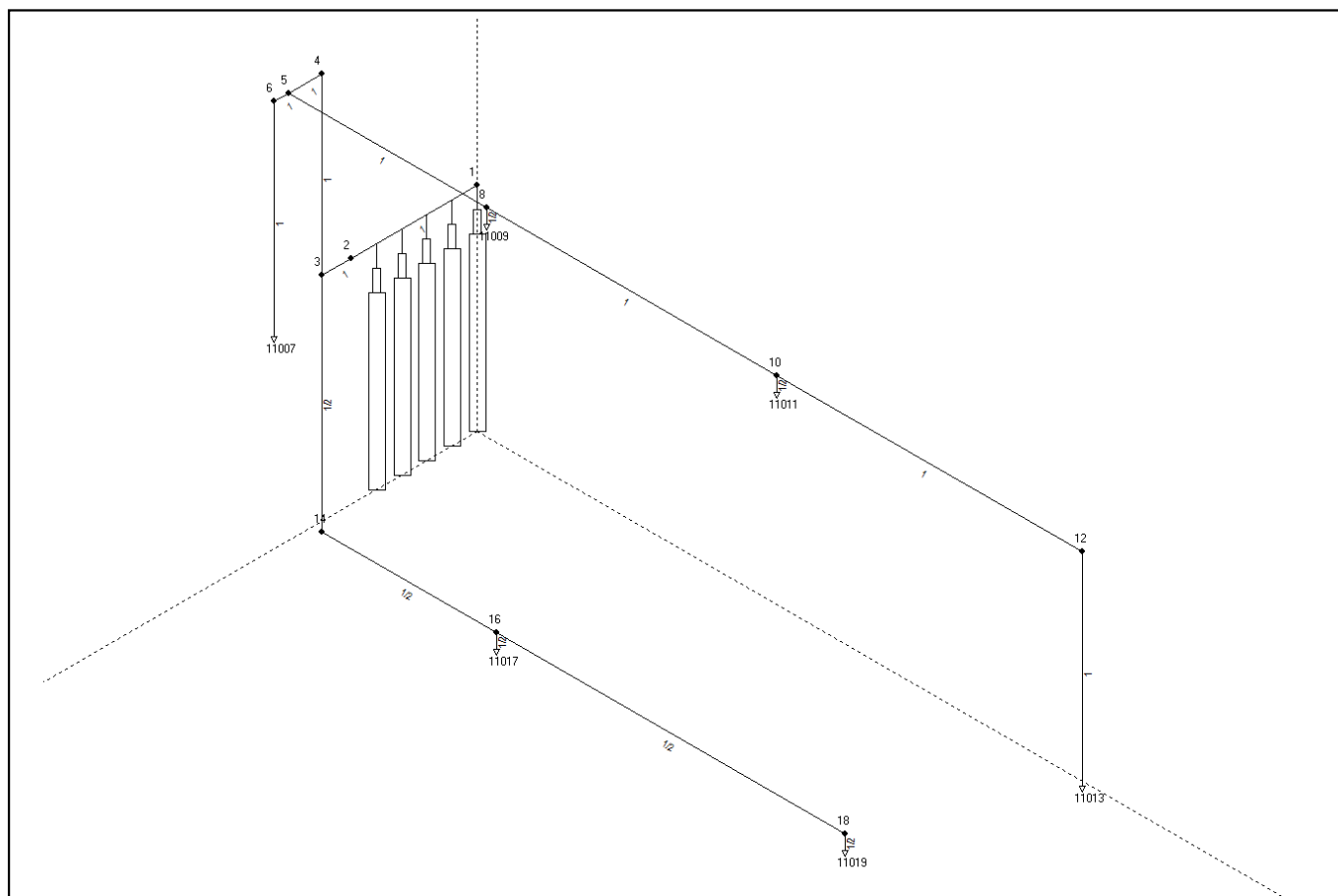


Project:  
 Project-No:  
 Building:  
 Object: Serwerownia BFG  
 Contractor:  
 Owner:  
 Project engineer: EG  
 Date: 2018-07-19  
 Altitude above sealevel: 200 m  
 Regulation rule for calculation of IG55 quantities: ISO 14520-1, Edition 2000

Pipe catalogue: ProInert pipe.rkl  
 Component catalogue: ProInert components.arm  
 Nozzle catalogue: ProInert nozzle.noz



