Frese OPTIMA Compact ANSI
- pressure independent balancing & control valve

Application

Frese OPTIMA Compact pressure independent balancing & control valve (PIBCV) is used in heating and cooling systems in applications with Fan Coil Units, Chilled Beams, Air Handling Units, Heat Exhangers or Mixing Circuits.

Frese OPTIMA Compact provides modulating control with full authority regardless of any fluctuations in the differential pressure of the system.

Frese OPTIMA Compact combines an externally adjustable automatic balancing valve, a differential pressure control valve and a full authority modulating control valve.

Frese OPTIMA Compact makes it simple to achieve 100% control of the water flow in the building, while creating high comfort and energy savings at the same time.
An additional benefit is that no balancing is required if further stages are added to the system, or if the dimensioned capacity is changed.

Energy saving due to optimal control, lower flow and pump pressure. Maximized ΔT due to faster response and increased system stability.

Benefits

Design
- Less time to define the necessary equipment for a hydraulic balanced system (only flow data are required)
- No need to calculate valve authority - always one
- Flexibility if the system is modified after the initial installation

Installation
- No further regulating valves required in the distribution pipework when Frese OPTIMA Compact is installed at the units
- Total number of valves minimized due to the 3-in-1 design
- Minimized commissioning time due to automatic balancing of the system
- No minimum straight pipe lengths required before or after the valve

Operation
- High comfort for the end-users due to high precision temperature control
- Longer life due to less movements of the actuator

Features

- The presetting function has no impact on the stroke; Full stroke modulation at all times, regardless the preset flow
- Regulation characteristic remains unchanged regardless of preset flow
- The constant differential pressure across the modulating control component guarantees 100% authority
- Automatic balancing eliminates overflows, regardless of fluctuating pressure conditions in the system
- Motoric actuator 0-10 V and 3 point control
- Differential pressure operating range up to 116 PSI
- High flows with minimal required differential pressure due to advanced design of the valve
- Small dimensions due to compact housing
- Higher presetting precision due to stepless analogue scale

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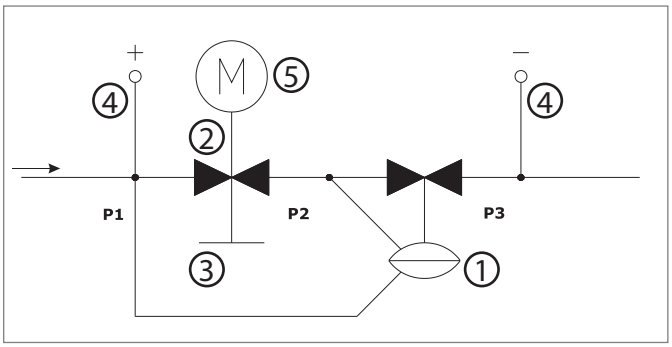
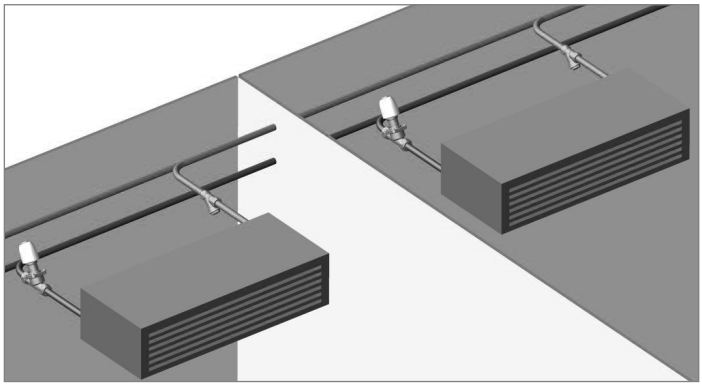




Design

The design of Frese OPTIMA Compact combines high performance and a compact design.
The main components of the valve are:

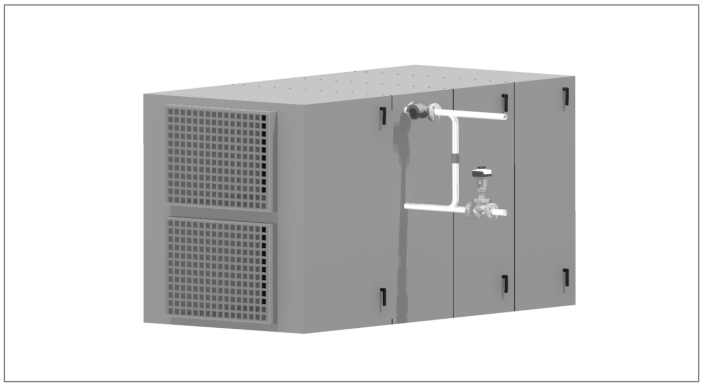
① Differential pressure control

② Modulating control component

③ Presetting scale

④ P/T Plugs

⑤ Actuator



Function

Frese OPTIMA Compact can be flushed and commissioned before the actuator is installed.

