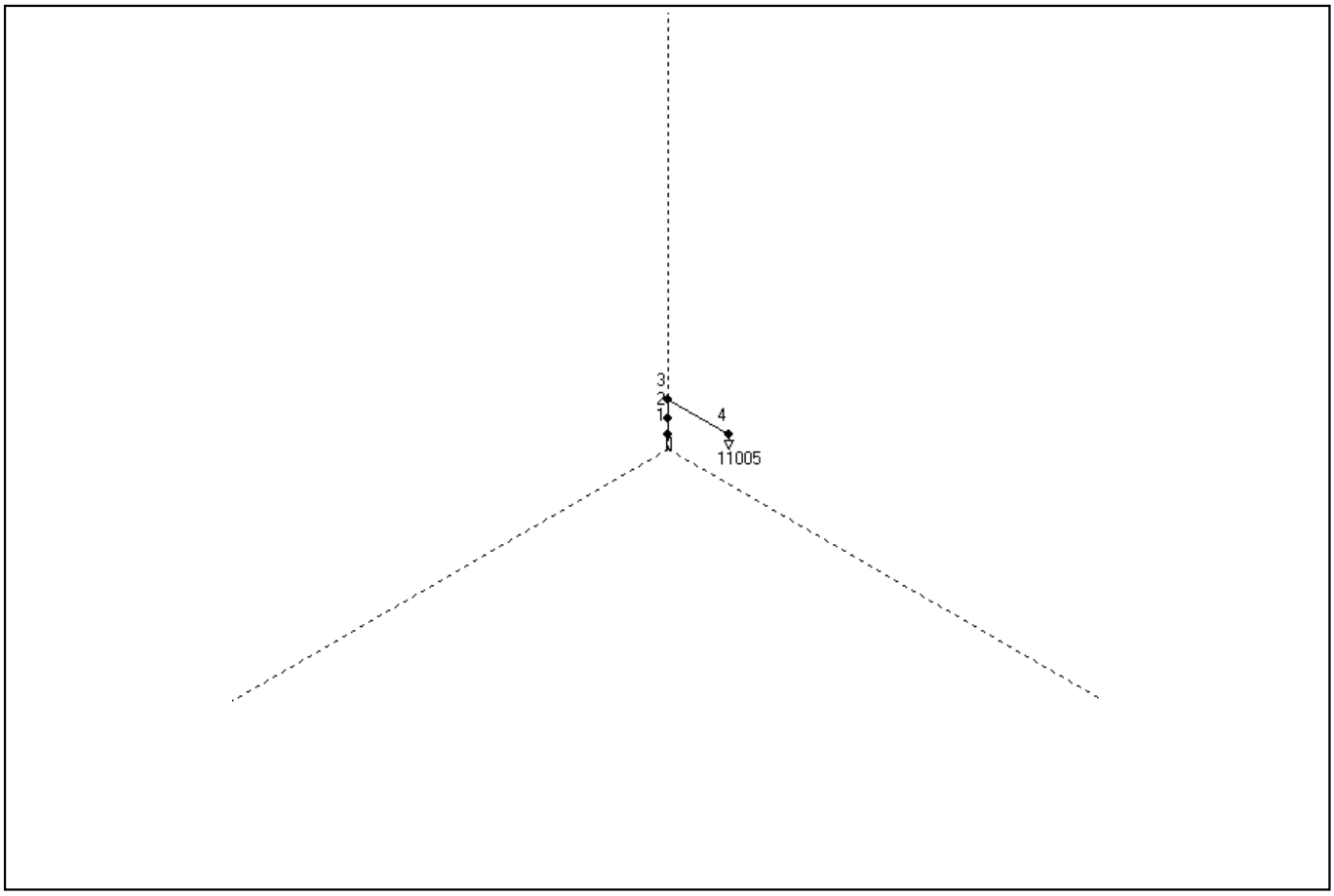
Project:	Urzad Gminy Stegna
Project-No:	
Building:	
Object:	1.9 Archiwum
Contractor:	
Owner:	
Project engineer:	
Date:	27.09.2018
Altitude above sealevel:	1 m
Regulation rule for calculation of IG541 quantities:	ISO 14520-1, Edition 2000

