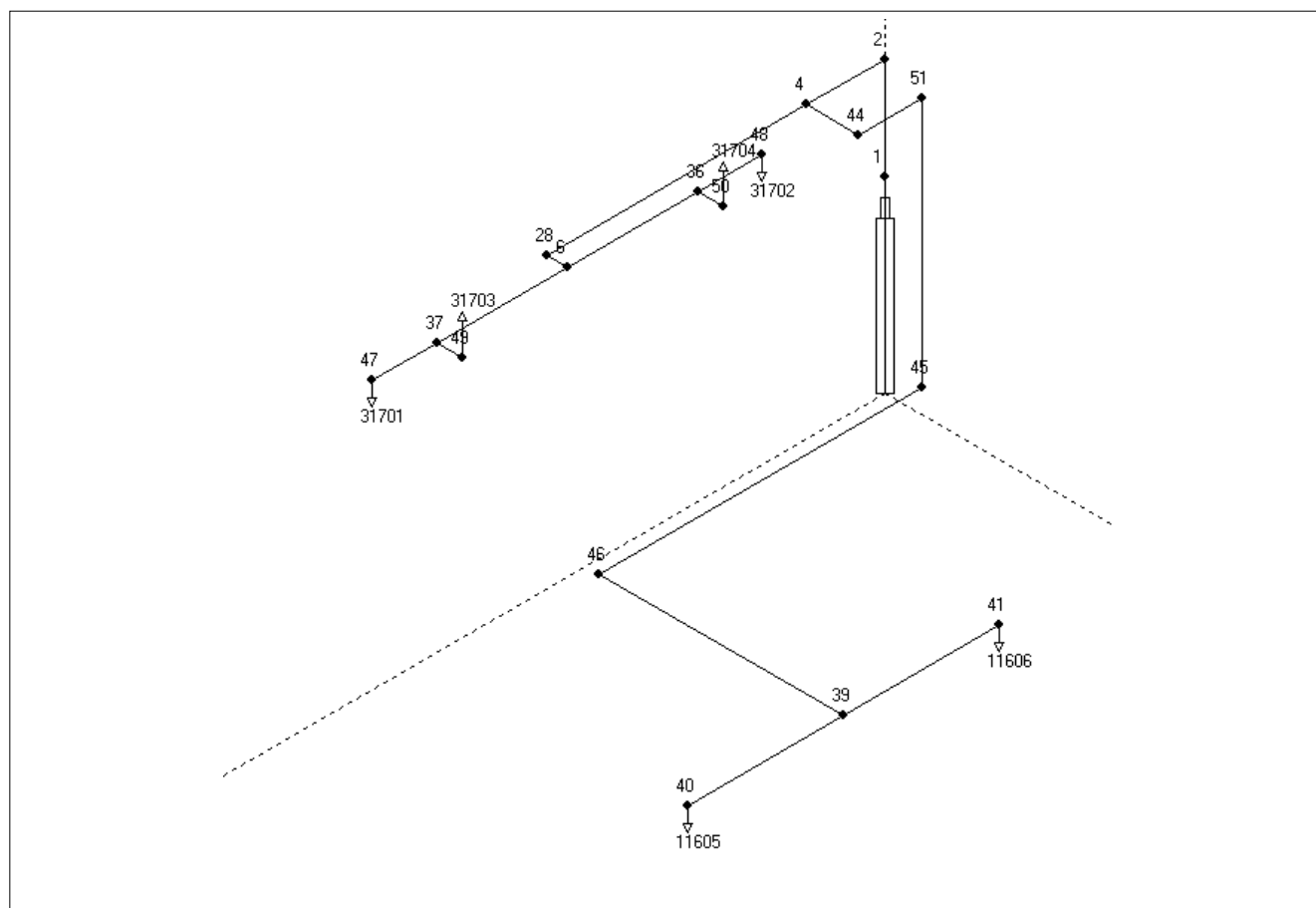




Project: Vrbenskeho kasarna  
Project-No: Hradec Králové  
Building:  
Object:  
Contractor:  
Owner:  
Project engineer:  
Date: 05.05.2023  
Altitude above sealevel: 200 m  
Regulation rule for calculation of FK-5-1-12 quantities: ISO 14520-1, Edition 2000

Pipe catalogue: Wattcom-potrubí-Novec-2021.01.21.rkl  
Component catalogue: Rotarex - Novec-2021.01.21.arm  
Nozzle catalogue: Rotarex - Novec-2021.01.21.noz



