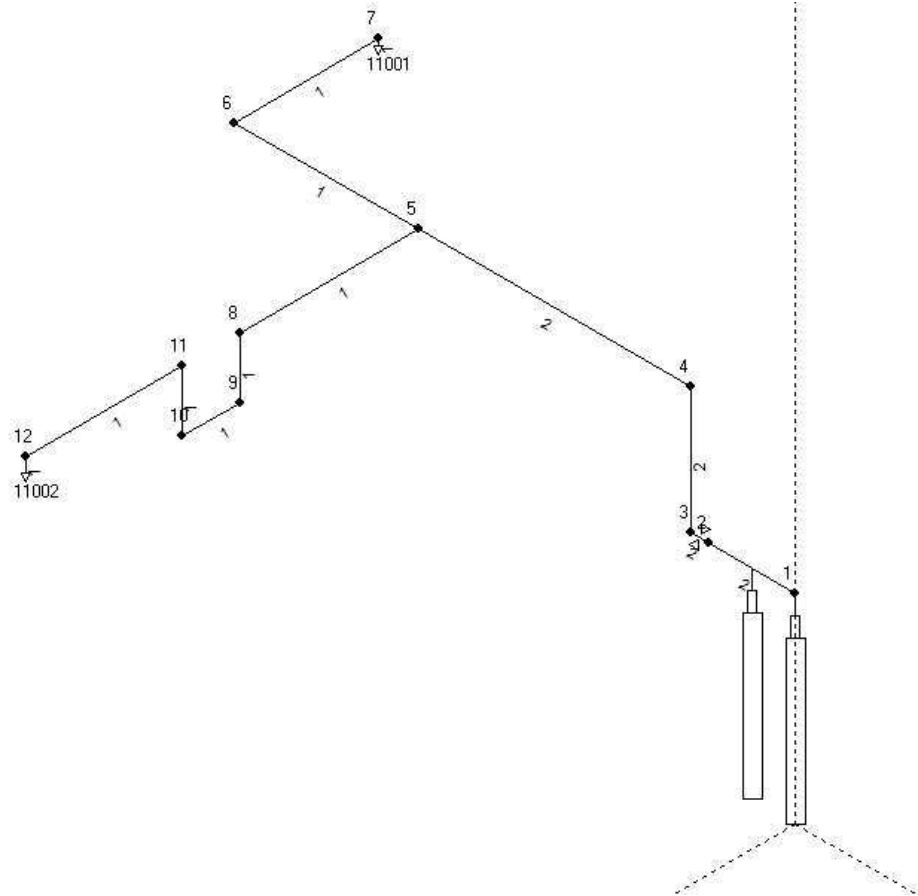


Project: Stilde SI IG-541  
Project-No: Starachowice  
Building:  
Object:  
Contractor:  
Owner:  
Project engineer:  
Date: 2017-12-04  
Altitude above sealevel: 100 m  
Regulation rule for calculation of IG541 quantities: ISO 14520-1, Edition 2000

Pipe catalogue: Rury Logistal.rkl  
Component catalogue: Stilde SI.arm  
Nozzle catalogue: Dysze Stilde SI.noz



**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	1,730	1,730	12	37,5	C	250	16,000	2,0
2	1	2	0,750	0,000	20	53,1	E	-	-	0,0
3	2	3	0,100	0,000	21	53,1	R	-	-	0,0
4	3	4	1,100	1,100	21	53,1	E	-	-	0,0
5	4	5	2,350	0,000	21	53,1	E	-	-	0,0
6	5	6	1,600	0,000	21	27,9	T-0°	-	-	0,0
7	6	7	1,250	0,000	21	27,9	E	-	-	0,0
8	7	11001	0,050	-0,050	21	27,9	E	-	-	0,0
9	5	8	1,550	0,000	21	27,9	T-90°	-	-	0,0
10	8	9	0,350	-0,350	21	27,9	E	-	-	0,0
11	9	10	0,500	0,000	21	27,9	E	-	-	0,0
12	10	11	0,350	0,350	21	27,9	E	-	-	0,0
13	11	12	1,350	0,000	21	27,9	E	-	-	0,0
14	12	11002	0,050	-0,050	21	27,9	E	-	-	0,0

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

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

**Legend of pipetypes**

Type	Pipeclass	Pipe roughness
12	Rury Savi	hose
20	Rury Logistal	smooth
21	Rury Logistal	galvanized

**Legend of components**

Code	Type	Resistance coefficient
250	Zawór	16,000

**Nozzle data:**

No.	Calculation zone	Diameter [mm]
11001	PG	12,7
11002	PG	12,9

**Legend of nozzles and restrictor:**

Type	Number of orifices	C1	C2	C3	C4	C5	C6
1 Dysze Stilde SI	1	-0,147	0,006	0,001	0,000	0,000	0,000
Restrictor		-0,147	0,006	0,001	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 PG	90,3	0,0	90,3	2,000	20,0	35,2	1,30	45,7	78,19

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

Altitude above sealevel: 100,0 m

**IG541 storage input data:**

Container volume: 140,0 l  
Container pressure: 200,0 bar abs  
Storage temperature: 15,0 °C  
Supplement factor: 1,00  
Minimum storage quantity: 78,19 kg  
Number of containers: 2

**Discharge time (input value):** 65,0 s  
Pressure downstream restrictor: 60,0 bar

**Further information:**

Design with included gas discharge time  
Design with predetermined orifice diameters  
Design with predetermined restrictor diameter

