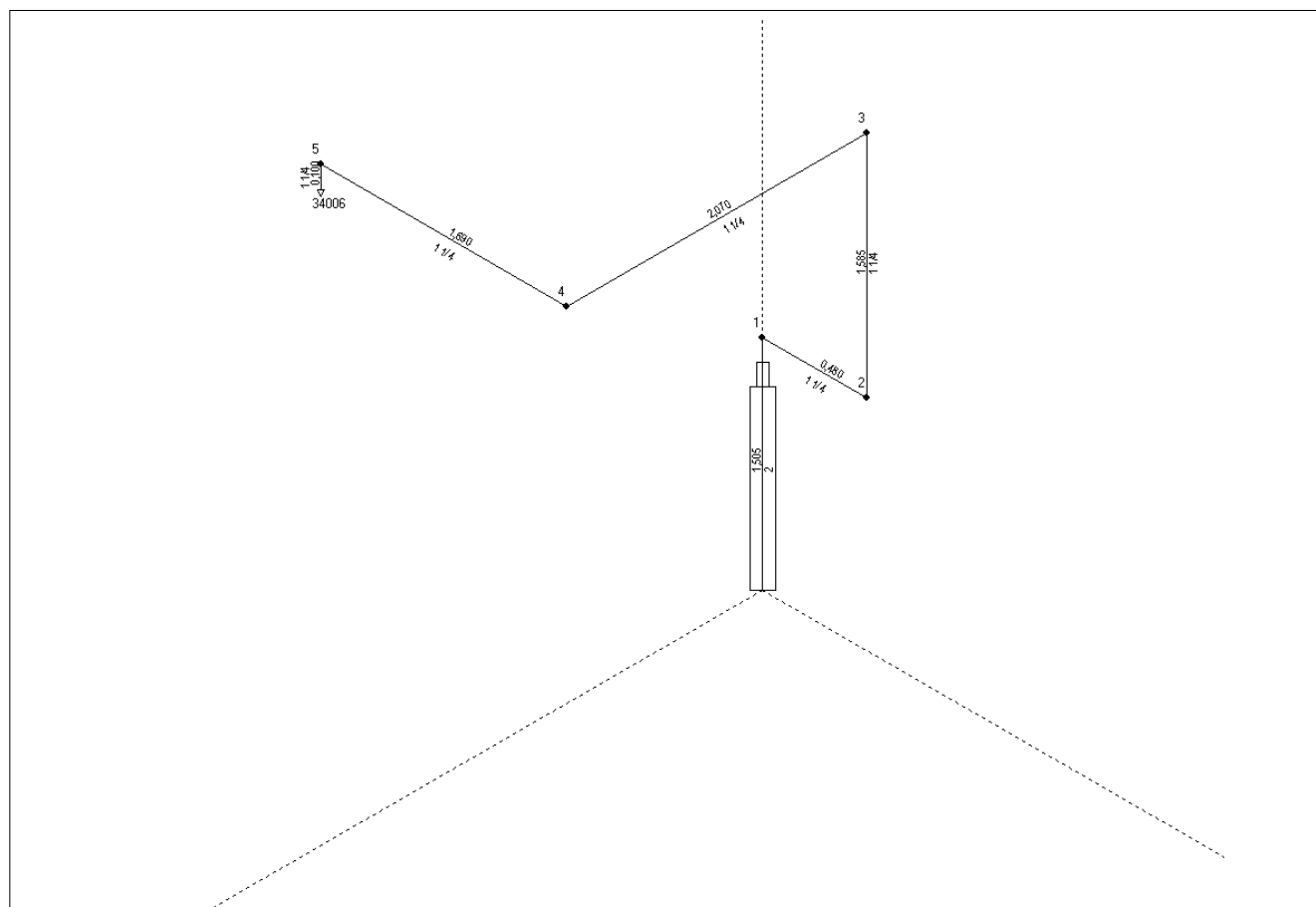


Project:  
Project-No:  
Building: Budynek Biurowy  
Object: Pomieszczenie UPS  
Contractor: Sealab  
Owner:  
Project engineer: Tomasz Sawicki  
Date: 2010-01-05  
Altitude above sealevel: 100 m  
Regulation rule for calculation of FM200 quantities: NFPA 2001 (edition 2000)

Pipe catalogue: kidde\_18.10.2004.rkl  
Component catalogue: Kidde\_18.10.2004.arm  
Nozzle catalogue: kidde\_18.10.2004.noz