**Pipesystem data:**

Section-No:	Starting-node	Endnode	Length [m]	Height [m]	Pipetype	Diameter [mm] **	Fitting *	Component code	coefficient	Nb of containers FK-5-1-12 quantity
1	0	1	0,600	0,600	22	42,6	C	481	7,060	1,0
2	1	2	1,300	1,300	11	35,8		-	-	0,0
3	2	4	0,500	0,000	11	35,8	E	-	-	0,0
4	4	28	2,500	0,000	11	35,8	T-0°	-	-	0,0
5	28	6	0,200	0,000	11	35,8	E	-	-	0,0
6	6	37	1,250	0,000	11	35,8	T-90°	-	-	0,0
7	37	47	0,250	0,000	11	35,8	T-0°	-	-	0,0
8	47	31701	0,100	-0,100	11	35,8	E	-	-	0,0
9	37	49	0,250	0,000	11	15,9	T-90°	-	-	0,0
10	49	31703	0,200	0,200	11	15,9	E	-	-	0,0
11	6	36	1,250	0,000	11	35,8	T-90°	-	-	0,0
12	36	48	0,250	0,000	11	35,8	T-0°	-	-	0,0
13	48	31702	0,100	-0,100	11	35,8	E	-	-	0,0
14	36	50	0,250	0,000	11	15,9	T-90°	-	-	0,0
15	50	31704	0,200	0,200	11	15,9	E	-	-	0,0
16	4	44	0,500	0,000	11	20,9	T-90°	-	-	0,0
17	44	51	0,600	0,000	11	20,9	E	-	-	0,0
18	51	45	3,000	-3,000	11	20,9	E	-	-	0,0
19	45	46	3,100	0,000	11	20,9	E	-	-	0,0
20	46	39	2,350	0,000	11	20,9	E	-	-	0,0
21	39	40	1,500	0,000	11	15,9	T-90°	-	-	0,0
22	40	11605	0,100	-0,100	11	15,9	E	-	-	0,0
23	39	41	1,500	0,000	11	15,9	T-90°	-	-	0,0
24	41	11606	0,100	-0,100	11	15,9	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
22	Sestava hadice	hose
11	Potrubí	galvanized

**Legend of components**

Code	Type	Resistance coefficient
481	Sestava vypouštění B0481	7,060

**Nozzle data:**

No.	Calculation zone	Diameter [mm]
31701	Místnost	4,0
31702	Místnost	4,0
11605	Podlaha	1,9
11606	Podlaha	1,9
31703	Strop	1,6
31704	Strop	1,6

**Legend of nozzles:**

Type	Number of orifices	C1	C2	C3	C4	C5	C6
3 180° 1/2 - 1-1/4	17	0,82800	0,05416	0,00000	0,10826	0,00000	0,00000
1 360° 1/2 - 1-1/4	16	0,82800	0,05416	0,00000	0,10826	0,00000	0,00000

**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 Místnost	124,7	0,0	124,7	3,000	20,0	4,3	1,30	5,6	103,76
2 Podlaha	5,9	0,0	5,9	3,000	20,0	4,3	1,30	5,6	4,86
3 Strop	5,9	0,0	5,9	3,000	20,0	4,3	1,30	5,6	4,86

Regulation rule for calculation of FK-5-1-12 quantities: ISO 14520-1, Edition 2000

Altitude above sealevel: 200,0 m

**FK-5-1-12 storage input data:**

Container volume:	120,0 l
Filling ratio:	-1,070 kg/l (fixed value)
Filling pressure:	50,0 bar abs
Storage temperature:	20,0 °C
Supplement factor:	1,00
Minimum storage quantity:	113,48 kg
Number of containers:	1

**Discharge time (input value):** 10,0 s**Further information:**

Design with included gas discharge time

Design with predetermined orifice diameters

**Calculation results:****FK-5-1-12 storage data:**

Design quantity:	113,5 kg
Supplement factor:	1,00
Minimum storage quantity:	113,5 kg
Container volume:	120,0 l
Filling ratio:	1,07 kg/l
Filling pressure:	50,0 bar abs
FK-5-1-12 -mass per container:	128,4 kg
Number of containers:	1
Actual storage quantity:	128,4 kg
Storage temperature:	20,0 °C
Starting container pressure:	50,0 bar abs

**Discharge time:**

Discharge time air:	0,1 s
Total gas discharge time:	0,9 s
Two-phase discharge time:	7,6 s
Total discharge time:	8,4 s

