

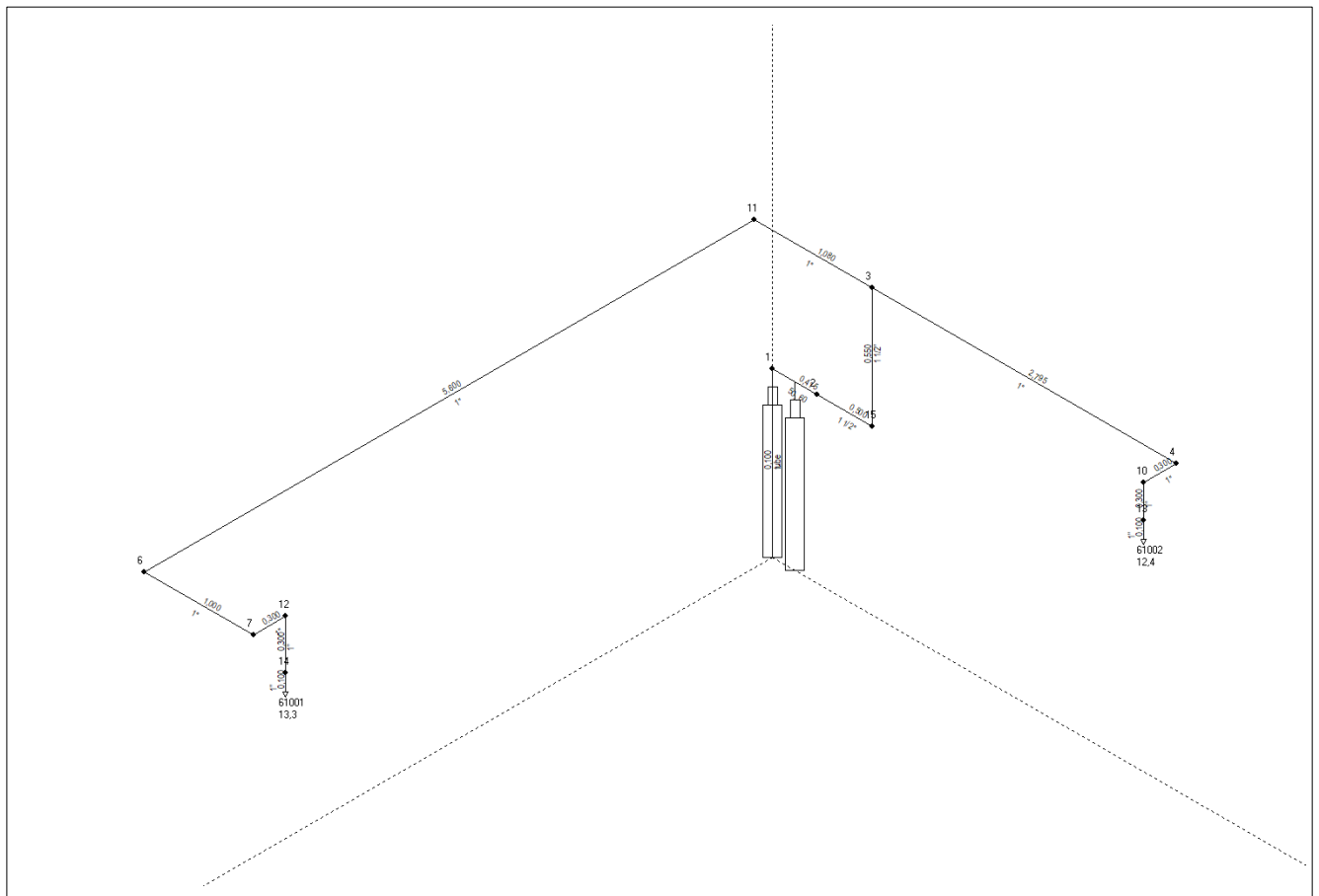
$\pm 0,000 = 295,50$

VEDOUCÍ PROJEKTANT	ZODPOVĚDNÝ PROJ.	VYPRACOVAL	<div>SIEMENS</div> <div>Ingenuity for Life</div> <div>Siemens s.r.o., Siemensova 1 Smart Infrastructure 155 00, Praha 13</div>	
Ing. Antonín Kašpar	Ing. Michal Vavřík	Ing. Marek Kovář		
STAVEBNÍK: NEMOCNICE ZNOJMO, PŘÍSPĚVKOVÁ ORGANIZACE Mudr. Jana Jánského 11 669 01 Znojmo				
AKCE: CHLAZENÍ SERVEROVNY, NEMOCNICE ZNOJMO Mudr. Jana Jánského 11			FORMÁT:	A4
			DATUM:	3 / 2021
STUPEŇ: Projektová dokumentace pro provedení stavby	VÝTISK:			
OBSAH: EPS, SHZ				
ST. OBJEKT: SO-01				
HYDRAULICKÝ VÝPOČET			MĚŘÍTKO --	VÝKRES Č: 002



Project: Nemocnice Zojmo  
Project-No: SI-4-48C-21-0022  
Building:  
Object: Serverovna  
Contractor: Nemocnice Znojmo  
Owner:  
Project engineer: Ing. Marek Kovář  
Date: 04.03.2021  
Altitude above sealevel: 295 m  
Regulation rule for calculation of FK-5-1-12 quantities: ISO 14520-5, Edition 2006

