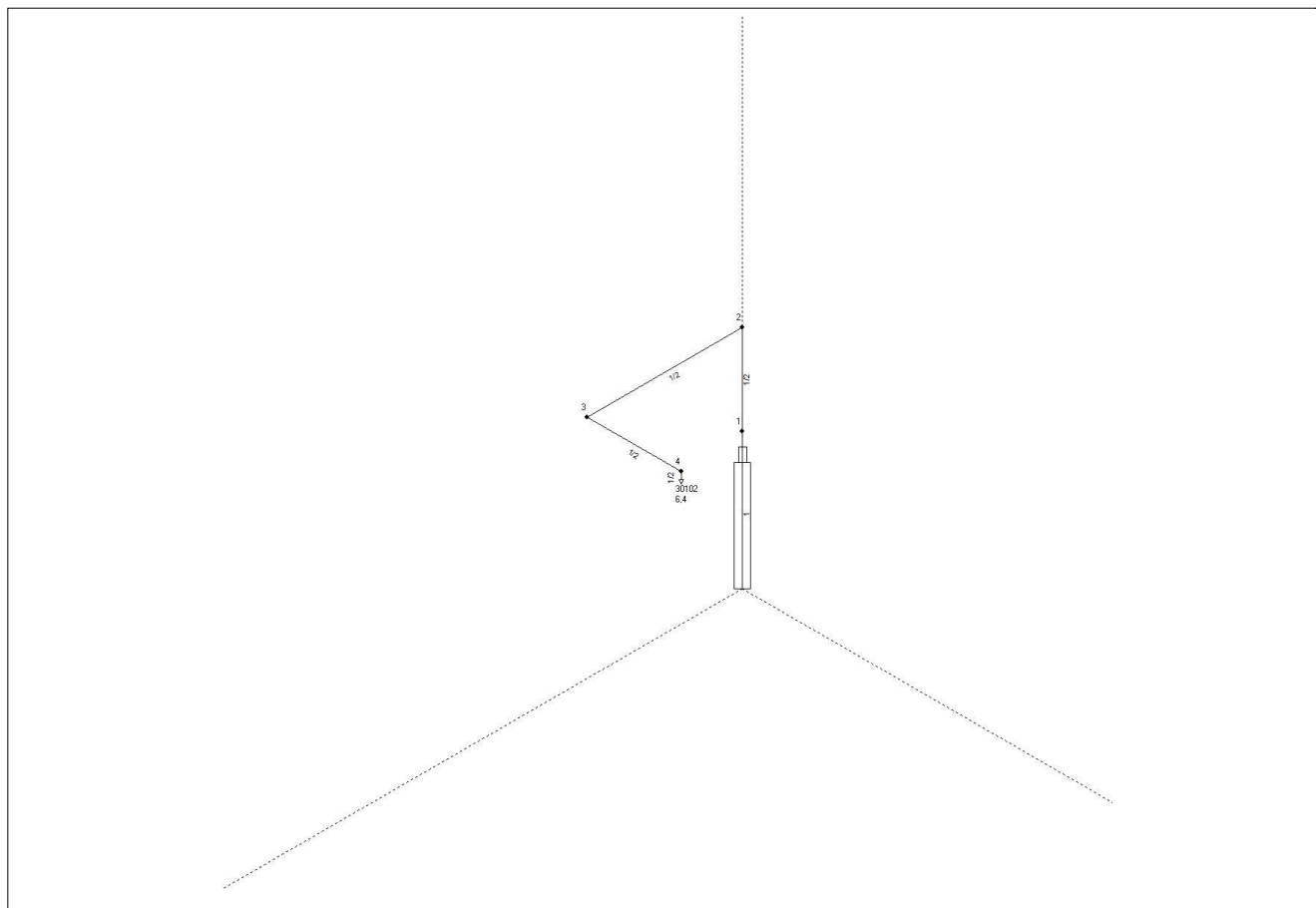




| | |
|--|---|
| Project: | PR-3002 |
| Project-No: | 3002 |
| Building: | Samodzielny Publiczny Zakład opieki Zdrowotnej MSWiA w Poznaniu |
| Object: | Pom. techniczne UPS w holu z windami p. -1 |
| Contractor: | |
| Owner: | |
| Project engineer: | MK |
| Date: | 2023-09-07 |
| Altitude above sealevel: | 100 m |
| Regulation rule for calculation of FK-5-1-12 quantities: | ISO 14520-1, Edition 2000 |
| Pipe catalogue: | Rury Logistal.rkl |
| Component catalogue: | Savi Technologie.arm |
| Nozzle catalogue: | Savi Technologie.noz |





Pipesystem data:

| Section-No: | Starting-node | Endnode | Length [m] | Height [m] | Pipetype | Diameter [mm] ** | Fitting * | Component code | Component coefficient | Nb of containers FK-5-1-12 quantity |
|-------------|---------------|---------|------------|------------|----------|------------------|-----------|----------------|-----------------------|-------------------------------------|
| 1 | 0 | 1 | 1,450 | 1,450 | 10 | 28,0 | C | 250 | 4,000 | 1,0 |
| 2 | 1 | 2 | 0,960 | 0,960 | 31 | 16,1 | | - | - | 0,0 |
| 3 | 2 | 3 | 1,100 | 0,000 | 31 | 16,1 | B | - | - | 0,0 |
| 4 | 3 | 4 | 1,000 | 0,000 | 31 | 16,1 | E | - | - | 0,0 |
| 5 | 4 | 30102 | 0,050 | -0,050 | 31 | 16,1 | E | - | - | 0,0 |

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

** If a pipe diameter is equal zero see the extra table of the calculated diameters

Legend of pipetypes

| Type | Pipeclass | Pipe roughness |
|------|-----------|----------------|
|------|-----------|----------------|

| | | |
|----|---------------|------------|
| 10 | Rury Savi | smooth |
| 31 | Logistal 2020 | galvanized |