**Pipesystem data:**

Section-No:	Starting-node	Endnode	Length [m]	Height [m]	Pipetype	Diameter [mm] **	Fitting *	Component code	Component coefficient	Nb of containers FM200 quantity
1	0	1	1,505	1,505	20	46,8	C	142	16,000	0,0
2	1	2	0,480	0,000	11	36,0	E	-	-	0,0
3	2	3	1,585	1,585	11	36,0	E	-	-	0,0
4	3	4	2,070	0,000	11	36,0	E	-	-	0,0
5	4	5	1,690	0,000	11	36,0	E	-	-	0,0
6	5	34006	0,100	-0,100	11	36,0	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
20	dip tube KD-200/KD-1230 (only for smoothg calculations)	
11	welded pipe, PT=90 bar, (EN 102Cgalvanized)	

**Legend of components**

Code	Type	Resistance coefficient
142	cylinder valves KD-200, 42 bar (preliminary coefficient)	16,000

**Nozzle data:**

No.	Calculation zone	Diameter [mm]
34006	Pom. UPS GŁÓWNA	0,0

**Legend of nozzles:**

Type	Number of orifices	C1	C2	C3	C4	C5	C6
3 KD-200/25 and /42 ba	4	1,000	-1,255	3,294	15,475	-0,791	0,000

**Calculation zone data:****Calculation of design quantity:**

Zone	Total volume [m3]	Volume of building parts [m3]	Calculated volume [m3]	Total surface [m2]	Max. Over-pressure [mbar]	Design temp. [°C]	Extinguish-conc. [% Vol]	Design factor	Design conc. [% Vol]	Design quantity [kg]
1 Pom. UPS GŁÓW	51,5	0,0	51,5	0,0	5,000	20,0	6,6	1,20	7,9	32,29

Regulation rule for calculation of FM200 quantities: NFPA 2001 (edition 2000)

Altitude above sealevel: 100,0 m

**FM200 storage input data:**

Container volume:	40,0 l
Filling ratio:	1,050 kg/l
Filling pressure:	43,0 bar abs
Storage temperature:	20,0 °C
Supplement factor:	1,02
Minimum storage quantity:	32,94 kg
Number of containers:	0

**Discharge time (input value):** 9,5 s**Further information:**

Design with included gas discharge time

## Calculation results:

### FM200 storage data:

Design quantity:	32,3 kg
Supplement factor:	1,02
Minimum storage quantity:	32,9 kg
Container volume:	40,0 l
Filling ratio:	0,82 kg/l
Filling pressure:	43,0 bar abs
FM200 -mass per container:	32,9 kg
Number of containers:	1
Actual storage quantity:	32,9 kg
Storage temperature:	20,0 °C
Starting container pressure:	43,0 bar abs

### Discharge time:

Discharge time air:	0,1 s
Total gas discharge time:	0,1 s
Two-phase discharge time:	9,4 s
Total discharge time:	9,5 s

### System information:

Container working pressure:	19,6 bar abs
Container working temperature:	18,1 °C
Total network volume:	8,4 l
Medium pipe content:	10,8 kg FM200
Filling portion in pipe system:	0,33 kg FM200 /kg FM200 -storage

**Pipe system:**

Section- No:	Starting- node	Endnode	Pressure [bar abs]	Flowrate [kg/s]	Pipedimension Di [mm]	DN
1	0	1	19,22	3,25	46,8	--
2	1	2	19,11	3,25	36,0	--
3	2	3	18,79	3,25	36,0	--
4	3	4	18,66	3,25	36,0	--
5	4	5	18,54	3,25	36,0	--
6	5	34006	18,45	3,25	36,0	--

**Nozzle data:**

Calculation- zone no:	Nozzle no.	Nozzle type	Number of orifices	Pipeconnection Di [mm]	DN	Orifice [mm]	FM200 out- put [kg]
1	34006	3	4	36,0	--	12,7	32,3

Two-phase discharge time: 9,4 s

Released two-phase FM200 : 32,3 kg

Calculation- zone no:	Nozzle no.	Outlet velocity [m/s]	Transport time [s]	Jetdistance [m]
1	34006	5,1	3,29	2,09

**Concentrations:**

Calculation- zone no:	O2	Gascomposition after discharge [%]	
		FM200	N2
1	19,2	8,0	71,8

**Pressure relief opening:**

Calculation- zone no:	Recommended area against overpressure	
	Area [m <sup>2</sup> ]	Overpressure [mbar]
1	0,026	5,0



### **Component list:**

Component	Number	Code	Coefficient
cylinder valves KD-2	1	142	16,000

Nozzle-type	Number	C1	C2	C3	C4	C5	C6
3	1	1,000	-1,250	3,290	15,500	-0,791	0,000

Pipe-type	Di [mm]	DN	Length [m]
20	46,80	2	1,500
11	36,00	1 1/4	6,000

### **Number of bends (+) and elbows (-)**

Bend-type	Di [mm]	DN	Number
-90	36,00	1 1/4	5

### **Number of T-distributors (in- and outdiameter)**

Number	Input	90-out	90-out	0-out
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