



VAE SPRINKLERS, s.r.o.
nám. J. Gagarina 233/1
710 00 Ostrava
tel: +420 734 586 401
vae.sprinklers@vaesprinklers.cz
www.vaesprinklers.cz

STUPEŇ DOKUMENTACE/DOCUMENTATION PHASE

**DOKUMENTACE PRO PROVEDENÍ
STAVBY**

ČÍSLO PARÉ/SET NO.

ČÁST PROJEKTU/PART OF PROJECT

D.1.4.7 STABILNÍ HASICÍ ZAŘÍZENÍ

VYPRACOVAL/ELABORATED BY

Ing. Vladimír Svárovský

KONTROLOVAL/CHECKED BY

Ing. Vladimír Svárovský

DATUM/DATE

6.3.2021

Č. ZAK./CONTRACT NO.

2020-2-013

NÁZEV PROJEKTU/
PROJECT NAME

**ROZŠÍŘENÍ PBZ NA SKLADĚ PHL
ČEPRO A.S. KLOBOUKY**

MĚŘÍTKO/SCALE

-

MÍSTO STAVBY/SITE LOCATION

KLOBOUKY U BRNA

REVIZE/REVISION

0

INVESTOR

ČEPRO a.s., Dělnická 213/12, 170 00 Praha 7

NÁZEV VÝKRESU/TITLE

SO239 - HYDRAULICKÝ VÝPOČET

VÝKRES ČÍSLO/DRAWING NO.

14

HYDRAULIC CALCULATIONS for

Job Information

Project Name : ROZŠÍŘENÍ PBZ NA SKLADĚ PHL, ČEPRO A.S. KLOBOUKY

Contract No. : 2020-2-013

City: Klobouky u Brna, Czech republic 691 72

Project Location: Klobouky u Brna 860

Date: 09.11.2020

Contractor Information

Name of Contractor: VAE SPRINKLERS, s.r.o.

Address: nám. J. Gagarina 233/1

City: Ostrava, CZ 710 00

Phone Number: +420734649187

E-mail: vladimir.svarovsky@vaesprinklers.cz

Name of Designer: Ing. Vladimír Svárovský

Authority Having Jurisdiction: ČSN EN 13565-2

Design

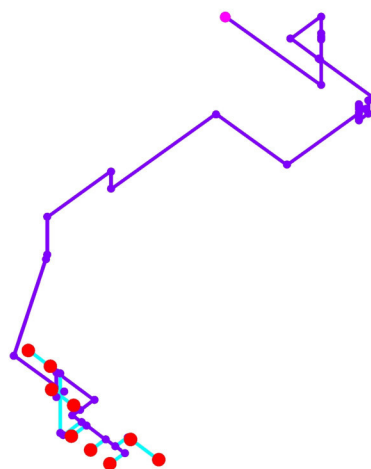
Remote Area Name	3
Remote Area Location	SO239
Occupancy Classification	
Density (l/min/m²)	8,9
Area of Application (m²)	57,6
Coverage per Sprinkler (m²)	6,4
Number of Calculated Sprinklers	9
In-Rack Demand (l/min)	0
Special Heads	
Hose Streams (l/min)	0
Total Water Required (incl. Hose Streams) (l/min)	824,99
Required Pressure at Source (bar)	5,08
Type of System	Wet
Volume - Downstream DPV (l)	0 l

Water Supply Information

Date	9.11.2020
Location	Požární nádrž - UPA 300/65
Source	W1

Notes

Diagram for Design Area : 3



Hydraulic Analysis for : 3**Calculation Info**

Calculation Mode
 Hydraulic Model
 Fluid Name
 Fluid Weight, (N/m³)
 Fluid Dynamic Viscosity, (Pa·s)

Demand
 Darcy-Weisbach
 Water @ 60F (15.6C)
 9803,04
 1,125E-3

Water Supply Parameters

Supply 1 : W1

Flow (l/min)	Pressure (bar)
0	14,7
2000	12,9
2667	12,3
3333	11,6
4167	10,6
5000	9
5833	6,7

Supply Analysis

Node at Source	Static Pressure (bar)	Residual Pressure (bar)	Flow (l/min)	Available Pressure (bar)	Total Demand (l/min)	Required Pressure (bar)
W1	14,7	12,9	2000	14,35	824,99	5,08

Hoses

Inside Hose Flow / Standpipe Demand (l/min)

Outside Hose Flow (l/min)

Additional Outside Hose Flow (l/min)

Other (custom defined) Hose Flow (l/min)

Total Hose Flow (l/min)

Sprinklers

Ovehead Sprinkler Flow (l/min)

824,99

InRack Sprinkler Flow (l/min)

0

Other (custom defined) Sprinkler Flow (l/min)

0

Total Sprinkler Flow (l/min)

824,99

Other

Required Margin of Safety (bar)

0

W1 - Pressure (bar)

