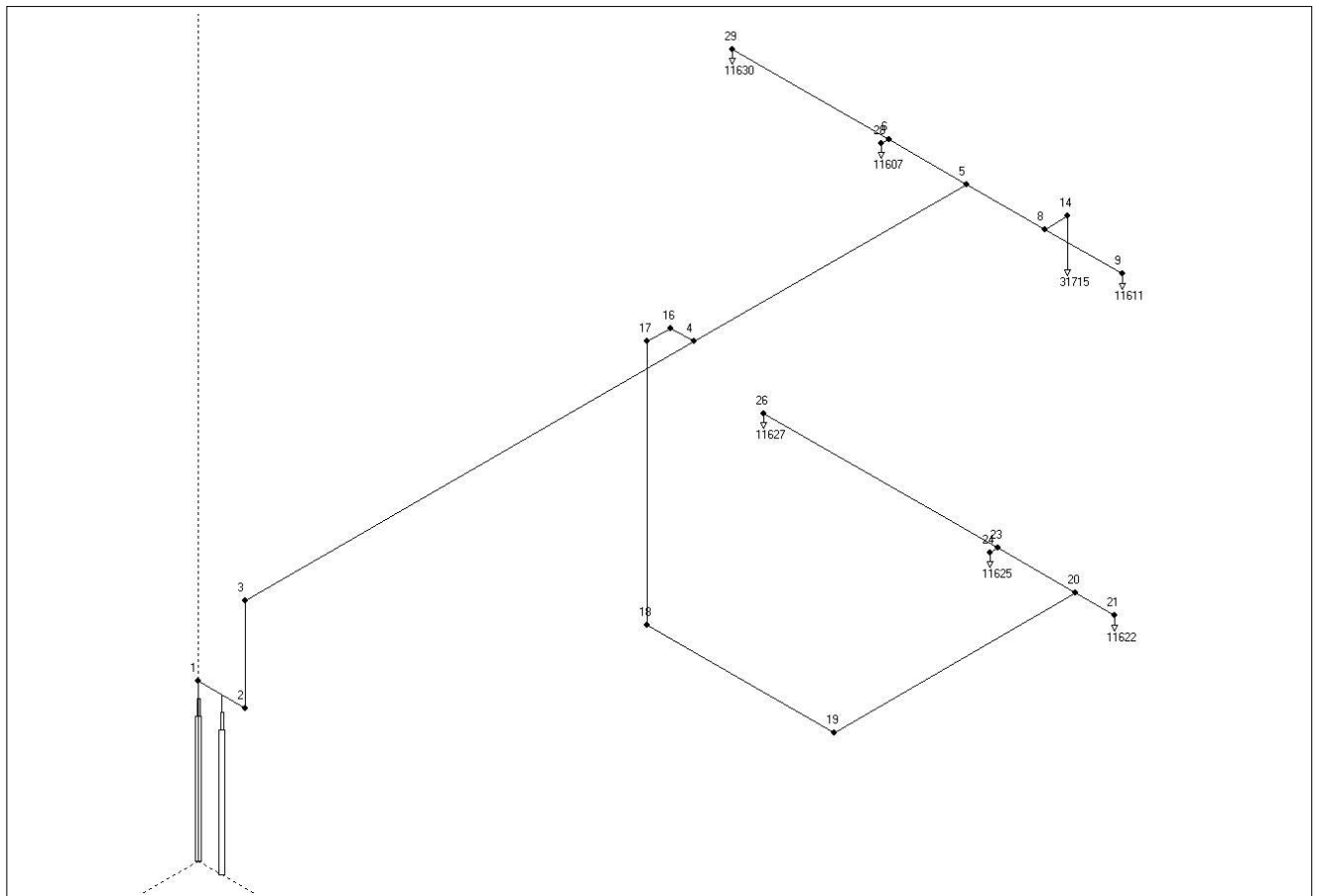




Project: DCI GmbH
Project-No:
Building: Vivantes GmbH
Object: Gebäude 820
Contractor: Serverraum B
Owner:
Project engineer: G.Divkovic
Date: 10.05.2026
Altitude above sealevel: 100 m
Regulation rule for calculation of FK-5-1-12 quantities: VdS 2381, Edition 06-2002

Pipe catalogue: PHMN Sch40-Ansi FK5112.rkl
Component catalogue: Firetec FK5112.arm
Nozzle catalogue: Firetec FK5112.noz



