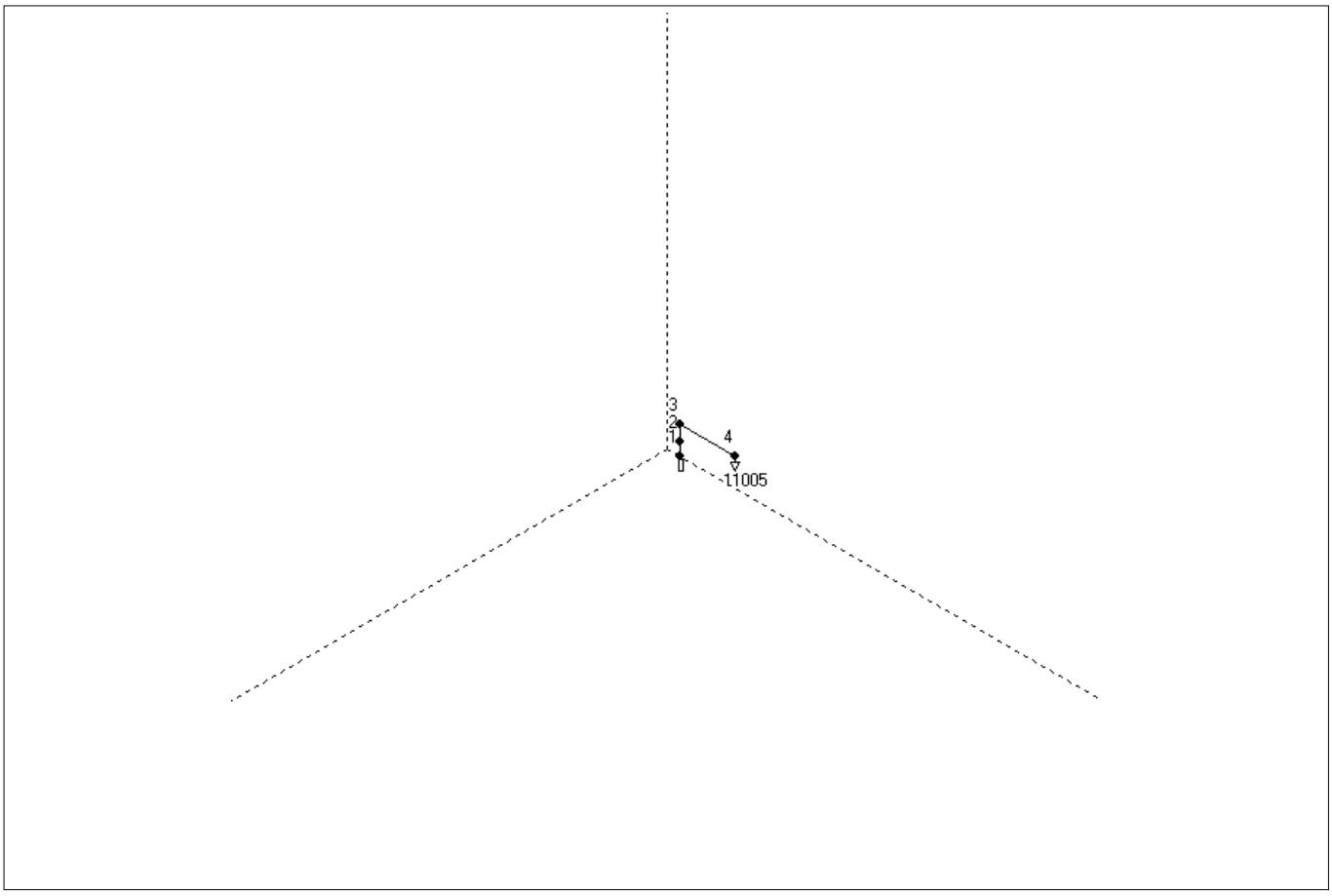
Project:	Urzad Gminy Stegna
Project-No:	
Building:	
Object:	1.4 Archiwum
Contractor:	
Owner:	
Project engineer:	
Date:	27.09.2018
Altitude above sealevel:	1 m
Regulation rule for calculation of IG541 quantities:	ISO 14520-1, Edition 2000

Pipe catalogue:
Component catalogue:
Nozzle catalogue:

Error messages:
No errors detected



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	0,000	12	21,1	R	-	-	0
2	1	2	0,350	0,350	12	21,1	E	-	-	
3	2	3	0,400	0,400	13	21,1		-	-	
4	3	4	2,200	0,000	13	21,1	E	-	-	
5	4	11005	0,150	-0,150	13	21,1	E	-	-	33.2

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

Legend of pipetypes

Type	Pipeclass	Pipe roughness
12	EN 10216-1	coated
13	EN 10216-1	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	44,3	0,0	44,3	1,000	20,0	31,6	1,30	41,1	33,23

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 predeterminated orifice diameters

Calculation results:

IG541 design data:

Design quantity:	33,23
Supplement factor:	1,00
Minimum storage quantitiy:	33,23
Container volume:	80,0 l
Storage temperature:	20,0 °C
Container starting pressure:	308,9 bar abs
IG541-mass in one container:	33,3 kg
Number of containers:	1
Actual storage quantity:	33,3 kg

Discharge time:

Total discharge time of air and IG541:	52,4 s

System information:

Pipe system working pressure:	38,0 bar abs
Container working pressure:	185,3 bar abs
Total network volume:	1,0 l

Pipe system:

Section-No:	Starting-node	Endnode Nozzle	Pressure [bar abs]	Temperature [°C]	Flowrate [kg/s]	Pipedimension Di [mm]	DN
1	0	1	158,41	-11,60	0,72	21,1	3/4
2	1	2	35,86	-54,20	0,72	21,1	3/4
3	2	3	35,73	-53,02	0,72	21,1	3/4
4	3	4	34,57	-46,86	0,72	21,1	3/4
5	4	11005	34,08	-46,96	0,72	21,1	3/4

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	8,4	33,2

Concentrations:

Calculation-zone no:	Gascomposition after the discharge of the design quantity [%] O2	CO2	AR	N2
1	12,4	3,3	17,0	67,3

Total flooded design quantity within discharge time: 33,23 kg

Calculation-zone no:	Gascomposition after total discharge [%] O2	CO2	AR	N2
1	12,4	3,3	17,0	67,3

Total flooded IG541 mass: 33.1 KG

Pressure relief opening:

Calculation-zone no:	Recommended area against overpressure Area [m²]	Overpressure [mbar]	Max. flow [kg/s]
1	0,098	1,0	1,19

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	2,700

Number of bends (+) and elbows (-)

Bend-type	Di [mm]	DN	Number
-90	21,10	3/4	1
-90	21,10	3/4	2

Number of T-distributors (in- and outdiameter)