5,08

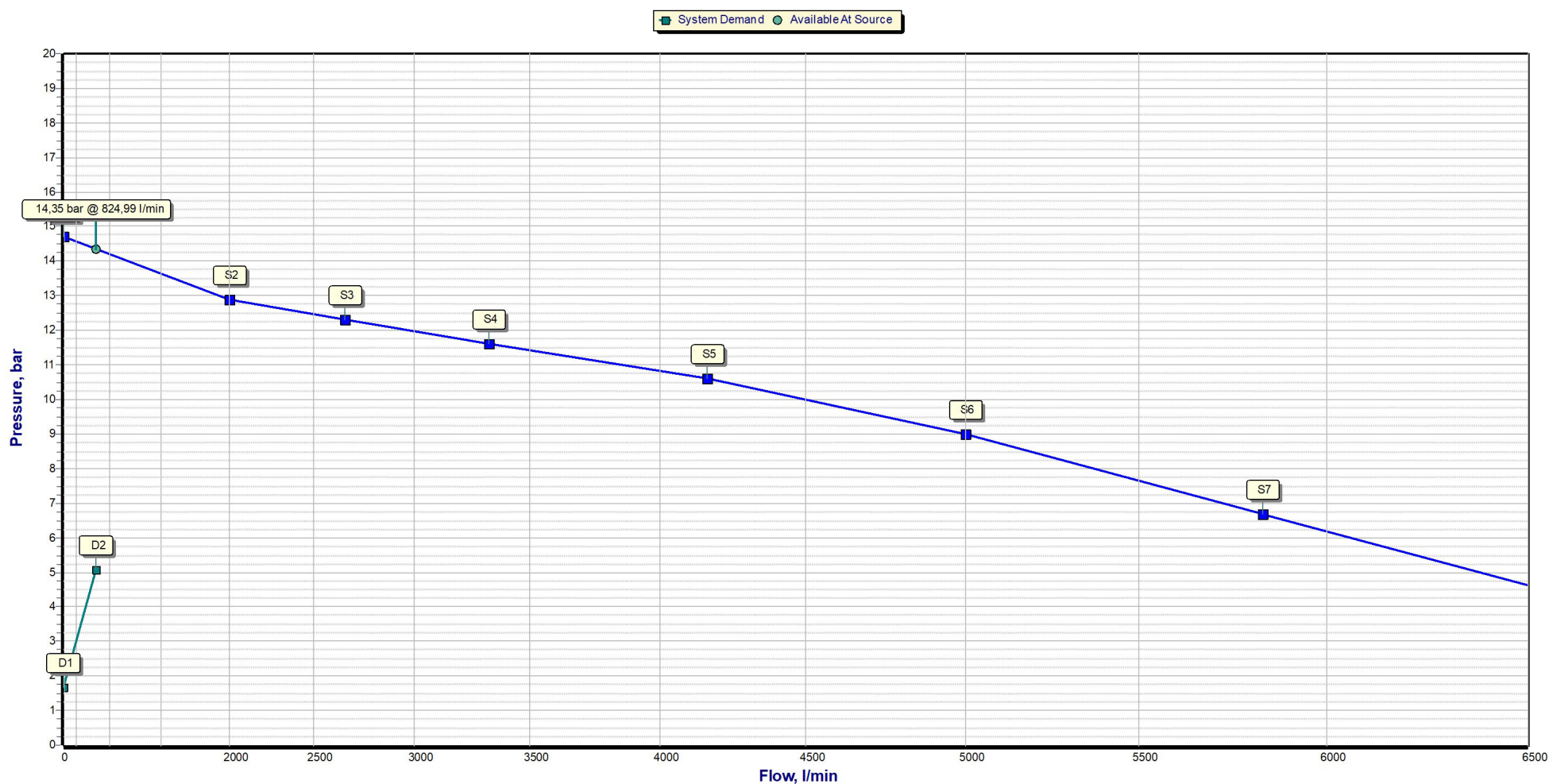
W1 - Flow (l/min)

824,99

Demand w/o System Pump(s)

N/A

Hydraulic Analysis for : 3



Hydraulic Analysis for : 3**Graph Labels**

Label	Description	Values	
		Flow (l/min)	Pressure (bar)
S1	Supply point #1 - Static	0	14,7
S2	Supply point #2	2000	12,9
S3	Supply point #3	2667	12,3
S4	Supply point #4	3333	11,6
S5	Supply point #5	4167	10,6
S6	Supply point #6	5000	9
S7	Supply point #7	5833	6,7
D1	Elevation Pressure	0	1,66
D2	System Demand	824,99	5,08

Curve Intersections & Safety Margins

Curve Name	Intersection		Safety Margin	
	Pressure (bar)	Flow (l/min)	Pressure (bar)	@ Flow (l/min)
Supply	13,49	1613,65	9,27	824,99