The presetting of the dial is user-friendly requiring only a simple flow vs. presetting graph.

Once the flow is set, the actuator can be mounted and the valve ready to operate.

For lowest energy consumption, check the differential pressure at the index valve to set the pump at minimum speed.

Operating Pressure

The Frese OPTIMA Compact can operate to a maximum differential pressure of 116 PSI (8 bar).

Close Off Pressure

The Frese OPTIMA Compact is capable of closing against the following differential pressure to EN 1349 Class IV:

2½" to 5": 116 PSI (8 bar) - based on 800N actuator force
6": 116 PSI (8 bar) - based on 1100N actuator force

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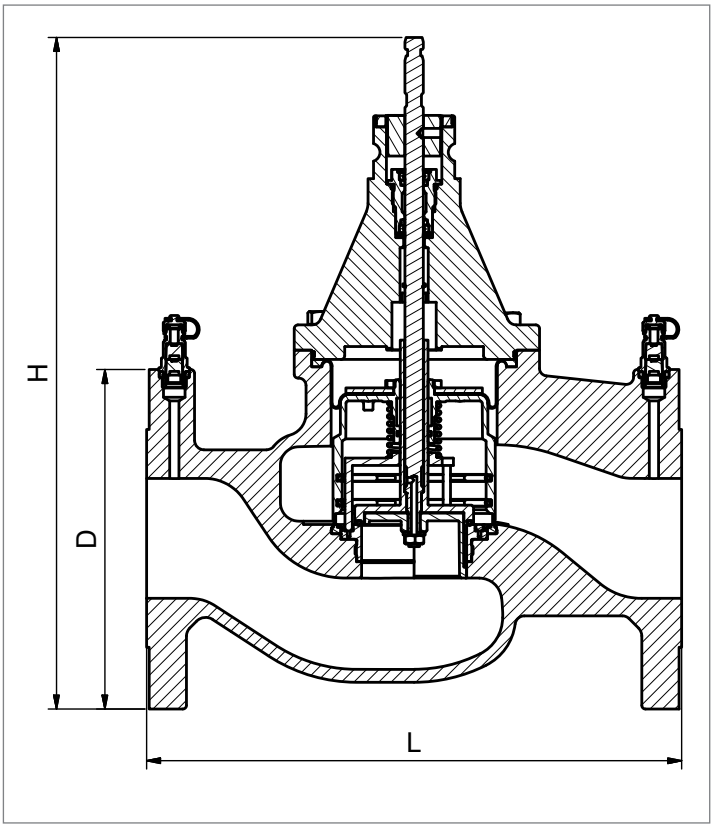
Technical data 2½" - 3"

Valve housing:	ASTM A 126 Class B
DP controller:	Stainless steel
Spring:	Stainless steel
Diaphragm:	Reinforced EPDM
O-rings:	EPDM
Pressure class:	ANSI 125 / ANSI 250
Stroke:	0.79" (20 mm)
Max. differential pressure:	116 PSI
Medium temperature range:	32°F - 248°F

The pipe system shall be properly ventilated to avoid risk of air pockets. Glycolic mixtures up to 50% are applicable (both ethylene and propylene). Frese A/S can accept no responsibility if another actuator is used instead of the Frese actuator recommendation: Water treatment to VDI 2035.



Dimension & Weight 2½" & 3"

Dim.		2½"	3"
		ISO	ISO
Dimensions inches (mm)	L	11.4 (290)	12.2 (310)
	H	15.1 (384)	16.3 (413)
	D	7.28 (185)	7.87 (200)
Weight lb (kg)	ANSI 125	41.0 (18.6)	61.3 (27.8)
	ANSI 250	54.5 (24.7)	79.8 (36.2)

Flow

Dim.		2½"		3"	
Type		LF	HF	LF	HF
Flow	m^3/h	4.38 - 25.00	5.95 - 35.00	5.34 - 34.00	7.02 - 43.00
	l/s	1.216 - 6.945	1.654 - 9.724	1.484 - 9.450	1.951 - 11.954
	gpm	19.27 - 110.06	26.21 - 154.11	25.53 - 149.78	30.92 - 189.47