### Pipesystem data:

Section-No:	Starting-node	Endnode Nozzle	Length [m]	Height [m]	Pipetype	Diameter [mm] **	Fitting *	Component code	Component coefficient	Nb of containers IG55 quantity
1	0	1	2,200	2,200	12	15,0	P	-	3,0000	5,0
2	1	2	1,300	0,000	21	26,6	E	-	-	0,0
3	2	3	0,300	0,000	21	26,6		-	-	0,0
4	3	4	1,800	1,800	21	26,6	T-90°	-	-	0,0
5	4	5	0,350	0,000	21	26,6	E	-	-	0,0
6	5	6	0,150	0,000	21	26,6	T-0°	-	-	0,0
7	6	11007	1,400	-1,400	21	26,6	E	-	-	0,0
8	5	8	2,050	0,000	21	26,6	T-90°	-	-	0,0
9	8	11009	0,100	-0,100	21	15,8	T-90°	-	-	0,0
10	8	10	3,000	0,000	21	26,6	T-0°	-	-	0,0
11	10	11011	0,100	-0,100	21	15,8	T-90°	-	-	0,0
12	10	12	2,100	0,000	21	26,6	T-0°	-	-	0,0
13	12	11013	1,400	-1,400	21	26,6	E	-	-	0,0
14	3	14	2,300	-2,300	21	15,8	T-90°	-	-	0,0
15	14	16	1,800	0,000	21	15,8	E	-	-	0,0
16	16	11017	0,100	-0,100	21	15,8	T-90°	-	-	0,0
17	16	18	3,600	0,000	21	15,8	T-0°	-	-	0,0
18	18	11019	0,100	-0,100	21	15,8	E	-	-	0,0

\* C=Component, B=Bend, T=T-Piece, E=Elbow, P=Pressure control valve

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

### Legend of pipetypes

Type	Pipeclass	Pipe roughness
12	Cylinder Only	hose
21	Schedule 40	galvanized

### Nozzle data:

No.	Calculation zone	Diameter [mm]
11017	Podloga	3,7
11019	Podloga	3,7
11007	Glowna	10,2
11013	Glowna	10,8
11009	Sufit	7,7
11011	Sufit	7,7

### Legend of nozzles:

Type	Number of orifices	C1	C2	C3	C4	C5	C6
1 Fike ProInert Nozzle	1	-0,045	0,000	-0,038	0,000	0,000	0,000



#### 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 Podloga	14,7	0,0	14,7	5,000	18,0	34,8	1,30	45,2	12,46
2 Glowna	99,4	0,0	99,4	5,000	18,0	34,8	1,30	45,2	84,10
3 Sufit	51,5	0,0	51,5	5,000	18,0	34,8	1,30	45,2	43,61

Regulation rule for calculation of IG55 quantities: ISO 14520-1, Edition 2000  
Altitude above sealevel: 200,0 m

#### IG55 storage input data:

Container volume: 80,0 l  
Container pressure: 300,0 bar abs  
Storage temperature: 15,0 °C  
Supplement factor: 1,00  
Minimum storage quantity: 140,17 kg  
Number of containers: 5

**Discharge time (input value):** 60,0 s  
Pressure downstream control valve: 42,0 bar

#### Further information:

Design with included gas discharge time  
Design with predetermined orifice diameters



## Calculation results:

### IG55 design data:

Design quantity:	140,17
Supplement factor:	1,00
Minimum storage quantity:	140,17
Container volume:	80,0 l
Container pressure:	300,0 bar abs
IG55-mass in one container:	32,1 kg
Number of containers:	5
Actual storage quantity:	160,4 kg
Storage temperature:	15,0 °C
Starting container pressure:	300,0 bar abs

### Discharge time:

Total discharge time of air and IG55:	56,9 s
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### System information:

Max. pressure downstream control valve:	42,0 bar abs
Pipe system working pressure:	0,0 bar abs
Container working pressure:	300,0 bar abs
Total network volume:	8,6 l



**Pipe system:**

Section- No:	Starting- node	Endnode Nozzle	Pressure [bar abs]	Temperature [°C]	Flowrate [kg/s]	Pipedimension Di [mm]	DN
1	0	1	299,53	14,97	0,43	15,0	1/2
2	1	2	38,97	-22,51	2,19	26,6	1
3	2	3	38,83	-22,60	2,19	26,6	1
4	3	4	35,42	-23,17	1,99	26,6	1
5	4	5	34,13	-24,11	1,99	26,6	1
6	5	6	33,40	-24,12	0,66	26,6	1
7	6	11007	33,18	-24,27	0,66	26,6	1
8	5	8	31,26	-24,49	1,34	26,6	1
9	8	11009	30,04	-24,51	0,34	15,8	1/2
10	8	10	30,44	-24,83	1,00	26,6	1
11	10	11011	29,73	-24,85	0,34	15,8	1/2
12	10	12	30,07	-24,94	0,66	26,6	1
13	12	11013	29,83	-25,13	0,66	26,6	1
14	3	14	36,04	-22,74	0,19	15,8	1/2
15	14	16	35,69	-22,95	0,19	15,8	1/2
16	16	11017	35,47	-22,95	0,10	15,8	1/2
17	16	18	35,53	-23,01	0,10	15,8	1/2
18	18	11019	35,49	-23,04	0,10	15,8	1/2