Open Heads

Head Ref.	Head Type	Coverage	K-Factor	Required			Calculated		
				Density	Flow	Pressure	Density	Flow	Pressure
		(m2)	(lpm/bar1)	(l/min/m2)	(l/min)	(bar)	(l/min/m2)	(l/min)	(bar)
S1	Overhead Sprinkler	6,4	80,7	8,2	52,8	0,5	14,1	90,36	1,25
S2	Overhead Sprinkler	6,4	80,7	8,2	52,8	0,5	14,8	94,73	1,38
S3	Overhead Sprinkler	6,4	80,7	8,2	52,8	0,5	16,9	107,89	1,79
S4	Overhead Sprinkler	6,4	80,7	8,2	52,8	0,5	16,9	107,97	1,79
S5	Overhead Sprinkler	6,4	80,7	8,2	52,8	0,5	16,9	108,24	1,8
S6	Overhead Sprinkler	6,4	80,7	8,2	52,8	0,5	8,9	57,07	0,5
S7	Overhead Sprinkler	6,4	80,7	8,2	52,8	0,5	9,3	59,31	0,54
S8	Overhead Sprinkler	6,4	80,7	8,2	52,8	0,5	15,9	101,57	1,58
S9	Overhead Sprinkler	6,4	80,7	8,2	52,8	0,5	15,3	97,86	1,47

Node Data

Node#	Hgroup	K-Fact.	Open/Closed	Tot. Pres.	Req. Pres.	Discharge	Overdischarge	Density	Req. Density	Coverage
		lpm/bar1		bar	bar	l/min	l/min	l/min/m2	l/min/m2	m2
01	NODE			1,49						
02	NODE			1,97						
03	NODE			1,97						
05	NODE			1,97						
06	NODE			1,98						
07	NODE			1,99						
08	NODE			2,01						
09	NODE			2,02						
10	NODE			2,06						
11	NODE			2,16						
12	NODE			2,48						
13	NODE			2,51						
14	NODE			2,63						
15	NODE			3,17						
16	NODE			3,19						
17	NODE			2,9						
18	NODE			3,04						
19	NODE			3,27						
20	NODE			3,5						
21	NODE			3,67						
22	NODE			3,85						
23	NODE			3,88						
24-I	NODE			3,96						
24-O	NODE			3,91						
25-I	NODE			4,08						
25-O	NODE			3,97						
26-I	NODE			4,17						
26-O	NODE			4,12						
27	NODE			4,21						
28	NODE			4,22						
29	NODE			4,09						
30	NODE			4,09						
31-I	NODE			4,28						
31-O	NODE			4,2						
32	NODE			4,36						
33	NODE			4,36						
34-I	NODE			4,57						
34-O	NODE			4,53						
35-I	NODE			4,6						
35-O	NODE			4,6						
37	NODE			5,07						
38	NODE			1,75						
39	NODE			1,71						
40	NODE			0,64						

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Node Data

Node#	Hgroup	K-Fact.	Open/Closed	Tot. Pres.	Req. Pres.	Discharge	Overdischarge	Density	Req. Density	Coverage
		lpm/bar1		bar	bar	l/min	l/min	l/min/m2	l/min/m2	m2
S1	HEAD	80,7	Open	1,25	0,5	90,36	37,56	14,1	8,2	6,4
S2	HEAD	80,7	Open	1,38	0,5	94,73	41,93	14,8	8,2	6,4
S3	HEAD	80,7	Open	1,79	0,5	107,89	55,09	16,9	8,2	6,4
S4	HEAD	80,7	Open	1,79	0,5	107,97	55,17	16,9	8,2	6,4
S5	HEAD	80,7	Open	1,8	0,5	108,24	55,44	16,9	8,2	6,4
S6	HEAD	80,7	Open	0,5	0,5	57,07	4,27	8,9	8,2	6,4
S7	HEAD	80,7	Open	0,54	0,5	59,31	6,51	9,3	8,2	6,4
S8	HEAD	80,7	Open	1,58	0,5	101,57	48,77	15,9	8,2	6,4
S9	HEAD	80,7	Open	1,47	0,5	97,86	45,06	15,3	8,2	6,4
W1	SUPPLY			5,08		-824,99				