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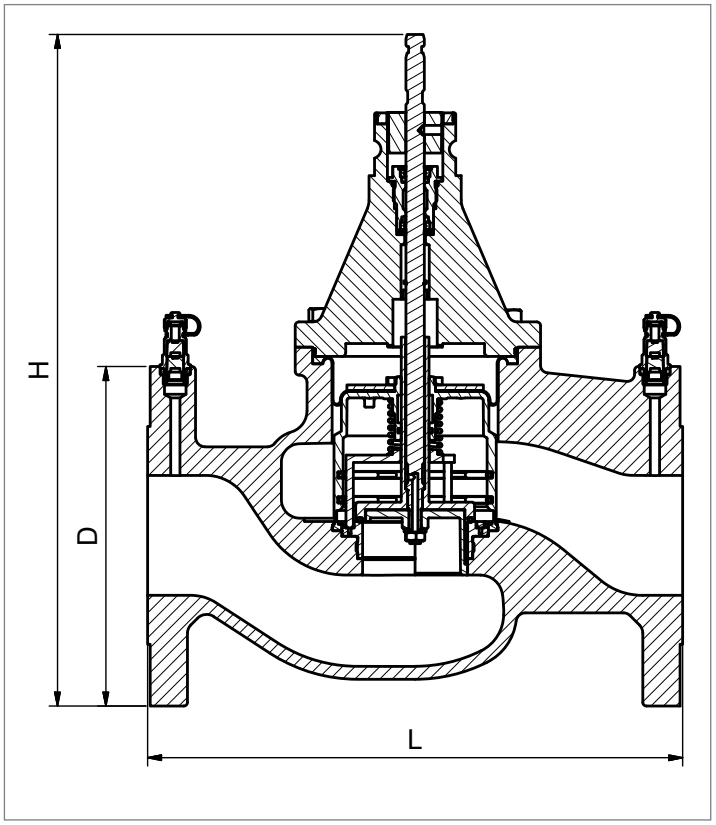
Technical data 4" - 6"

Valve housing:	ASTM A 126 Class B
DP controller:	Stainless steel
Spring:	Stainless steel
Diaphragm:	Reinforced EPDM
O-rings:	EPDM
Pressure class:	ANSI 125 / ANSI 250
Stroke	1.58" (40 mm)
Max. differential pressure:	116 PSI
Medium temperature range	32°F - 248°F



The pipe system shall be properly ventilated to avoid risk of air pockets. Glycolic mixtures up to 50% are applicable (both ethylene and propylene). Frese A/S can accept no responsibility if another actuator is used instead of the Frese actuator recommendation: Water treatment to VDI 2035.

Dimension & Weight 4" - 6"

Dim.		4"	5"	6"
		ISO	ISO	ISO
Dimensions inches (mm)	L	13.8 (350)	15.8 (400)	18.9 (480)
	H	22.3 (566)	23.9 (608)	26.6 (676)
	D	9.25 (235)	10.6 (270)	11.2 (285)
Weight lb (kg)	ANSI 125	123.7 (56.1)	171.3 (77.7)	241.0 (109.3)
	ANSI 150	157.2 (71.3)	221,6 (100.5)	310.9 (141.0)

Flow

Dim.		4"		5"		6"	
Type		LF	HF	LF	HF	LF	HF
Flow	m^3/h	12.1- 68.0	14.8 - 90.0	18.5 -110.0	23.0 - 135.0	25.6 - 148.0	32.0 - 195.0
	l/s	2.917 - 19.444	3.750 - 25.000	5.139 - 30.556	6.389 - 37.500	7.111 - 41.110	8.889 - 54.168
	gpm	46.23-308.20	59.44-396.26	81.45-484.32	101.26-594.39	112.71-651.59	140.89-858.56

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Product programme

Dim.	Type	GPM	ANSI 125	ANSI 250
2½"	Low Flow PT	19.27 - 110.06	53-1241	53-1261
2½"	High Flow PT	26.21 - 154.11	53-1251	53-1271
3"	Low Flow PT	25.53 - 149.78	53-1242	53-1262
3"	High Flow PT	30.92 - 189.47	53-1252	53-1272
4"	Low Flow PT	46.23-308.20	53-1243	53-1263
4"	High Flow PT	59.44-396.26	53-1253	53-1273
5"	Low Flow PT	81.45-484.32	53-1244	53-1264
5"	High Flow PT	101.26-594.39	53-1254	53-1274
6"	Low Flow PT	112.71-651.59	53-1245	53-1265
6"	High Flow PT	140.89-858.56	53-1255	53-1275