**Calculation results:****IG541 design data:**

Design quantity:	78,19
Supplement factor:	1,00
Minimum storage quantity:	78,19
Container volume:	140,0 l
Container pressure:	200,0 bar abs
IG541-mass in one container:	41,6 kg
Number of containers:	2
Actual storage quantity:	83,2 kg
Storage temperature:	15,0 °C
Starting container pressure:	200,0 bar abs

**Discharge time:**

Total discharge time of air and IG541:	51,2 s
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**System information:**

Restrictor diameter:	10,4 mm
Container working pressure:	110,2 bar abs
Total network volume:	15,5 l

**Pipe system:**

Section-No:	Starting-node	Endnode Nozzle	Pressure [bar abs]	Temperature [°C]	Flowrate [kg/s]	Pipedimension Di [mm]	DN
1	0	1	109,79	-7,23	1,07	37,5	1_1/4
2	1	2	109,76	-7,23	2,14	53,1	2
3	2	3	34,15	-28,60	2,14	53,1	2
4	3	4	34,06	-28,66	2,14	53,1	2
5	4	5	33,94	-28,73	2,14	53,1	2
6	5	6	33,71	-28,85	1,09	27,9	1
7	6	7	33,28	-29,11	1,09	27,9	1
8	7	11001	33,00	-29,33	1,09	27,9	1
9	5	8	33,63	-28,84	1,06	27,9	1
10	8	9	33,34	-29,02	1,06	27,9	1
11	9	10	33,02	-29,26	1,06	27,9	1
12	10	11	32,72	-29,45	1,06	27,9	1
13	11	12	32,28	-29,73	1,06	27,9	1
14	12	11002	32,00	-29,92	1,06	27,9	1

**Nozzle data:**

Calculation- zone no:	Nozzle no.	Nozzle type	Number of orifices	Pipeconnection Di [mm]	DN	Orifice [mm]	IG541 out- put [kg]
1	11001	1	1	27,9	1	12,7	39,8
1	11002	1	1	27,9	1	12,9	38,8

MAX. TRANSPORT TIME DIFF. BETWEEN NOZZLES: 11002./ 11001. IS 0.04 S

**Concentrations:**

Calculation- zone no:	Gascomposition after the discharge of the design quantity [%]			
	O2	CO2	AR	N2

1	11,2	3,7	19,2	65,8
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Total flooded design quantity within discharge time: 78,19 kg

Calculation- zone no:	Gascomposition after total discharge [%]			
	O2	CO2	AR	N2

1	10,8	3,9	19,9	65,4
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Total flooded IG541 mass: 82.8 KG

**Pressure relief opening:**

Calculation- zone no:	Recommended area against overpressure		Max. flow [kg/s]
	Area [m.]	Overpressure [mbar]	

1	0,250	2,0	4,16
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**Component list:**

Nozzle-type	Number	C1	C2	C3	C4	C5	C6
1	2	-0,147	0,006	0,001	0,000	0,000	0,000
Restrictor	1	-0,147	0,006	0,001	0,000	0,000	0,000

Pipe-type	Di [mm]	DN	Length [m]
12	37,50	1_1/4"	1,700
20	53,10	2	0,800
21	53,10	2	3,600
21	27,90	1	7,200

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

Bend-type	Di [mm]	DN	Number
-90	53,10	2	1
-90	53,10	2	2
-90	27,90	1	7

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

Number	Input	90-out	90-out	0-out
1	53,1	27,9	0,0	27,9





## 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	83,2	0,0	0,00	200,0	1,0	1,0
1,9	67,2	19,2	3,21	158,0	51,8	49,1
2,2	66,5	20,1	3,14	154,3	50,6	47,9
2,4	65,7	21,0	3,08	150,8	49,4	46,8
2,7	64,9	22,0	3,02	147,5	48,3	45,8
2,9	64,2	22,8	2,96	144,4	47,2	44,8
3,2	63,5	23,7	2,90	141,4	46,2	43,8
3,4	62,7	24,6	2,89	138,5	46,6	44,3
3,7	62,0	25,4	2,88	135,8	45,7	43,3
4,2	60,6	27,2	2,83	131,5	44,8	42,4
4,7	59,2	28,8	2,75	127,0	43,4	41,1
5,2	57,9	30,4	2,67	122,5	41,9	39,7
7,2	52,9	36,5	2,46	107,9	38,0	36,0
9,2	48,4	41,9	2,18	94,0	33,2	31,5
11,0	44,4	46,7	1,93	82,4	29,0	27,5
16,0	36,1	56,6	1,50	61,0	22,6	21,4
21,0	29,7	64,3	1,17	47,2	17,3	16,5
26,0	24,6	70,5	0,94	37,8	13,8	13,1
31,0	20,4	75,5	0,77	31,0	11,3	10,7
36,0	17,0	79,6	0,63	25,8	9,4	8,9
41,0	14,1	83,0	0,53	21,8	7,9	7,5
46,0	11,7	85,9	0,45	19,4	6,9	6,5
51,0	9,7	88,4	0,38	17,0	5,8	5,5
56,0	7,9	90,5	0,32	14,6	5,0	4,8
61,0	6,5	92,2	0,27	12,5	4,3	4,1
66,0	5,3	93,6	0,22	10,6	3,7	3,5
71,0	4,3	94,8	0,19	9,0	3,1	2,9

Discharge meantime at nozzle:

51,2 s