Pipe Data

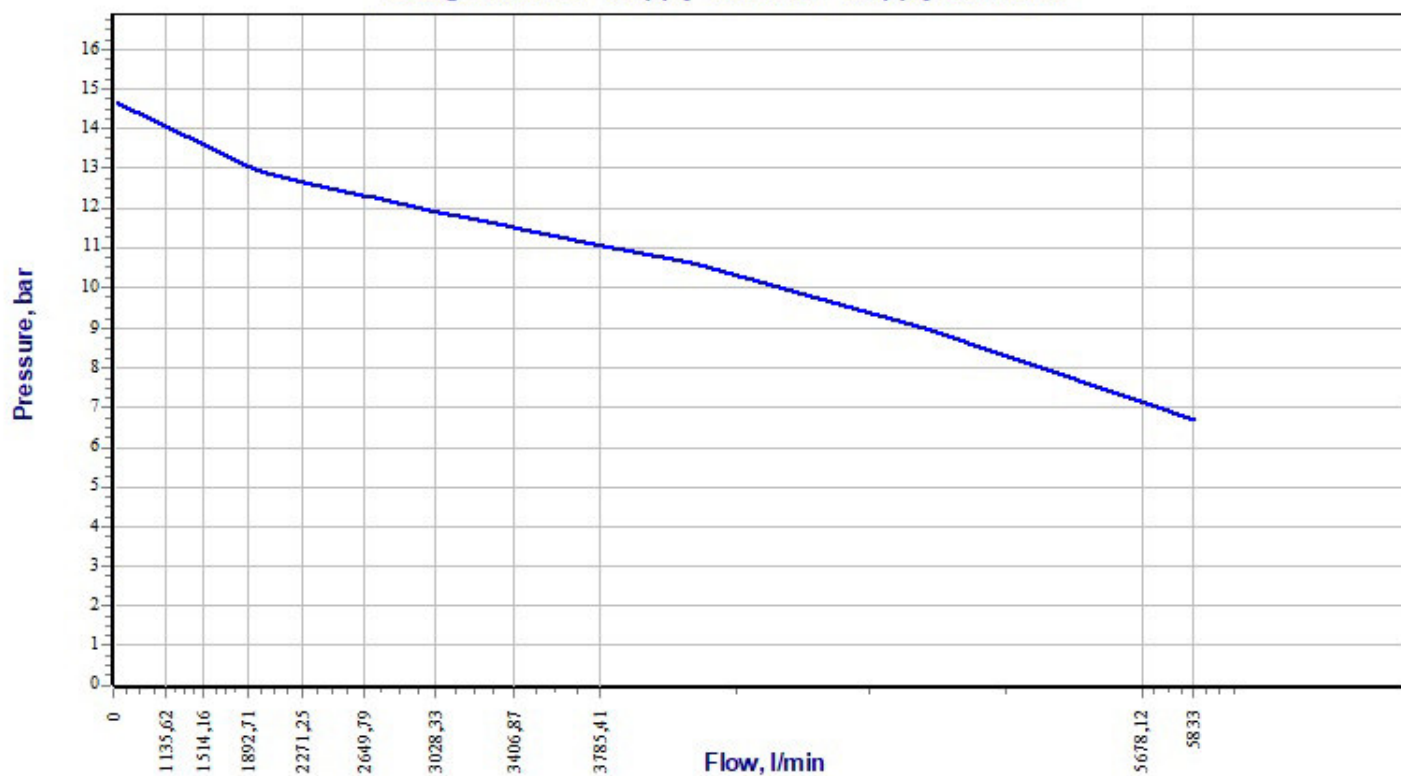
Pipe	Start	End	Size	ID	HWC	Len.	Fitt	Eq. L.	Tot. L.	Vel.	Loss Fr.	Loss El.	Flow
				mm		m		m	m	m/s	bar	bar	l/min
52	24-I	24-O	80		0	0,116				0	0,04	0,01	824,99
51	25-I	25-O	80		0	0,4				0	0,07	0,04	824,99
50	26-I	26-O	80		0	0,116				0	0,04	0,01	824,99
53	31-I	31-O	65		0	0,116				0	0,09	0	824,99
55	34-I	34-O	200		0	0,356				0	0,01	0,03	824,99
54	35-I	35-O	200		0	0,06				0	0	0,01	824,99
32	30	29	200	210,1	120	0,5	1(VdS.90w);	2,64	3,14	0,4	0	0	824,99
35	33	32	200	210,1	120	3,256	1(VdS.90w);	2,64	5,896	0,4	0	0	824,99
36	34-O	33	200	210,1	120	1,744				0,4	0	0,17	824,99
37	35-O	34-I	200	210,1	120	0,24				0,4	0	0,02	824,99
38	37	35-I	200	210,1	120	4,8	1(eu.90w);	2,6	7,4	0,4	0	0,47	824,99
04	02	03	65	70,9	120	1,038	1(VdS.Tee-Run);			0,46	0	0	107,89
40	W1	37	200	163,6	140	10,137				0,65	0,00	0	824,99
07	05	02	65	70,9	120	1,01	1(VdS.Tee-Run);			1,24	0,00	0	292,97
30	28	27	100	107,9	120	1	1(VdS.90w);	1,43	2,43	1,5	0,01	0	824,99
31	29	28	100	107,9	120	1,4	1(VdS.90w);	1,43	2,83	1,5	0,01	-0,14	824,99
08	06	05	65	70,9	120	2,048	1(VdS.Tee-Run);			1,69	0,01	0	400,94
47	S7	S6	25	26,6	120	2,347				1,71	0,04	0	57,07
09	07	06	65	70,9	120	0,52	1(VdS.Tee-Run);			2,15	0,00	0	509,18
27	25-O	24-I	80	83,1	120	0,1				2,54	0	0,01	824,99
28	26-O	25-I	80	83,1	120	0,384				2,54	0,00	0,04	824,99
29	27	26-I	80	83,1	120	0,3	1(VdS.90w);	1,1	1,4	2,54	0,01	0,03	824,99
