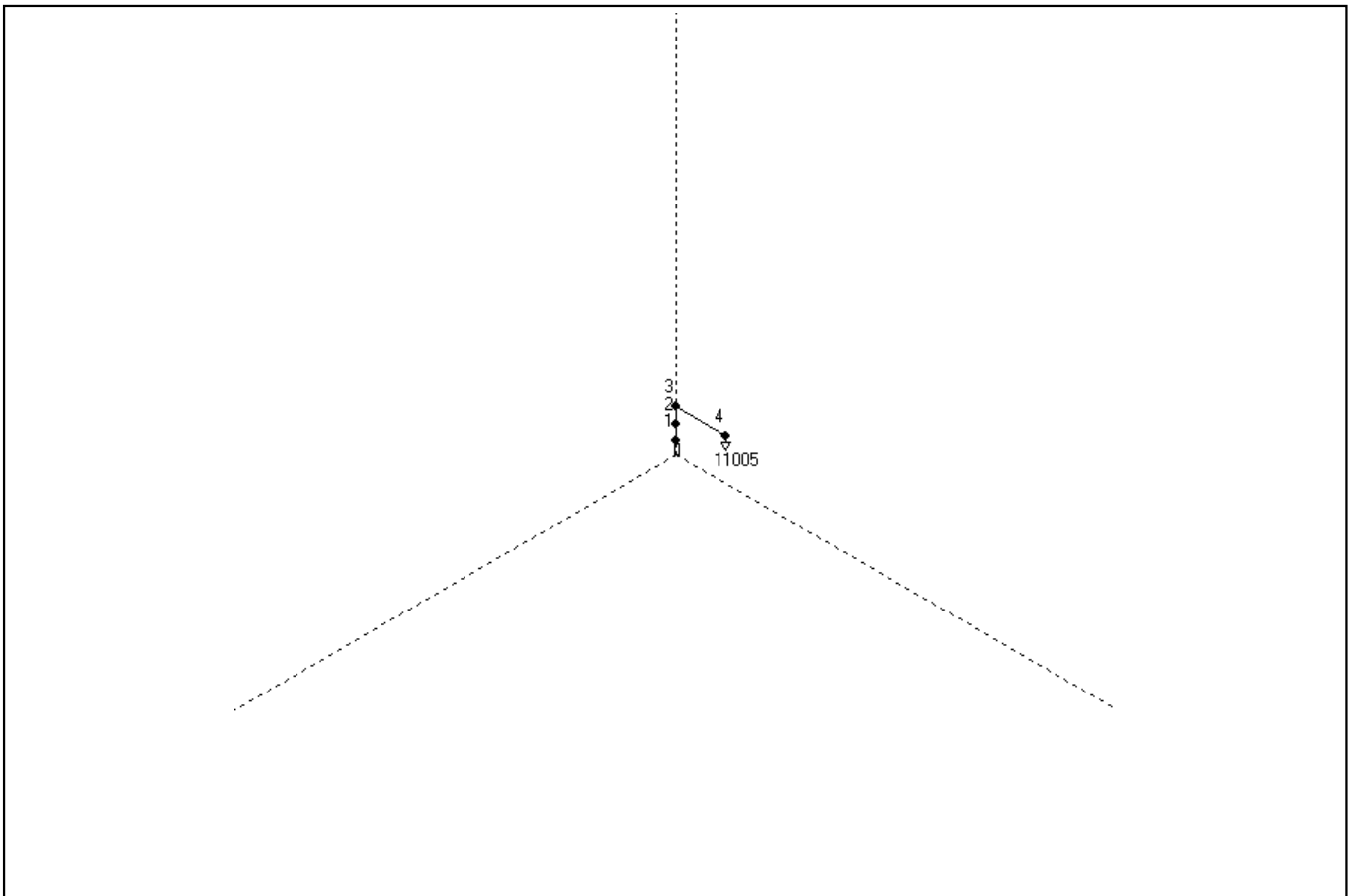


Project: Urzad Gminy Stegna
Project-No:
Building:
Object: 1.10 Archiwum
Contractor:
Owner:
Project engineer:
Date: 27.09.2018
Altitude above sealevel: 1 m
Regulation rule for calculation of IG541 quantities: ISO 14520-1, Edition 2000

Pipe catalogue:
Component catalogue:
Nozzle catalogue:

Error messages:

No errors detected



This software has been developed based on real discharge tests

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Pipesystem data:

| Section- No: | Starting- node | Endnode Nozzle | Length [m] | Height [m] | Pipetype | Diameter [mm] | Fitting * | Component code | Component coefficient | Nb of containers IG541 quantity |
|-----------------|-------------------|-------------------|---------------|---------------|----------|------------------|--------------|-------------------|--------------------------|------------------------------------|
| 1 | 0 | 1 | 0,350 | 0,350 | 12 | 21,1 | R | - | - | 0 |
| 2 | 1 | 2 | 0,350 | 0,350 | 12 | 21,1 | | - | - | |
| 3 | 2 | 3 | 0,400 | 0,400 | 13 | 21,1 | | - | - | |
| 4 | 3 | 4 | 1,950 | 0,000 | 13 | 21,1 | E | - | - | |
| 5 | 4 | 11005 | 0,150 | -0,150 | 13 | 21,1 | E | - | - | 20.6 |

* C=Component, B=Bend, T=T-Piece, E=Elbow

Legend of pipetypes**Type Pipeclass**

12 EN 10216-1
13 EN 10216-1

Pipe roughness

coated
black pipe

Calculation zone data:

| Zone | Total volume [m3] | Volume of building parts [m3] | Calculated volume [m3] | Max. Over-pressure [mbar] | Design temp. [°C] | Extinguish-conc. [% Vol] | Design factor | Design conc. [% Vol] | Design quantity [kg] |
|------|-------------------|-------------------------------|------------------------|---------------------------|-------------------|--------------------------|---------------|----------------------|----------------------|
| 1 pg | 28,6 | 0,0 | 28,6 | 1,000 | 20,0 | 30,7 | 1,30 | 39,9 | 20,66 |

Regulation rule for calculation of IG541 quantities: ISO 14520-1, Edition 2000

Altitude above sealevel: 1,0 m

Further information:

Design with included gas discharge time

Design with predetermined orifice diameters

Calculation results:**IG541 design data:**

| | |
|------------------------------|---------------|
| Design quantity: | 20,66 |
| Supplement factor: | 1,00 |
| Minimum storage quantity: | 20,66 |
| Container volume: | 80,0 l |
| Storage temperature: | 20,0 °C |
| Container starting pressure: | 205,4 bar abs |
| IG541-mass in one container: | 24,0 kg |
| Number of containers: | 1 |
| Actual storage quantity: | 24,0 kg |

Discharge time:

| | |
|--|--------|
| Total discharge time of air and IG541: | 49,0 s |
|--|--------|

System information:

| | |
|-------------------------------|---------------|
| Pipe system working pressure: | 64,2 bar abs |
| Container working pressure: | 123,3 bar abs |
| Total network volume: | 0,9 l |

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Pipe system:

| Section- No: | Starting- node | Endnode Nozzle | Pressure [bar abs] | Temperature [°C] | Flowrate [kg/s] | Pipedimension Di [mm] | DN |
|-----------------|-------------------|-------------------|-----------------------|---------------------|--------------------|--------------------------|-----|
| 1 | 0 | 1 | 104,87 | -11,69 | 0,48 | 21,1 | 3/4 |
| 2 | 1 | 2 | 61,53 | -27,44 | 0,48 | 21,1 | 3/4 |
| 3 | 2 | 3 | 61,47 | -26,40 | 0,48 | 21,1 | 3/4 |
| 4 | 3 | 4 | 60,99 | -21,66 | 0,48 | 21,1 | 3/4 |
| 5 | 4 | 11005 | 60,77 | -21,52 | 0,48 | 21,1 | 3/4 |

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Nozzle data:

| Calculation- zone no: | Nozzle no. | Nozzle type | Number of orifices | Pipeconnection Di [mm] | DN | Orifice [mm] | IG541 out- put [kg] |
|--------------------------|---------------|----------------|-----------------------|---------------------------|-----|-----------------|------------------------|
| 1 | 11005 | 1 | 1 | 21,1 | 3/4 | 6,0 | 20,6 |

Concentrations:

| Calculation- zone no: | Gascomposition after the discharge of the design quantity [%] | | | |
|--------------------------|---|-----|------|------|
| | O2 | CO2 | AR | N2 |
| 1 | 12,6 | 3,2 | 16,5 | 67,6 |

Total flooded design quantity within discharge time: 20,66 kg

| Calculation- zone no: | Gascomposition after total discharge [%] | | | |
|--------------------------|--|-----|------|------|
| | O2 | CO2 | AR | N2 |
| 1 | 11,6 | 3,6 | 18,4 | 66,4 |

Total flooded IG541 mass: 23.9 KG

Pressure relief opening:

| Calculation- zone no: | Recommended area against overpressure | | Max. flow [kg/s] |
|--------------------------|---------------------------------------|---------------------|------------------|
| | Area [m _e] | Overpressure [mbar] | |
| 1 | 0,048 | 1,0 | 0,59 |