**System information:**

Container working pressure:	22,3 bar abs
Container working temperature:	14,0 °C
Total network volume:	12,2 l
Medium pipe content:	13,4 kg FK-5-1-12
Filling portion in pipe system:	0,10 kg FK-5-1-12 /kg FK-5-1-12 -storage

**Pipe system:**

Section-No:	Starting-node	Endnode	Pressure [bar abs]	Flowrate [kg/s]	Pipedimension Di [mm]	DN
1	0	1	19,78	14,20	42,6	11/2
2	1	2	19,15	14,20	35,8	11/4
3	2	4	17,26	14,20	35,8	11/4
4	4	28	16,29	12,83	35,8	11/4
5	28	6	14,79	12,83	35,8	11/4
6	6	37	13,51	6,41	35,8	11/4
7	37	47	13,40	5,79	35,8	11/4
8	47	31701	13,09	5,79	35,8	11/4
9	37	49	13,16	0,63	15,9	1/2
10	49	31703	12,94	0,63	15,9	1/2
11	6	36	13,51	6,41	35,8	11/4
12	36	48	13,40	5,79	35,8	11/4
13	48	31702	13,09	5,79	35,8	11/4
14	36	50	13,16	0,63	15,9	1/2
15	50	31704	12,94	0,63	15,9	1/2
16	4	44	15,76	1,38	20,9	3/4
17	44	51	15,25	1,38	20,9	3/4
18	51	45	14,72	1,38	20,9	3/4
19	45	46	14,01	1,38	20,9	3/4
20	46	39	13,33	1,38	20,9	3/4
21	39	40	12,83	0,69	15,9	1/2
22	40	11605	12,48	0,69	15,9	1/2
23	39	41	12,83	0,69	15,9	1/2
24	41	11606	12,48	0,69	15,9	1/2

**Nozzle data:**

Calculation-zone no:	Nozzle no.	Nozzle type	Number of orifices	Pipeconnection Di [mm]	DN	Orifice [mm]	FK-5-1-12 output [kg]
1	31701	3	17	35,8	11/4	4,0	46,2
1	31702	3	17	35,8	11/4	4,0	46,2
2	11605	1	16	15,9	1/2	1,9	5,5
2	11606	1	16	15,9	1/2	1,9	5,5
3	31703	3	17	15,9	1/2	1,6	5,0
3	31704	3	17	15,9	1/2	1,6	5,0

Two-phase discharge time: 7,6 s

MAXIMUM TRANSPORT TIME DIFF. BETWEEN NOZZLES: 11605./ 31702. IS 0.74 S

Calculation-zone no:	Nozzle no.	Outlet velocity [m/s]	Transport time [s]	Jetdistance [m]	Evaporation distance [m]
1	31701	22,6	0,84	1,94	1,40
1	31702	22,6	0,84	1,94	1,40
2	11605	41,8	1,58	1,44	0,40
2	11606	41,8	1,58	1,44	0,40
3	31703	35,2	0,86	1,07	0,40
3	31704	35,2	0,86	1,07	0,40

**Concentrations:**

Calculation- zone no:	O2	Gascomposition after discharge [%]	
		FK-5-1-12	N2
1	19,7	5,6	73,7
2	18,2	13,0	67,9
3	18,4	12,0	68,7

**Pressure relief opening:**

Calculation- zone no:	Recommended area against overpressure		Max. flow [kg/s]
	Area [m <sub>c</sub> ]	Overpressure [mbar]	
1	0,067	3,0	11,6
2	0,010	3,0	1,4
3	0,009	3,0	1,3



**Component list:**

Component	Number	Code	Coefficient
Sestava vypouštění B	1	481	7,100

Nozzle-type	Number	C1	C2	C3	C4	C5	C6
1	2	0,82800	0,05410	0,00000	0,10820	0,00000	0,00000
3	4	0,82800	0,05410	0,00000	0,10820	0,00000	0,00000

Pipe-type	Di [mm]	DN	Length [m]
22	42,60	11/2	0,600
11	35,80	11/4	7,900
11	15,90	1/2	4,200
11	20,90	3/4	9,600

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

Bend-type	Di [mm]	DN	Number
-90	35,80	11/4	4
-90	15,90	1/2	4
-90	20,90	3/4	4

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

Number	Input	90-out	90-out	0-out
1	35,8	20,9	0,0	35,8
1	35,8	35,8	35,8	0,0
2	35,8	15,9	0,0	35,8
1	20,9	15,9	15,9	0,0