10	08	07	65	70,9	120	0,997	1(VdS.90w);	0,88	1,877	2,64	0,02	0	625,56
11	09	08	65	70,9	120	0,82	1(VdS.Tee-Run);			2,64	0,01	0	625,56
01	S2	S1	25	26,6	120	3				2,71	0,12	0	90,36
42	S8	S9	25	26,6	120	2,347				2,93	0,11	0	97,86
06	03	S3	25	26,6	120	1,586	1(VdS.Tee-Br);	1,54	3,126	3,24	0,18	0	107,89
49	05	S4	25	26,6	120	1,586	1(VdS.Tee-Br);	1,54	3,126	3,24	0,18	0	107,97
48	06	S5	25	26,6	120	1,586	1(VdS.Tee-Br);	1,54	3,126	3,25	0,18	0	108,24
12	10	09	65	70,9	120	1,519	1(VdS.90w);	0,88	2,399	3,48	0,05	0	824,99
13	11	10	65	70,9	120	4,063	1(VdS.90w);	0,88	4,943	3,48	0,1	0	824,99
14	12	11	65	70,9	120	2,6	1(VdS.90w);	0,88	3,48	3,48	0,07	0,25	824,99
15	13	12	65	70,9	120	0,83	1(VdS.90w);	0,88	1,71	3,48	0,03	0	824,99
16	14	13	65	70,9	120	5,336	1(VdS.90w);	0,88	6,216	3,48	0,12	0	824,99
17	15	14	65	70,9	120	13,406	1(elbow.22.5);	0,457	13,863	3,48	0,27	0,26	824,99
18	16	15	65	70,9	120	0,5	1(VdS.90w);	0,88	1,38	3,48	0,03	0	824,99
19	17	16	65	70,9	120	4	1(VdS.90w);	0,88	4,88	3,48	0,09	-0,39	824,99
20	18	17	65	70,9	120	6,745	1(VdS.90w);	0,88	7,625	3,48	0,15	0	824,99
21	19	18	65	70,9	120	1,8	1(VdS.90w);	0,88	2,68	3,48	0,05	0,18	824,99
22	20	19	65	70,9	120	11,097	1(VdS.90w);	0,88	11,977	3,48	0,23	0	824,99
23	21	20	65	70,9	120	7,499	1(VdS.90w);	0,88	8,379	3,48	0,16	0	824,99
24	22	21	65	70,9	120	8,309	1(VdS.90w);	0,88	9,189	3,48	0,18	0	824,99
25	23	22	65	70,9	120	0,706	1(VdS.90w);	0,88	1,586	3,48	0,03	0	824,99
26	24-O	23	65	70,9	120	0,284				3,48	0,01	0,03	824,99