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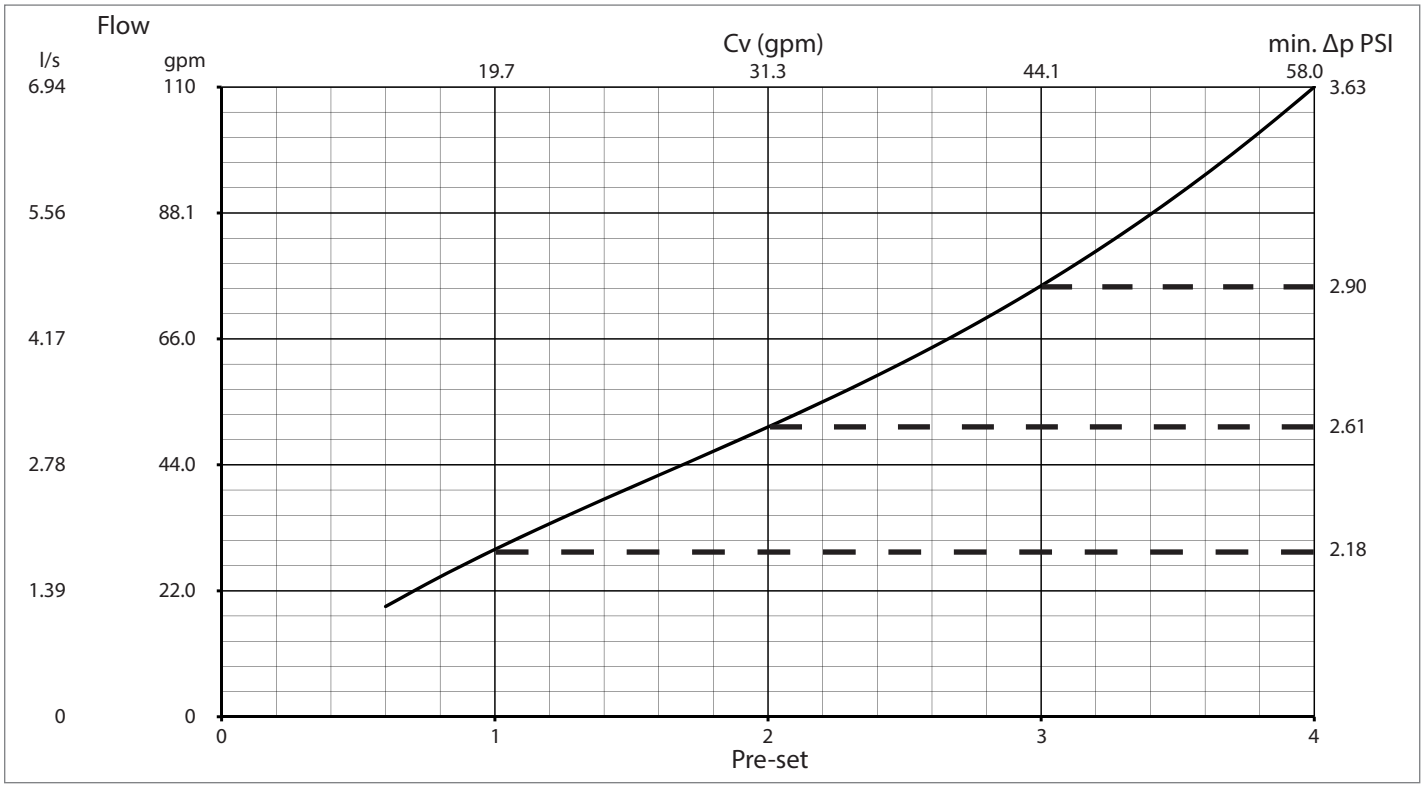
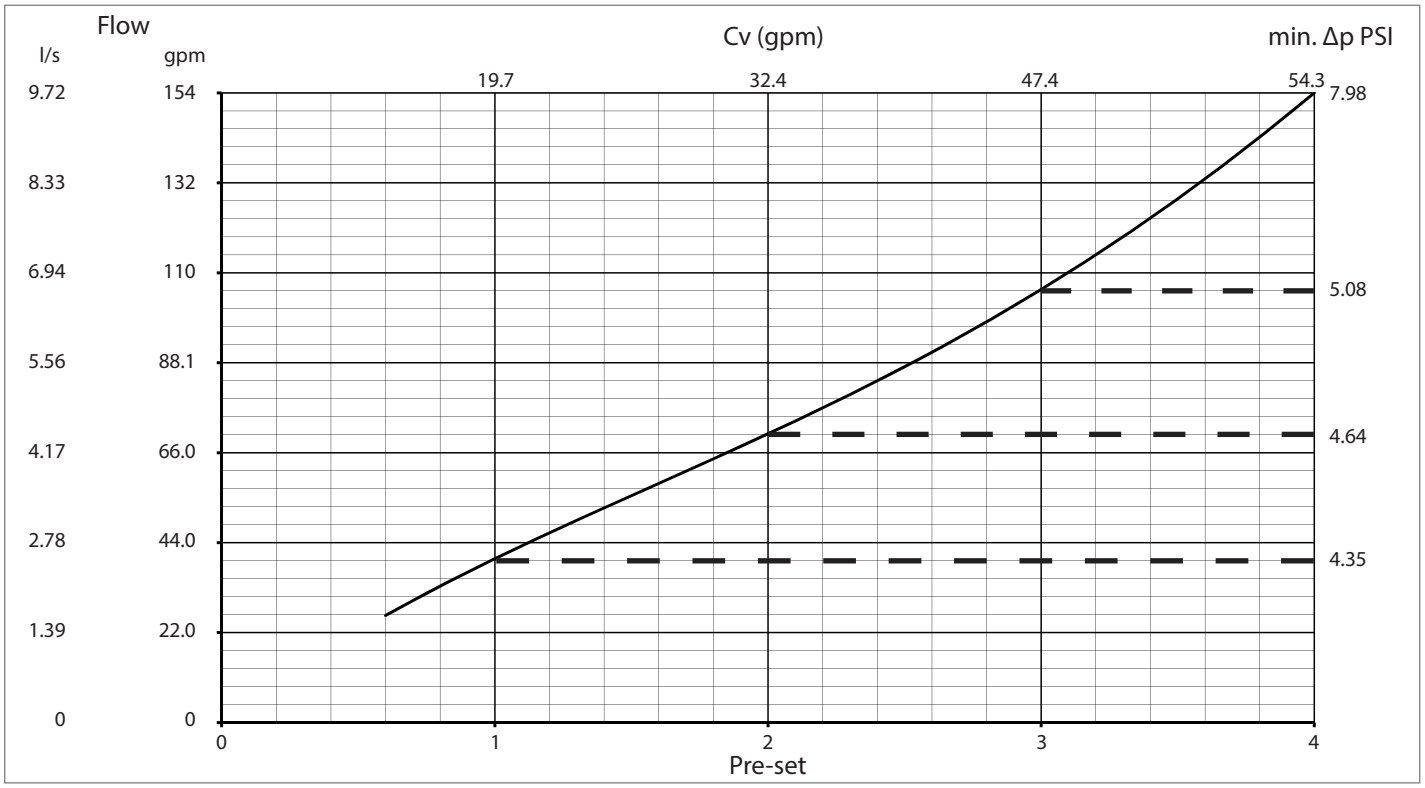
Frese OPTIMA Compact · Low Flow 2½"