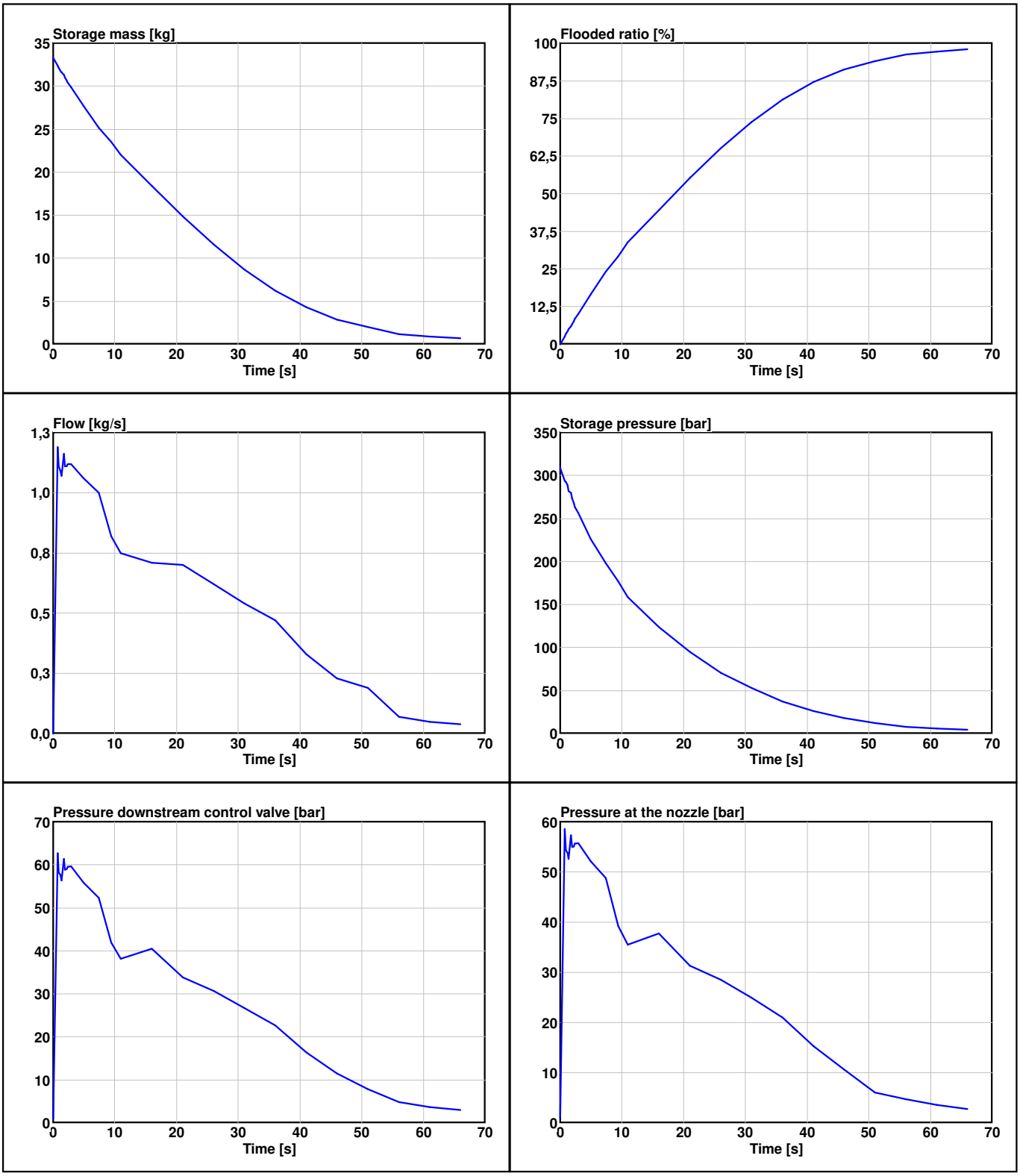
Number	Input	90-out	90-out	0-out

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	33,3	0,0	0,00	308,9	1,0	1,0
0,7	32,4	2,6	1,19	293,5	62,7	58,5
0,9	32,1	3,5	1,11	292,0	58,2	54,3
1,2	31,8	4,3	1,09	288,5	57,7	53,8
1,4	31,6	5,1	1,07	281,6	56,4	52,6
1,7	31,3	6,0	1,16	279,6	61,4	57,3
1,9	31,0	6,8	1,11	273,0	58,9	54,9
2,2	30,7	7,6	1,11	268,1	59,0	55,0
2,4	30,4	8,5	1,12	263,8	59,5	55,6
2,9	29,9	10,2	1,12	256,2	59,6	55,7
4,9	27,7	16,7	1,06	226,2	55,8	52,1
7,4	25,2	24,2	1,00	197,9	52,3	48,8
9,4	23,5	29,3	0,82	177,2	42,0	39,2
11,0	22,0	33,9	0,75	158,5	38,1	35,5
16,0	18,4	44,6	0,71	123,7	40,5	37,7
21,0	14,9	55,3	0,70	94,8	33,8	31,4
26,0	11,6	65,1	0,62	70,7	30,7	28,5
31,0	8,7	73,8	0,54	53,1	26,7	24,9
36,0	6,2	81,3	0,47	37,5	22,7	21,0
41,0	4,3	87,1	0,33	26,4	16,4	15,3
46,0	2,9	91,2	0,23	18,1	11,5	10,7
51,0	2,0	94,1	0,19	12,5	7,9	6,1
56,0	1,2	96,3	0,07	8,0	4,9	4,7
61,0	0,9	97,2	0,05	6,1	3,7	3,6
66,0	0,7	97,9	0,04	4,9	3,0	2,8

Discharge time at valve: 52,4 s


Storage mass [kg]
35
30
25
20
15
10
5
0
0 10 20 30 40 50 60 70
Time [s]
Flooded ratio [%]
100
87,5
75
62,5
50
37,5
25
12,5
0
0 10 20 30 40 50 60 70
Time [s]
Flow [kg/s]
1,3
1,0
0,8
0,5
0,3
0,0
0 10 20 30 40 50 60 70
Time [s]
Storage pressure [bar]
350
300
250
200
150
100
50
0
0 10 20 30 40 50 60 70
Time [s]
Pressure downstream control valve [bar]
70
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70
Time [s]
Pressure at the nozzle [bar]
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70
Time [s]