**Nozzle data:**

Calculation- zone no:	Nozzle no.	Nozzle type	Number of orifices	Pipeconnection Di [mm]	DN	Orifice [mm]	IG55 out- put [kg]
1	11017	1	1	15,8	1/2	3,7	6,2
1	11019	1	1	15,8	1/2	3,7	6,2
2	11007	1	1	26,6	1	10,2	42,3
2	11013	1	1	26,6	1	10,8	42,5
3	11009	1	1	15,8	1/2	7,7	22,0
3	11011	1	1	15,8	1/2	7,7	21,8

MAX. TRANSPORT TIME DIFF. BETWEEN NOZZLES: 11009./ 11019. IS 0.56 S



**Concentrations:**

Calculation- zone no:	Gascomposition after the discharge of the design quantity [%]			
	O2	CO2	AR	N2
1	11,4	0,0	23,4	65,2
2	11,3	0,0	23,6	65,1
3	11,3	0,0	23,5	65,1

Total flooded design quantity within discharge time: 140,17 kg

Calculation- zone no:	Gascomposition after total discharge [%]			
	O2	CO2	AR	N2
1	10,5	0,0	25,4	64,0
2	10,4	0,0	25,7	63,9
3	10,5	0,0	25,6	63,9

Total flooded IG55 mass: 159.9 KG

**Pressure relief opening:**

Calculation- zone no:	Recommended area against overpressure		Max. flow [kg/s]
	Area [m <sup>2</sup> ]	Overpressure [mbar]	
1	0,008	5,0	0,21
2	0,054	5,0	1,41
3	0,028	5,0	0,73

### **Component list:**

Nozzle-type	Number	C1	C2	C3	C4	C5	C6
1	6	-0,045	0,000	-0,038	0,000	0,000	0,000

Pipe-type	Di [mm]	DN	Length [m]
12	15,00	1/2	2,200
21	26,60	1	13,700
21	15,80	1/2	8,100

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

Bend-type	Di [mm]	DN	Number
-90	26,60	1	4
-90	15,80	1/2	2

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

Number	Input	90-out	90-out	0-out
1	26,6	26,6	15,8	0,0
1	26,6	26,6	0,0	26,6
2	26,6	15,8	0,0	26,6
1	15,8	15,8	0,0	15,8





## 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 restrictor [bar]	Pressure at nozzle [bar]
0,0	160,4	0,0	0,00	300,0	1,0	1,0
1,6	153,4	4,4	2,19	281,0	42,0	32,3
1,9	152,9	4,7	2,19	278,6	42,0	32,3
2,1	152,3	5,1	2,20	276,3	42,0	32,3
2,4	151,8	5,4	2,20	274,0	42,0	32,3
2,6	151,2	5,7	2,20	271,7	42,0	32,3
3,1	150,1	6,4	2,20	268,5	42,0	32,3
3,6	149,0	7,1	2,21	264,8	42,0	32,3
4,1	147,9	7,8	2,21	261,0	42,0	32,3
4,6	146,8	8,5	2,22	257,0	42,0	32,3
5,1	145,7	9,2	2,22	252,9	42,0	32,3
7,1	141,2	12,0	2,23	240,1	42,0	32,3
9,1	136,7	14,8	2,25	225,7	42,0	32,3
11,0	132,2	17,6	2,26	210,9	42,0	32,3
16,0	120,9	24,6	2,26	175,8	42,0	32,3
21,0	109,6	31,7	2,26	145,4	42,0	32,3
26,0	98,3	38,7	2,26	119,8	42,0	32,3
31,0	87,0	45,8	2,26	98,4	42,0	32,3
36,0	75,7	52,8	2,26	80,5	42,0	32,3
41,0	64,4	59,8	2,26	65,3	42,0	32,3
46,0	53,1	66,9	2,26	52,0	42,0	32,3
51,0	41,8	73,9	2,26	42,3	40,3	31,0
56,0	30,8	80,8	2,09	31,0	29,5	22,6
61,0	22,7	85,8	1,40	22,8	21,7	16,7
66,0	16,8	89,5	1,05	17,6	16,8	12,9
71,0	12,4	92,3	0,80	13,2	13,2	10,1
76,0	9,0	94,4	0,60	10,4	10,4	8,0
81,0	6,4	96,0	0,45	8,6	8,2	6,2
86,0	4,6	97,2	0,33	6,7	6,4	4,8

Discharge meantime at nozzle:

56,9 s