Frese OPTIMA Compact · High Flow 2½"



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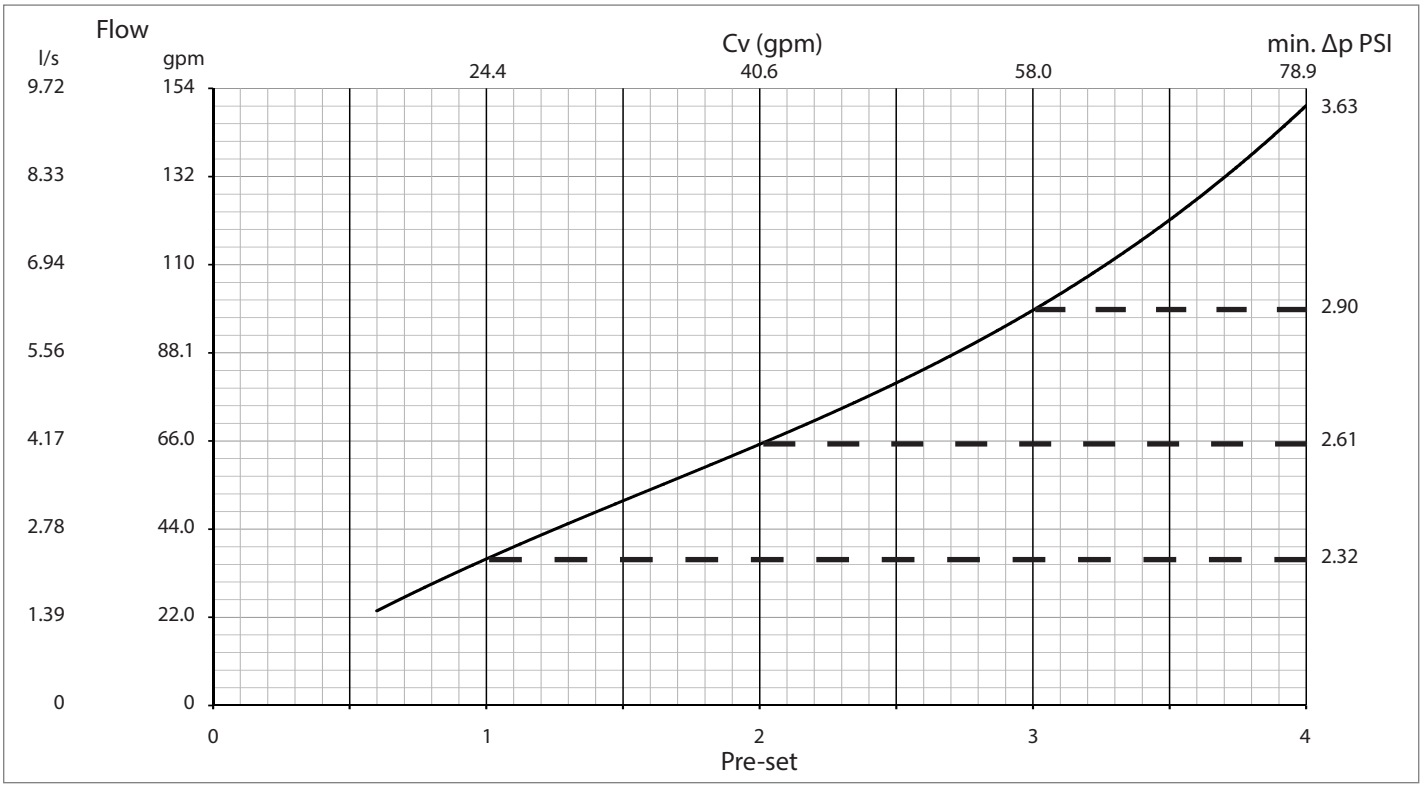
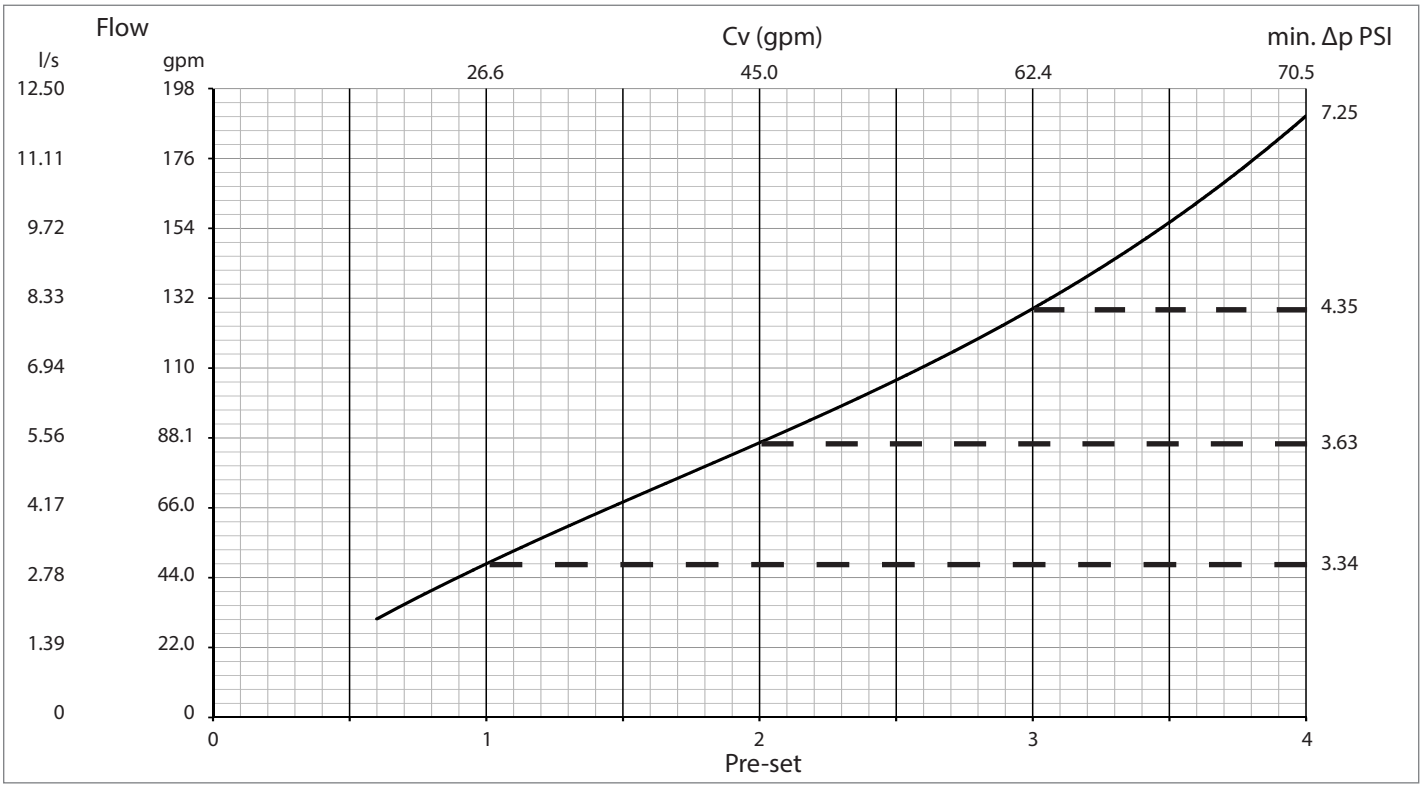
Frese OPTIMA Compact · Low Flow 3”