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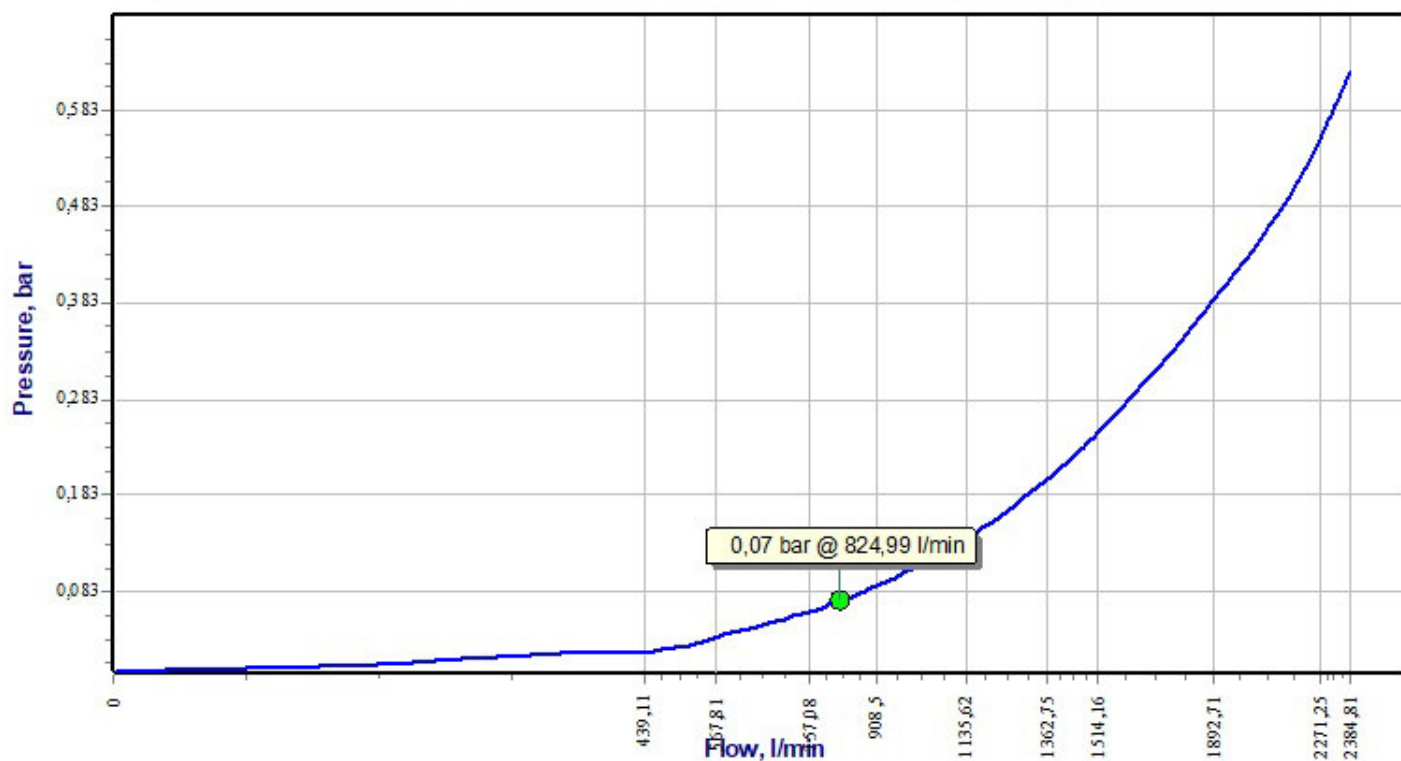
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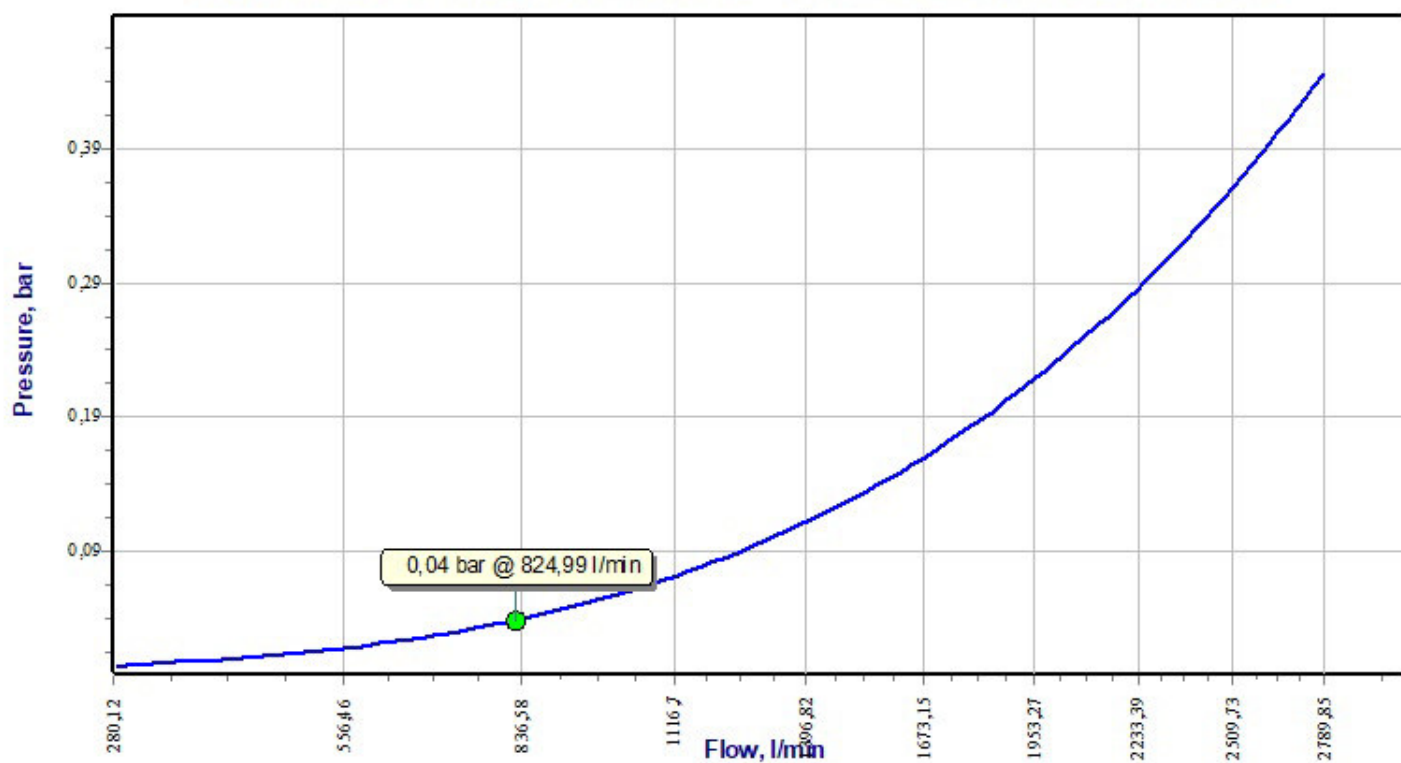
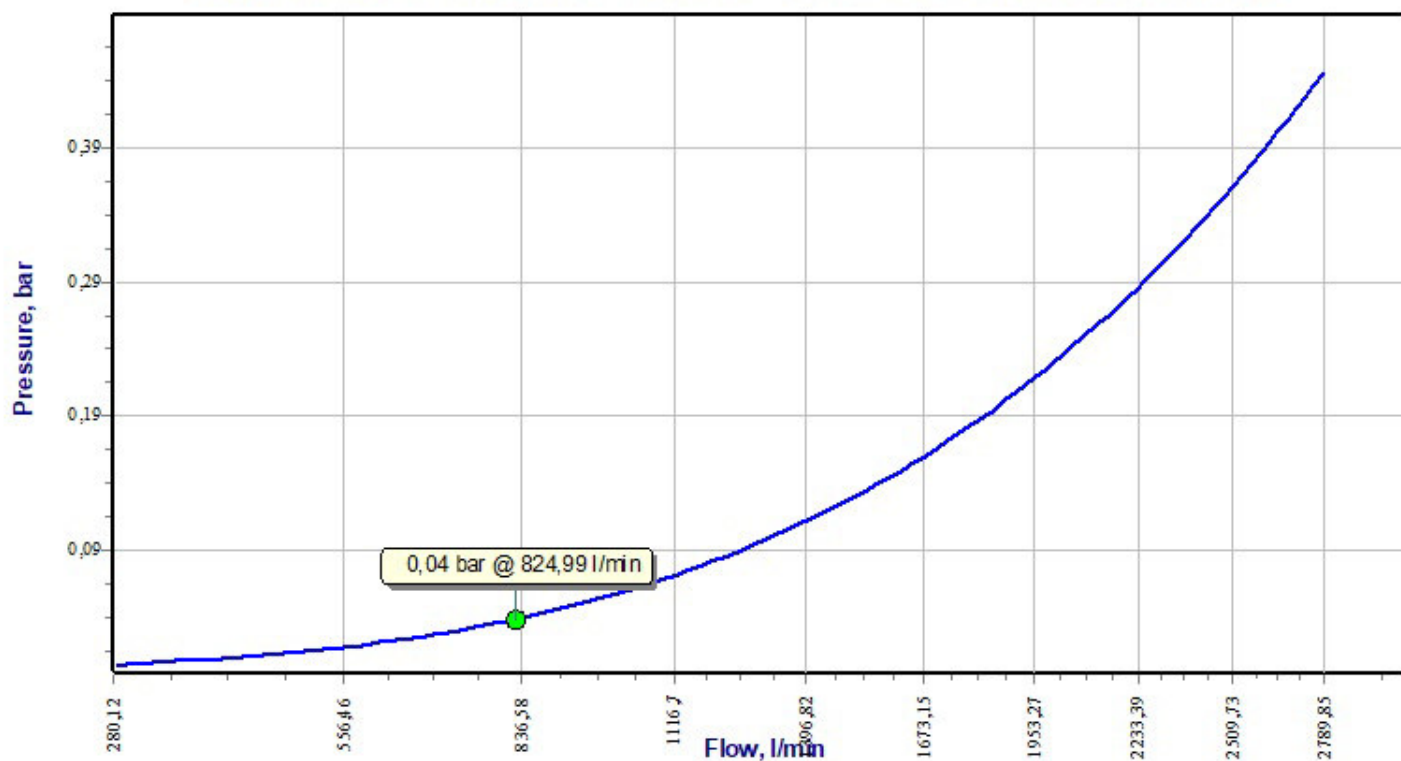
Pipe	Start	End	Size	ID	HWC	Len.	Fitt	Eq. L.	Tot. L.	Vel.	Loss Fr.	Loss El.	Flow
				mm		m		m	m	m/s	bar	bar	l/min
33	31-O	30	65	70,9	120	5,627				3,48	0,11	0	824,99
34	32	31-I	65	70,9	120	3	1(VdS.90w);	0,88	3,88	3,48	0,08	0	824,99
46	40	S7	25	26,6	120	1,054	1(VdS.90w);	0,36	1,414	3,49	0,1	0	116,38
45	39	40	25	26,6	120	6,3	1(VdS.90w);	0,36	6,66	3,49	0,45	0,62	116,38
44	38	39	25	26,6	120	0,3	1(VdS.90w);	0,36	0,66	3,49	0,04	0	116,38
43	07	38	25	26,6	120	1,946	1(VdS.Tee-Br);	1,54	3,486	3,49	0,24	0	116,38
02	01	S2	25	26,6	120	0,3	1(VdS.90w);	0,36	0,66	5,55	0,11	0	185,09
03	02	01	25	26,6	120	1,317	1(VdS.Tee-Br);	1,54	2,857	5,55	0,48	0	185,09
41	09	S8	25	26,6	120	0,68	1(VdS.Tee-Br);	1,54	2,22	5,98	0,43	0	199,43