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	0,350	12	21,1		-	-	0
2	1	2	0,350	0,350	12	21,1		-	-	
3	2	3	0,450	0,450	13	21,1		-	-	
4	3	4	2,400	0,000	13	21,1	E	-	-	
5	4	11005	0,150	-0,150	13	21,1	E	-	-	50.0

* 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	69,6	0,0	69,6	1,000	20,0	30,7	1,30	39,9	50,27

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

Calculation results:

IG541 design data:

Design quantity:	50,27
Supplement factor:	1,00
Minimum storage quantitiy:	50,27
Container volume:	140,0 l
Storage temperature:	20,0 °C
Container starting pressure:	308,9 bar abs
IG541-mass in one container:	58,2 kg
Number of containers:	1
Actual storage quantity:	58,2 kg

Discharge time:

Total discharge time of air and IG541:	51,4 s

System information:

Pipe system working pressure:	26,8 bar abs
Container working pressure:	185,3 bar abs
Total network volume:	1,2 l

Pipe system:

Section-No:	Starting-node	Endnode Nozzle	Pressure [bar abs]	Temperature [°C]	Flowrate [kg/s]	Pipedimension Di [mm]	DN
1	0	1	161,28	-10,90	0,87	21,1	3/4
2	1	2	36,74	-53,67	0,87	21,1	3/4
3	2	3	36,33	-52,70	0,87	21,1	3/4
4	3	4	33,18	-48,98	0,87	21,1	3/4
5	4	11005	31,89	-49,86	0,87	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	10,9	50,0

Concentrations:

Calculation-zone no:	Gascomposition after the discharge of the design quantity [%] O2	CO2	AR	N2
1	12,6	3,2	16,5	67,6

Total flooded design quantity within discharge time: 50,27 kg

Calculation-zone no:	Gascomposition after total discharge [%] O2	CO2	AR	N2
1	11,7	3,6	18,3	66,4

Total flooded IG541 mass: 58.0 KG

Pressure relief opening:

Calculation-zone no:	Recommended area against overpressure Area [m²]	Overpressure [mbar]	Max. flow [kg/s]
1	0,143	1,0	1,73

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	3,000

Number of bends (+) and elbows (-)

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

Number of T-distributors (in- and outdiameter)