Frese OPTIMA Compact · High Flow 3”



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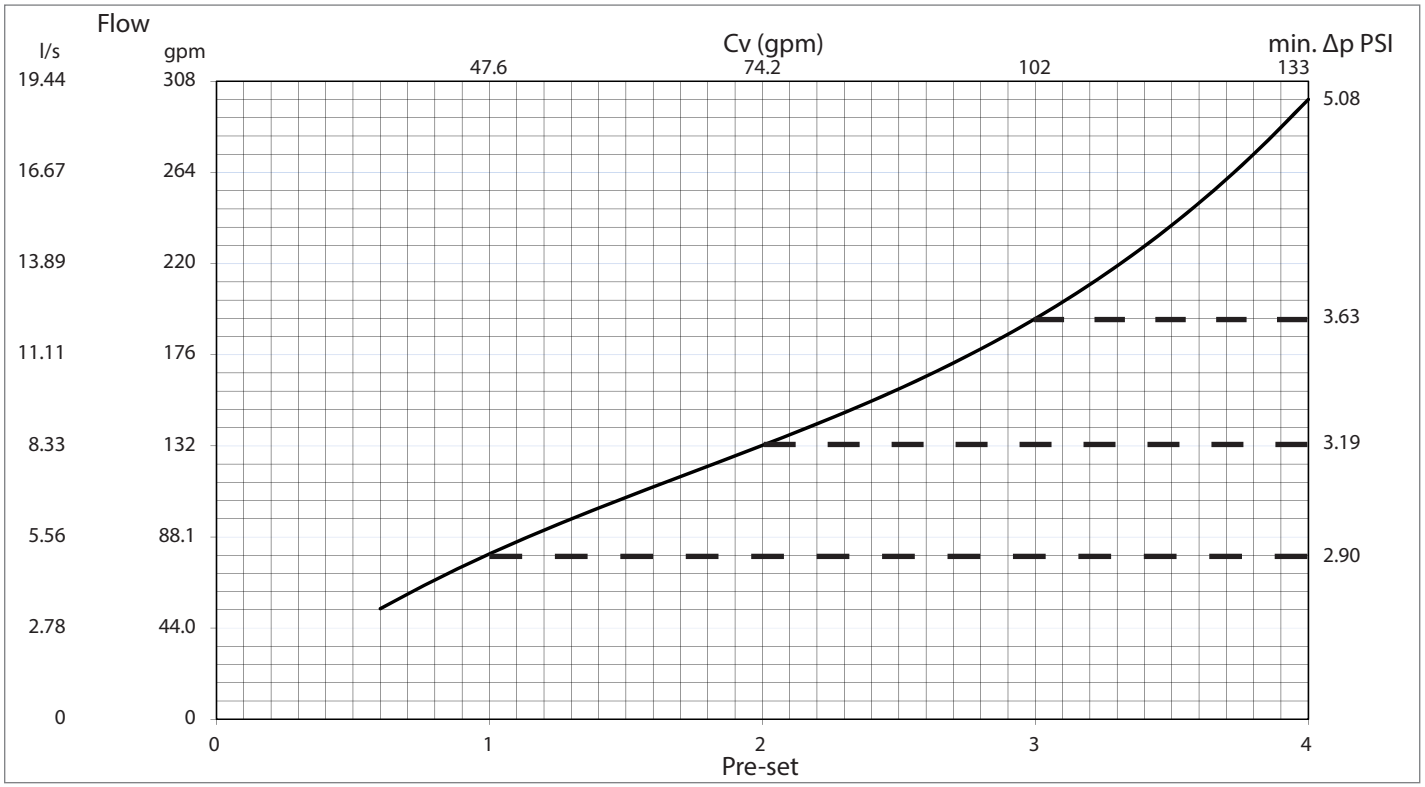
