at the cloud centreline height

| Concentration(ppm) Averaging Time |          |       |   | Distance (m) |              |
|-----------------------------------|----------|-------|---|--------------|--------------|
|                                   |          |       |   | Category 2/F | Category 5/D |
| UFL                               | (165000) | 18.75 | s | 3.28507      | 3.02432      |
| LFL                               | (44000)  | 18.75 | s | 12.2947      | 9.66157      |
| LFL Frac                          | (22000)  | 18.75 | s | 39.0001      | 26.2209      |

| Concentration(ppm) Averaging Time |          |       |   | Heights (m) for above distances |              |
|-----------------------------------|----------|-------|---|---------------------------------|--------------|
|                                   |          |       |   | Category 2/F                    | Category 5/D |
| UFL                               | (165000) | 18.75 | s | 1.00025                         | 1.00019      |
| LFL                               | (44000)  | 18.75 | s | 1.00644                         | 1.00302      |
| LFL Frac                          | (22000)  | 18.75 | s | 0.930634                        | 0.997034     |

### Jet Fire Hazard

Path: \70977-Fase 2-IP3\Separatore Testa Pozzo\10mm

Jet fire method used: API

|                 |  | Category 2/F | Category 5/D |
|-----------------|--|--------------|--------------|
| Jet Fire Status |  | Hazard       | Hazard       |
| Flame Direction |  | Horizontal   | Horizontal   |

### Radiation Effects: Jet Fire Ellipse

Path: \70977-Fase 2-IP3\Separatore Testa Pozzo\10mm

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

|                 |      |       |  | Distance (m) |              |
|-----------------|------|-------|--|--------------|--------------|
|                 |      |       |  | Category 2/F | Category 5/D |
| Radiation Level | 12.5 | kW/m2 |  | 22.6706      | 22.6706      |
| Radiation Level | 7    | kW/m2 |  | 23.595       | 23.595       |
| Radiation Level | 5    | kW/m2 |  | 24.2423      | 24.2423      |
| Radiation Level | 3    | kW/m2 |  | 25.6694      | 25.6694      |

### Radiation Effects: Jet Fire Distance

Path: \70977-Fase 2-IP3\Separatore Testa Pozzo\10mm

|  |  | Radiation Level (kW/m2) |
|--|--|-------------------------|
|  |  | Category 2/F            |

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## Flash Fire Envelope

Path: \70977-Fase 2-Ip3\Separatore Testa Pozzo\10mm

All flammable results are reported at the cloud centreline height

|                 |       |     | Distance (m) |              |
|-----------------|-------|-----|--------------|--------------|
|                 |       |     | Category 2/F | Category 5/D |
| Furthest Extent | 22000 | ppm | 39.0001      | 26.2209      |
| Furthest Extent | 44000 | ppm | 12.2947      | 9.66157      |

|                 |       |     | Heights (m) for above distances |              |
|-----------------|-------|-----|---------------------------------|--------------|
|                 |       |     | Category 2/F                    | Category 5/D |
| Furthest Extent | 22000 | ppm | 0.930634                        | 0.997034     |
| Furthest Extent | 44000 | ppm | 1.00644                         | 1.00302      |

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## Explosion Effects: Late Ignition

Path: \70977-Fase 2-Ip3\Separatore Testa Pozzo\10mm

Explosion Model Used : TNT

Explosion Location Criterion: Cloud Front (LFL Fraction)

All distances are measured from the Source

All flammable results are reported at the cloud centreline height

|              |         |     | Maximum Distance (m) at Overpressure Level |              |
|--------------|---------|-----|--------------------------------------------|--------------|
|              |         |     | Category 2/F                               | Category 5/D |
| Overpressure | 0.02068 | bar | 53.5875                                    | 40.1887      |
| Overpressure | 0.1379  | bar | 36.1074                                    | 25.2274      |
| Overpressure | 0.2068  | bar | 34.7258                                    | 24.0448      |

|                         |    |  | Supplementary Data at 0.02068 bar |              |
|-------------------------|----|--|-----------------------------------|--------------|
|                         |    |  | Category 2/F                      | Category 5/D |
| Supplied Flammable Mass | kg |  | 0.336754                          | 0.211151     |
| Used Flammable Mass     | kg |  | 0.336754                          | 0.211151     |
| Overpressure Radius     | m  |  | 23.5875                           | 20.1887      |
| Distance to:            |    |  |                                   |              |
| - Ignition Source       | m  |  | 30                                | 20           |
| - Cloud Front/Centre    | m  |  | 30                                | 20           |
| - Explosion Centre      | m  |  | 30                                | 20           |

|                         |    |  | Supplementary Data at 0.1379 bar |              |
|-------------------------|----|--|----------------------------------|--------------|
|                         |    |  | Category 2/F                     | Category 5/D |
| Supplied Flammable Mass | kg |  | 0.336754                         | 0.211151     |
| Used Flammable Mass     | kg |  | 0.336754                         | 0.211151     |
| Overpressure Radius     | m  |  | 6.10739                          | 5.22735      |
| Distance to:            |    |  |                                  |              |
| - Ignition Source       | m  |  | 30                               | 20           |
| - Cloud Front/Centre    | m  |  | 30                               | 20           |
| - Explosion Centre      | m  |  | 30                               | 20           |

|                         |    |  | Supplementary Data at 0.2068 bar |              |
|-------------------------|----|--|----------------------------------|--------------|
|                         |    |  | Category 2/F                     | Category 5/D |
| Supplied Flammable Mass | kg |  | 0.336754                         | 0.211151     |
| Used Flammable Mass     | kg |  | 0.336754                         | 0.211151     |
| Overpressure Radius     | m  |  | 4.72576                          | 4.04481      |
| Distance to:            |    |  |                                  |              |
| - Ignition Source       | m  |  | 30                               | 20           |
| - Cloud Front/Centre    | m  |  | 30                               | 20           |
| - Explosion Centre      | m  |  | 30                               | 20           |

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## Weather Conditions

Path: \70977-Fase 2-Ip3\Separatore Testa Pozzo\10mm

|                             |          | Category 2/F | Category 5/D |
|-----------------------------|----------|--------------|--------------|
| Wind Speed                  | m/s      | 2            | 5            |
| Pasquill Stability          |          | F            | D            |
| Surface Roughness Length    | mm       | 1000         | 1000         |
| Surface Roughness Parameter |          | 0.173718     | 0.173718     |
| Atmospheric Temperature     | degC     | 25           | 25           |
| Surface Temperature         | degC     | 25           | 25           |
| Relative Humidity           | fraction | 0.75         | 0.75         |