Legend of components

| Code | Type | Resistance coefficient |
|------|------|------------------------|
|------|------|------------------------|

| | | |
|-----|----------------|-------|
| 250 | Zawor HFC Savi | 4,000 |
|-----|----------------|-------|

Nozzle data:

| No. | Calculation zone | Diameter [mm] |
|-----|------------------|---------------|
|-----|------------------|---------------|

| | | |
|-------|--------|-----|
| 30102 | Główna | 6,4 |
|-------|--------|-----|

Legend of nozzles:

| Type | Number of orifices | C1 | C2 | C3 | C4 | C5 | C6 |
|------|--------------------|----|----|----|----|----|----|
|------|--------------------|----|----|----|----|----|----|

| | | | | | | | |
|------------------------|---|---------|---------|---------|---------|---------|---------|
| 3 Dysza FK-5-1-12 1/2" | 1 | 0,04976 | 0,25599 | 0,00000 | 0,00000 | 0,00000 | 0,00000 |
|------------------------|---|---------|---------|---------|---------|---------|---------|



Calculation zone data:

Calculation of design quantity:

| 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 Główna | 18,6 | 0,0 | 18,6 | 2,000 | 20,0 | 4,3 | 1,30 | 5,6 | 15,31 |

Regulation rule for calculation of FK-5-1-12 quantities: ISO 14520-1, Edition 2000
Altitude above sealevel: 100,0 m

FK-5-1-12 storage input data:

Container volume: 27,0 l
Filling ratio: 1,100 kg/l
Filling pressure: 42,0 bar abs
Storage temperature: 20,0 °C
Supplement factor: 1,00
Minimum storage quantity: 15,31 kg
Number of containers: 1

Discharge time (input value): 8,5 s

Further information:

Design with included gas discharge time
Design with predetermined orifice diameters



Calculation results:

FK-5-1-12 storage data:

| | |
|--------------------------------|--------------|
| Design quantity: | 15,3 kg |
| Supplement factor: | 1,00 |
| Minimum storage quantity: | 15,3 kg |
| Container volume: | 27,0 l |
| Filling ratio: | 0,57 kg/l |
| Filling pressure: | 42,0 bar abs |
| FK-5-1-12 -mass per container: | 15,3 kg |
| Number of containers: | 1 |
| Actual storage quantity: | 15,3 kg |
| Storage temperature: | 20,0 °C |
| Starting container pressure: | 42,0 bar abs |

Discharge time:

| | |
|---------------------------|-------|
| Discharge time air: | 0,1 s |
| Total gas discharge time: | 0,1 s |
| Two-phase discharge time: | 8,5 s |
| Total discharge time: | 8,6 s |

System information:

| | |
|---------------------------------|--|
| Container working pressure: | 32,2 bar abs |
| Container working temperature: | 20,0 °C |
| Total network volume: | 0,6 l |
| Medium pipe content: | 0,9 kg FK-5-1-12 |
| Filling portion in pipe system: | 0,06 kg FK-5-1-12 /kg FK-5-1-12 -storage |

**Pipe system:**

| Section-No: | Starting-node | Endnode | Pressure [bar abs] | Flowrate [kg/s] | Pipedimension Di [mm] | DN |
|-------------|---------------|---------|-----------------------|--------------------|--------------------------|-----|
| 1 | 0 | 1 | 31,88 | 1,70 | 28,0 | 1 |
| 2 | 1 | 2 | 30,94 | 1,70 | 16,1 | 1/2 |
| 3 | 2 | 3 | 30,31 | 1,70 | 16,1 | 1/2 |
| 4 | 3 | 4 | 29,45 | 1,70 | 16,1 | 1/2 |
| 5 | 4 | 30102 | 28,85 | 1,70 | 16,1 | 1/2 |



Nozzle data:

| Calculation- zone no: | Nozzle no. | Nozzle type | Number of orifices | Pipeconnection Di [mm] | DN | Orifice [mm] | FK-5-1-12 out- put [kg] |
|--------------------------|---------------|----------------|-----------------------|---------------------------|-----|-----------------|----------------------------|
| 1 | 30102 | 3 | 1 | 16,1 | 1/2 | 6,4 | 15,3 |

Two-phase discharge time: 8,5 s

| Calculation- zone no: | Nozzle no. | Outlet velocity [m/s] | Transport time [s] | Jetdistance [m] | Evaporation distance [m] |
|--------------------------|---------------|--------------------------|-----------------------|--------------------|-----------------------------|
| 1 | 30102 | 36,6 | 1,33 | 4,40 | 2,30 |



Concentrations:

| Calculation- zone no: | O2 | Gascomposition after discharge [%] | |
|--------------------------|------|------------------------------------|------|
| | | FK-5-1-12 | N2 |
| 1 | 19,8 | 5,5 | 73,8 |

Pressure relief opening:

| Calculation- zone no: | Recommended area against overpressure | | Max. flow [kg/s] |
|--------------------------|---------------------------------------|---------------------|------------------|
| | Area [m.] | Overpressure [mbar] | |
| 1 | 0,012 | 2,0 | 1,7 |



Component list:

| Component | Number | Code | Coefficient |
|----------------|--------|------|-------------|
| Zawor HFC Savi | 1 | 250 | 4,000 |

| Nozzle-type | Number | C1 | C2 | C3 | C4 | C5 | C6 |
|-------------|--------|---------|---------|---------|---------|---------|---------|
| 3 | 1 | 0,04970 | 0,25590 | 0,00000 | 0,00000 | 0,00000 | 0,00000 |

| Pipe-type | Di [mm] | DN | Length [m] |
|-----------|---------|-----|------------|
| 10 | 28,00 | 1 | 1,400 |
| 31 | 16,10 | 1/2 | 3,200 |

Number of bends (+) and elbows (-)

| Bend-type | Di [mm] | DN | Number |
|-----------|---------|-----|--------|
| 90 | 16,10 | 1/2 | 1 |
| -90 | 16,10 | 1/2 | 2 |

Number of T-distributors (in- and outdiameter)

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