Pipe catalogue: 1230\_FR\_20150727.rkl  
Component catalogue: 1230\_20150727.arm  
Nozzle catalogue: 1230\_20150727.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	0,100	0,100	30	27,0	C	101	7,340	2,0
2	1	2	0,415	0,000	31	52,3	E	-	-	0,0
3	2	15	0,500	0,000	21	40,2		-	-	0,0
4	15	3	0,550	0,550	21	40,2	E	-	-	0,0
5	3	11	1,080	0,000	21	25,6	T-90°	-	-	0,0
6	11	6	5,600	0,000	21	25,6	E	-	-	0,0
7	6	7	1,000	0,000	21	25,6	E	-	-	0,0
8	7	12	0,300	0,000	21	25,6	E	-	-	0,0
9	12	14	0,300	-0,300	21	25,6	E	-	-	0,0
10	14	61001	0,100	-0,100	21	25,6		-	-	0,0
11	3	4	2,795	0,000	21	25,6	T-90°	-	-	0,0
12	4	10	0,300	0,000	21	25,6	E	-	-	0,0
13	10	13	0,300	-0,300	21	25,6	E	-	-	0,0
14	13	61002	0,100	-0,100	21	25,6		-	-	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
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30	Manifolds/diptubes/valve section	smooth
31	Manifolds/diptubes/valve section	galvanized
21	EN 10255-H	galvanized

**Legend of components**

Code	Type	Resistance coefficient
101	VSB33+diptube (Di 27 mm)+FRF33+CAREF33+manifold	7,340

**Nozzle data:**

No.	Calculation zone	Diameter [mm]
61001	Serverovna-místnost	13,3
61002	Serverovna-místnost	12,4

**Legend of nozzles:**

Type	Number of orifices	C1	C2	C3	C4	C5	C6
6 SDNS-x	1	0,07421	0,22694	0,00000	0,20382	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 Serverovna-místn	109,9	0,0	109,9	3,000	20,0	4,3	1,30	5,6	91,24

Regulation rule for calculation of FK-5-1-12 quantities: ISO 14520-5, Edition 2006

Altitude above sealevel: 295,0 m

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

Container volume:	67,0 l
Filling ratio:	-0,720 kg/l (fixed value)
Filling pressure:	42,0 bar abs
Storage temperature:	18,0 °C
Supplement factor:	1,00
Minimum storage quantity:	91,24 kg
Number of containers:	2

**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:	91,2 kg
Supplement factor:	1,00
Minimum storage quantity:	91,2 kg
Container volume:	67,0 l
Filling ratio:	0,72 kg/l
Filling pressure:	42,0 bar abs
FK-5-1-12 -mass per container:	48,2 kg
Number of containers:	2
Actual storage quantity:	96,5 kg
Storage temperature:	18,0 °C
Starting container pressure:	41,4 bar abs

### Discharge time:

Discharge time air:	0,2 s
Total gas discharge time:	0,8 s
Two-phase discharge time:	9,2 s
Total discharge time:	10,1 s

### System information:

Container working pressure:	27,6 bar abs
Container working temperature:	18,0 °C
Total network volume:	7,9 l
Medium pipe content:	11,2 kg FK-5-1-12
Filling portion in pipe system:	0,12 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	25,96	4,69	27,0	tube
2	1	2	25,82	9,41	52,3	50_60
3	2	15	25,73	9,41	40,2	1 1/2"
4	15	3	25,25	9,41	40,2	1 1/2"
5	3	11	24,67	4,70	25,6	1"
6	11	6	22,58	4,70	25,6	1"
7	6	7	21,37	4,70	25,6	1"
8	7	12	20,25	4,70	25,6	1"
9	12	14	19,11	4,70	25,6	1"
10	14	61001	19,10	4,70	25,6	1"
11	3	4	24,31	4,71	25,6	1"
12	4	10	23,32	4,71	25,6	1"
13	10	13	22,32	4,71	25,6	1"
14	13	61002	22,31	4,71	25,6	1"

**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	61001	6	1	25,6	1"	13,3	45,7
1	61002	6	1	25,6	1"	12,4	45,9

Two-phase discharge time: 9,2 s

MAXIMUM TRANSPORT TIME DIFF. BETWEEN NOZZLES: 61002./ 61001. IS 0.66 S

Calculation-zone no:	Nozzle no.	Outlet velocity [m/s]	Transport time [s]	Jetdistance [m]	Evaporation distance [m]
1	61001	30,5	1,53	8,0	4,3
1	61002	30,0	0,87	7,4	4,3

**Concentrations:**

Calculation- zone no:	O2	Gascomposition after discharge [%]	
		FK-5-1-12	N2
1	19,7	5,8	73,6

**Pressure relief opening:**

Calculation- zone no:	Recommended area against overpressure		Max. flow [kg/s]
	Area [m.]	Overpressure [mbar]	
1	0,055	3,0	9,4



**Component list:**

Component	Number	Code	Coefficient
VSB33+diptube (Di 27	1	101	7,300

Nozzle-type	Number	C1	C2	C3	C4	C5	C6
6	2	0,07420	0,22690	0,00000	0,20380	0,00000	0,00000

Pipe-type	Di [mm]	DN	Length [m]
30	27,00	tube	0,100
31	52,30	50_60	0,400
21	40,20	1 1/2"	1,100
21	25,60	1"	11,900

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

Bend-type	Di [mm]	DN	Number
-90	52,30	50_60	1
-90	40,20	1 1/2"	1
-90	25,60	1"	6

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

Number	Input	90-out	90-out	0-out
1	40,2	25,6	25,6	0,0