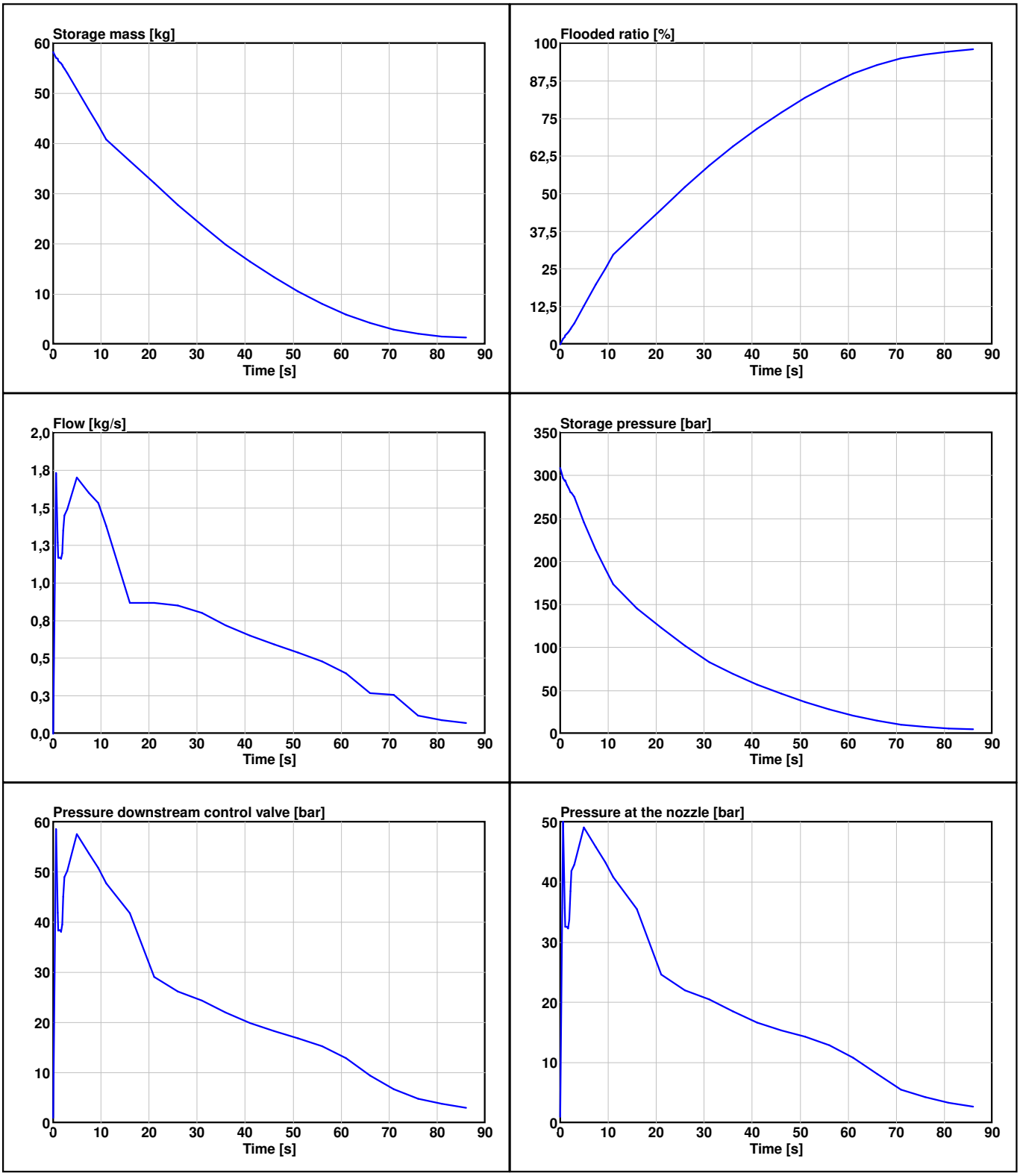
Number	Input	90-out	90-out	0-out

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	58,2	0,0	0,00	308,9	1,0	1,0
0,6	57,1	1,9	1,73	296,7	58,5	50,0
0,9	56,8	2,5	1,27	293,7	41,9	35,7
1,1	56,5	3,0	1,17	294,0	38,3	32,6
1,4	56,2	3,5	1,17	289,3	38,4	32,6
1,6	55,9	4,0	1,16	286,4	38,1	32,3
1,9	55,6	4,5	1,20	283,5	39,5	33,7
2,1	55,3	5,1	1,35	280,7	45,1	38,5
2,4	54,9	5,7	1,45	280,1	49,0	41,9
2,9	54,1	7,0	1,49	275,1	50,2	42,9
4,9	50,8	12,8	1,70	245,6	57,5	49,1
7,4	46,7	19,8	1,60	213,8	53,7	45,8
9,4	43,6	25,1	1,53	191,6	50,8	43,3
11,0	40,8	29,8	1,38	173,8	47,8	40,8
16,0	36,5	37,3	0,87	145,4	41,8	35,5
21,0	32,1	44,8	0,87	123,0	29,1	24,6
26,0	27,8	52,2	0,85	102,1	26,2	22,0
31,0	23,7	59,3	0,80	83,5	24,4	20,5
36,0	19,9	65,8	0,72	69,5	22,0	18,5
41,0	16,5	71,6	0,65	57,3	19,9	16,7
46,0	13,4	76,9	0,59	46,6	18,3	15,4
51,0	10,6	81,8	0,54	36,8	16,9	14,3
56,0	8,1	86,1	0,48	28,3	15,3	12,9
61,0	5,9	89,9	0,40	20,9	12,9	10,9
66,0	4,3	92,7	0,27	15,3	9,4	8,1
71,0	2,9	95,0	0,26	10,7	6,7	5,5
76,0	2,1	96,3	0,12	7,8	4,8	4,3
81,0	1,6	97,2	0,09	6,2	3,8	3,4
86,0	1,3	97,9	0,07	5,1	3,0	2,7

Discharge time at valve: 51,4 s


Storage mass [kg]
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90
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 80 90
Time [s]
Flow [kg/s]
2,0
1,8
1,5
1,3
1,0
0,8
0,5
0,3
0,0
0 10 20 30 40 50 60 70 80 90
Time [s]
Storage pressure [bar]
350
300
250
200
150
100
50
0
0 10 20 30 40 50 60 70 80 90
Time [s]
Pressure downstream control valve [bar]
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90
Time [s]
Pressure at the nozzle [bar]
50
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90
Time [s]