**Pipesystem data:**

Section-No:	Starting-node	Endnode	Length [m]	Height [m]	Pipetype	Diameter [mm] **	Fitting *	Component code	Resistance coefficient	Nb of containers FK-5-1-12 quantity
1	0	1	0,100	0,100	10	42,6	C	481	7,060	2,0
2	1	2	0,600	0,000	41	77,9	E	-	-	0,0
3	2	3	1,200	1,200	41	62,7	E	-	-	0,0
4	3	4	9,600	0,000	41	62,7	E	-	-	0,0
5	4	5	3,500	0,000	41	52,5	T-0°	-	-	0,0
6	5	6	1,000	0,000	41	35,1	T-90°	-	-	0,0
7	6	28	0,100	0,000	41	35,1	T-90°	-	-	0,0
8	28	11607	0,100	-0,100	41	35,1	E	-	-	0,0
9	6	29	2,000	0,000	41	35,1	T-0°	-	-	0,0
10	29	11630	0,100	-0,100	41	35,1	E	-	-	0,0
11	5	8	1,000	0,000	41	52,5	T-90°	-	-	0,0
12	8	14	0,300	0,000	41	15,8	T-90°	-	-	0,0
13	14	31715	0,600	-0,600	41	15,8	E	-	-	0,0
14	8	9	1,000	0,000	41	40,9	T-0°	-	-	0,0
15	9	11611	0,100	-0,100	41	35,1	E	-	-	0,0
16	4	16	0,300	0,000	41	21,0	T-90°	-	-	0,0
17	16	17	0,300	0,000	41	21,0	E	-	-	0,0
18	17	18	3,150	-3,150	41	21,0	E	-	-	0,0
19	18	19	2,000	0,000	41	21,0	E	-	-	0,0
20	19	20	3,100	0,000	41	21,0	E	-	-	0,0
21	20	23	1,000	0,000	41	15,8	T-90°	-	-	0,0
22	23	26	3,000	0,000	41	15,8	T-0°	-	-	0,0
23	26	11627	0,100	-0,100	41	15,8	E	-	-	0,0
24	23	24	0,100	0,000	41	15,8	T-90°	-	-	0,0
25	24	11625	0,100	-0,100	41	15,8	E	-	-	0,0
26	20	21	0,500	0,000	41	15,8	T-90°	-	-	0,0
27	21	11622	0,100	-0,100	41	15,8	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
10	Hoses and Ball Valves	smooth
41	Galv. Sch40 pipe ANSI B36.10 ASgalvanized106 grade B	

Legend of components

Code	Type	Resistance coefficient
481	B0481 FK-5-1-12	7,060



Nozzle data:

No.	Calculation zone	Diameter [mm]
11607	Raum	3,5
11611	Raum	3,5
11630	Raum	3,5
31715	Kaltgang	1,9
11622	Doppelboden	1,6
11625	Doppelboden	1,6
11627	Doppelboden	1,6

Legend of nozzles:

Type	Number of orifices	C1	C2	C3	C4	C5	C6
1 Firetec FK-5-1-12 36	16	0,82800	0,05416	0,00000	0,10826	0,00000	0,00000
3 Firetec FK-5-1-12 18	17	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]	Total surface [m2]	Max. Over-pressure [mbar]	Design temp. [°C]	Extinguish-conc. [% Vol]	Design factor	Design conc. [% Vol]	Design quantity [kg]
1 Raum	160,5	0,0	160,5	0,0	2,000	20,0	4,5	1,30	5,8	137,77
2 Kaltgang	13,6	0,0	13,6	0,0	2,000	20,0	4,5	1,30	5,8	11,68
3 Doppelboden	20,0	0,0	20,0	0,0	2,000	20,0	4,5	1,30	5,8	17,14

Regulation rule for calculation of FK-5-1-12 quantities: VdS 2381, Edition 06-2002

FK-5-1-12 storage input data:

Container volume: 120,0 l
Filling ratio: 1,000 kg/l
Filling pressure: 50,0 bar abs
Storage temperature: 15,0 °C
Supplement factor: 1,10
Minimum storage quantity: 183,24 kg
Number of containers: 2

Discharge time (input value): 10,0 s

Further information:

Design with predetermined orifice diameters



Calculation results:

FK-5-1-12 storage data:

Design quantity:	166,6 kg
Supplement factor:	1,10
Minimum storage quantity:	183,2 kg
Container volume:	120,0 l
Filling ratio:	0,76 kg/l
Filling pressure:	50,0 bar abs
FK-5-1-12 -mass per container:	91,6 kg
Number of containers:	2
Actual storage quantity:	183,2 kg
Storage temperature:	15,0 °C
Starting container pressure:	48,8 bar abs

Discharge time:

Discharge time air:	0,5 s
Total gas discharge time:	1,1 s
Two-phase discharge time:	7,1 s
Total discharge time:	8,2 s

System information:

Container working pressure:	26,6 bar abs
Container working temperature:	13,9 °C
Total network volume:	53,0 l
Medium pipe content:	76,6 kg FK-5-1-12
Filling portion in pipe system:	0,46 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	25,18	11,13	42,6	
2	1	2	25,02	22,26	77,9 *	3
3	2	3	24,43	22,26	62,7 *	21/2
4	3	4	23,75	22,26	62,7 *	21/2
5	4	5	23,40	20,09	52,5 *	2
6	5	6	22,70	11,94	35,1 *	11/4
7	6	28	21,72	5,71	35,1 *	11/4
8	28	11607	21,43	5,71	35,1 *	11/4
9	6	29	22,28	6,23	35,1 *	11/4
10	29	11630	21,98	6,23	35,1 *	11/4
11	5	8	22,90	8,15	52,5 *	2
12	8	14	22,71	1,80	15,8 *	1/2
13	14	31715	21,81	1,80	15,8 *	1/2
14	8	9	22,84	6,36	40,9 *	11/2
15	9	11611	22,52	6,36	35,1 *	11/4
16	4	16	23,42	2,17	21,0 *	3/4
17	16	17	22,52	2,17	21,0 *	3/4
18	17	18	21,43	2,17	21,0 *	3/4
19	18	19	20,22	2,17	21,0 *	3/4
20	19	20	18,81	2,17	21,0 *	3/4
21	20	23	17,81	1,47	15,8 *	1/2
22	23	26	17,32	0,42	15,8 *	1/2
23	26	11627	17,05	0,42	15,8 *	1/2
24	23	24	16,43	1,06	15,8 *	1/2
25	24	11625	16,18	1,06	15,8 *	1/2
26	20	21	18,02	0,69	15,8 *	1/2
27	21	11622	17,74	0,69	15,8 *	1/2

* Attention! This pipe dimension is not in the pipe catalogue!



Nozzle data:

Calculation- zone no:	Nozzle no.	Nozzle type	Number of orifices	Pipeconnection Di [mm]	DN	Orifice [mm]	FK-5-1-12 out- put [kg]
1	11607	1	16	35,1	11/4	3,5	42,7
1	11611	1	16	35,1	11/4	3,5	47,6
1	11630	1	16	35,1	11/4	3,5	46,6
2	31715	3	17	15,8	1/2	1,9	13,4
3	11622	1	16	15,8	1/2	1,6	5,2
3	11625	1	16	15,8	1/2	1,6	7,9
3	11627	1	16	15,8	1/2	1,6	3,1

Two-phase discharge time: 7,1 s

MAXIMUM TRANSPORT TIME DIFF. BETWEEN NOZZLES: 11627./ 11607. IS 0.65 S

Calculation- zone no:	Nozzle no.	Outlet velocity [m/s]	Transport time [s]	Jetdistance [m]	Evaporation distance [m]
1	11607	27,0	3,08	1,93	1,30
1	11611	25,3	3,65	1,84	1,40
1	11630	25,2	3,52	1,84	1,40
2	31715	29,0	3,44	1,10	0,70
3	11622	41,4	3,33	1,20	0,40
3	11625	24,0	3,35	0,81	0,60
3	11627	68,5	3,73	1,73	0,30



Concentrations:

Calculation- zone no:	O2	Gascomposition after discharge [%]	
		FK-5-1-12	N2
1	19,6	6,2	73,2
2	19,4	7,1	72,5
3	19,7	6,0	73,4

Pressure relief opening:

Calculation- zone no:	Recommended area against overpressure		Max. flow [kg/s]
	Area [m ²]	Overpressure [mbar]	
1	0,131	2,0	18,3
2	0,013	2,0	1,8
3	0,015	2,0	2,2



Component list:

Component	Number	Code	Coefficient
B0481 FK-5-1-12	1	481	7,100

Nozzle-type	Number	C1	C2	C3	C4	C5	C6
1	6	0,82800	0,05410	0,00000	0,10820	0,00000	0,00000
3	1	0,82800	0,05410	0,00000	0,10820	0,00000	0,00000

Pipe-type	Di [mm]	DN	Length [m]
10	42,60		0,100
41	77,90	3	0,600
41	62,70	2 1/2	10,800
41	52,50	2	4,500
41	35,10	1 1/4	3,400
41	15,80	1/2	5,800
41	40,90	1 1/2	1,000
41	21,00	3/4	8,800

Number of bends (+) and elbows (-)

Bend-type	Di [mm]	DN	Number
-90	77,90	3	1
-90	62,70	2 1/2	2
-90	35,10	1 1/4	3
-90	15,80	1/2	4
-90	21,00	3/4	4

Number of T-distributors (in- and outdiameter)

Number	Input	90-out	90-out	0-out
1	62,7	21,0	0,0	52,5
1	52,5	35,1	52,5	0,0
1	35,1	35,1	0,0	35,1
1	52,5	15,8	0,0	40,9
1	21,0	15,8	15,8	0,0
1	15,8	15,8	0,0	15,8