Component list:

| Nozzle-type | Number |
|----------------------------|--------|
| Inert Nozzle 180° and 360° | 1 |

| Pipe-type | Di [mm] | DN | Length [m] |
|-----------|---------|-----|------------|
| 12 | 21,10 | 3/4 | 0,600 |
| 13 | 21,10 | 3/4 | 2,400 |

Number of bends (+) and elbows (-)

| Bend-type | Di [mm] | DN | Number |
|-----------|---------|-----|--------|
| -90 | 21,10 | 3/4 | 2 |

Number of T-distributors (in- and outdiameter)

| Number | Input | 90-out | 90-out | 0-out |
|--------|-------|--------|--------|-------|
|--------|-------|--------|--------|-------|

Dynamic flooding results

The calculation bases on a mean nozzle pressure!

| Flooding time [s] | Storage mass [kg] | Flooded ratio [%] | Flow [kg/s] | Storage pressure [bar] | Pressure downstream Control valve [bar] | Pressure at nozzle [bar] |
|--------------------------|--------------------------|--------------------------|--------------------|-------------------------------|--|---------------------------------|
| 0,0 | 24,0 | 0,0 | 0,00 | 205,4 | 1,0 | 1,0 |
| 1,3 | 23,1 | 3,8 | 0,59 | 193,9 | 60,0 | 59,1 |
| 1,5 | 23,0 | 4,4 | 0,58 | 193,7 | 59,6 | 58,7 |
| 1,8 | 22,8 | 5,0 | 0,58 | 192,3 | 59,6 | 58,7 |
| 2,0 | 22,7 | 5,6 | 0,58 | 188,9 | 59,4 | 58,5 |
| 2,3 | 22,5 | 6,2 | 0,58 | 188,6 | 59,9 | 59,1 |
| 2,5 | 22,4 | 6,8 | 0,57 | 187,3 | 58,8 | 57,9 |
| 3,0 | 22,1 | 8,0 | 0,58 | 182,5 | 59,6 | 58,7 |
| 5,0 | 21,1 | 12,3 | 0,49 | 171,6 | 50,7 | 50,0 |
| 7,0 | 20,1 | 16,3 | 0,48 | 161,2 | 50,0 | 49,3 |
| 9,0 | 19,2 | 20,3 | 0,48 | 149,8 | 48,8 | 48,1 |
| 11,0 | 18,2 | 24,3 | 0,48 | 140,1 | 48,8 | 48,1 |
| 16,0 | 15,8 | 34,1 | 0,48 | 115,5 | 63,1 | 62,2 |
| 21,0 | 13,5 | 44,0 | 0,48 | 93,1 | 57,1 | 56,2 |
| 26,0 | 11,1 | 53,8 | 0,45 | 74,0 | 45,1 | 44,4 |
| 31,0 | 9,1 | 62,2 | 0,37 | 58,7 | 35,8 | 35,2 |
| 36,0 | 7,4 | 69,0 | 0,30 | 46,9 | 29,1 | 28,7 |
| 41,0 | 6,1 | 74,6 | 0,25 | 38,2 | 23,6 | 23,2 |
| 46,0 | 5,0 | 79,0 | 0,20 | 31,7 | 19,4 | 19,1 |
| 51,0 | 4,2 | 82,7 | 0,16 | 26,4 | 16,1 | 15,9 |
| 56,0 | 3,5 | 85,6 | 0,13 | 22,0 | 13,4 | 13,2 |
| 61,0 | 2,9 | 88,0 | 0,11 | 18,2 | 11,1 | 10,8 |
| 66,0 | 2,3 | 90,4 | 0,11 | 14,9 | 9,0 | 7,6 |
| 71,0 | 1,8 | 92,7 | 0,11 | 11,4 | 7,1 | 6,9 |
| 76,0 | 1,4 | 94,0 | 0,05 | 9,4 | 5,8 | 5,7 |
| 81,0 | 1,2 | 94,8 | 0,04 | 8,2 | 5,0 | 4,9 |
| 86,0 | 1,1 | 95,6 | 0,03 | 7,1 | 4,3 | 4,3 |
| 91,0 | 0,9 | 96,2 | 0,03 | 6,2 | 3,8 | 3,7 |
| 96,0 | 0,8 | 96,8 | 0,02 | 5,5 | 3,3 | 3,2 |
| 101,0 | 0,7 | 97,3 | 0,02 | 4,9 | 3,0 | 2,9 |

Discharge time at valve:

49,0 s

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