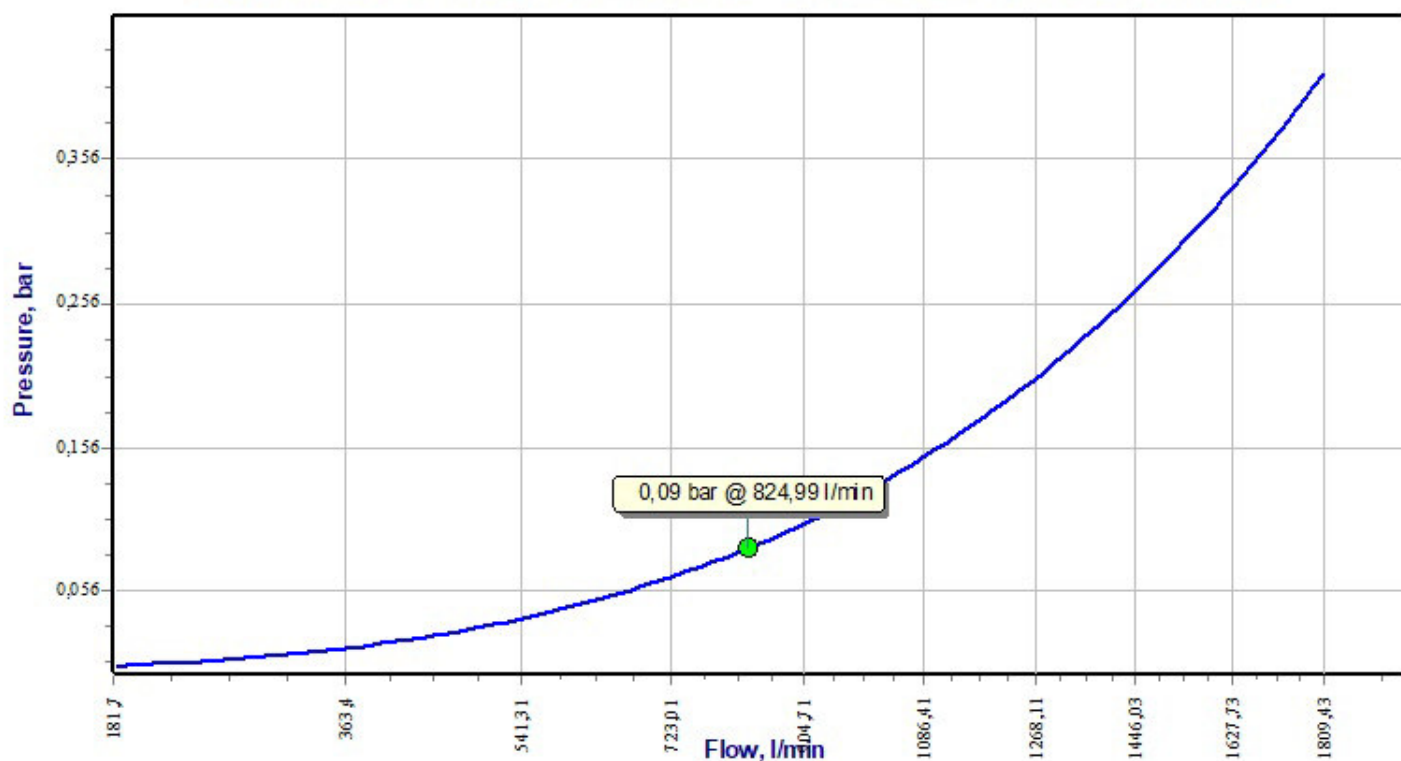
Pressure vs. Flow Function
Design Area: 3; Supply Ref.: W1; Supply Name:W1



Pressure Loss Function
Design Area: 3; DPV Ref.: 51 (DV-5 deluge, Size = 80); Inlet Node: 25-I; Outlet Node: 25-O



Pressure Loss Function**Design Area: 3; Valve Ref.: 50 (BFV-N, Size = 80); Inlet Node: 26-I; Outlet Node: 26-O****Pressure Loss Function****Design Area: 3; Valve Ref.: 52 (BFV-N, Size = 80); Inlet Node: 24-I; Outlet Node: 24-O**

Pressure Loss Function**Design Area: 3; Valve Ref.: 53 (BFV-N, Size = 65); Inlet Node: 31-I; Outlet Node: 31-O****Pressure Loss Function****Design Area: 3; Valve Ref.: 54 (BFV-N, Size = 200); Inlet Node: 35-I; Outlet Node: 35-O**