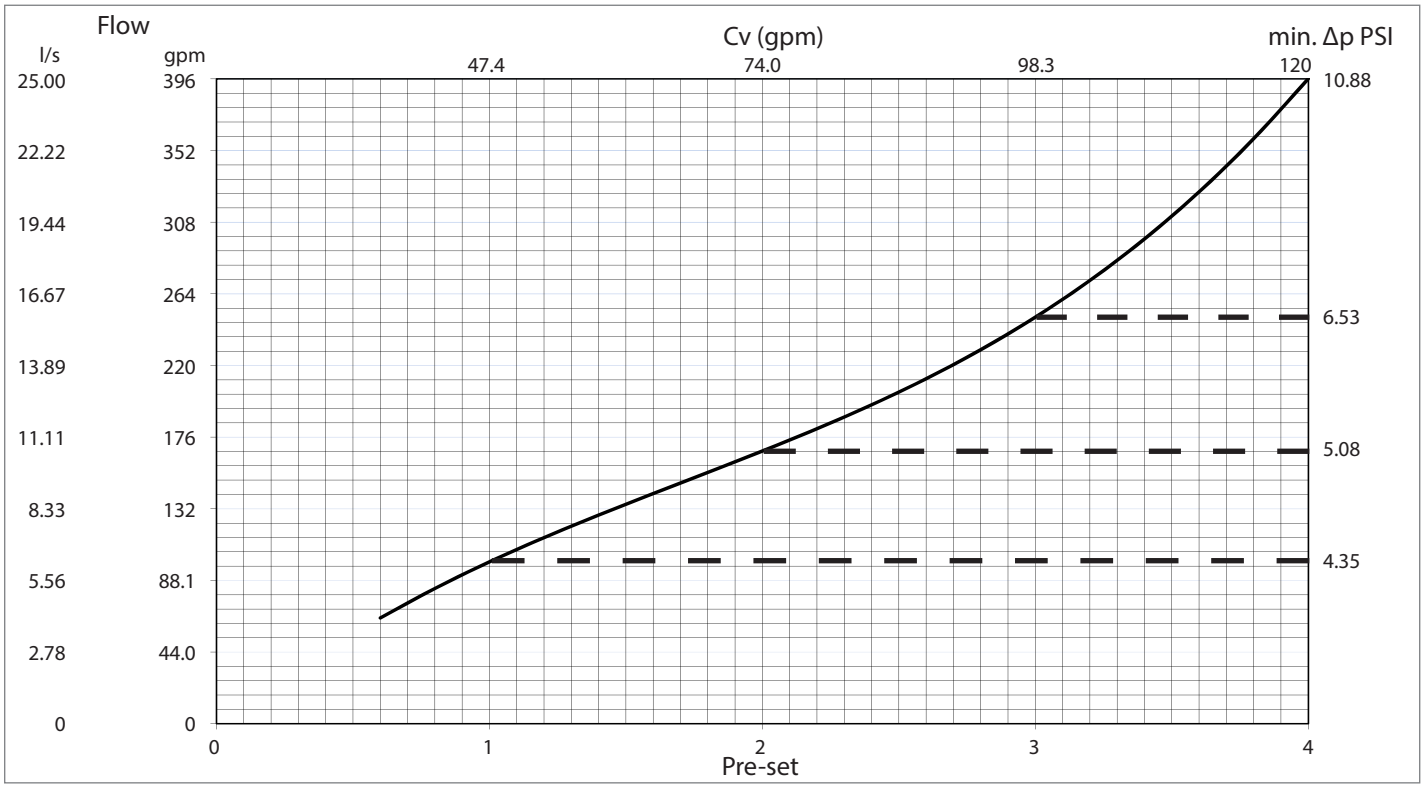
Frese OPTIMA Compact · Low Flow 4”



Frese OPTIMA Compact · High Flow 4”



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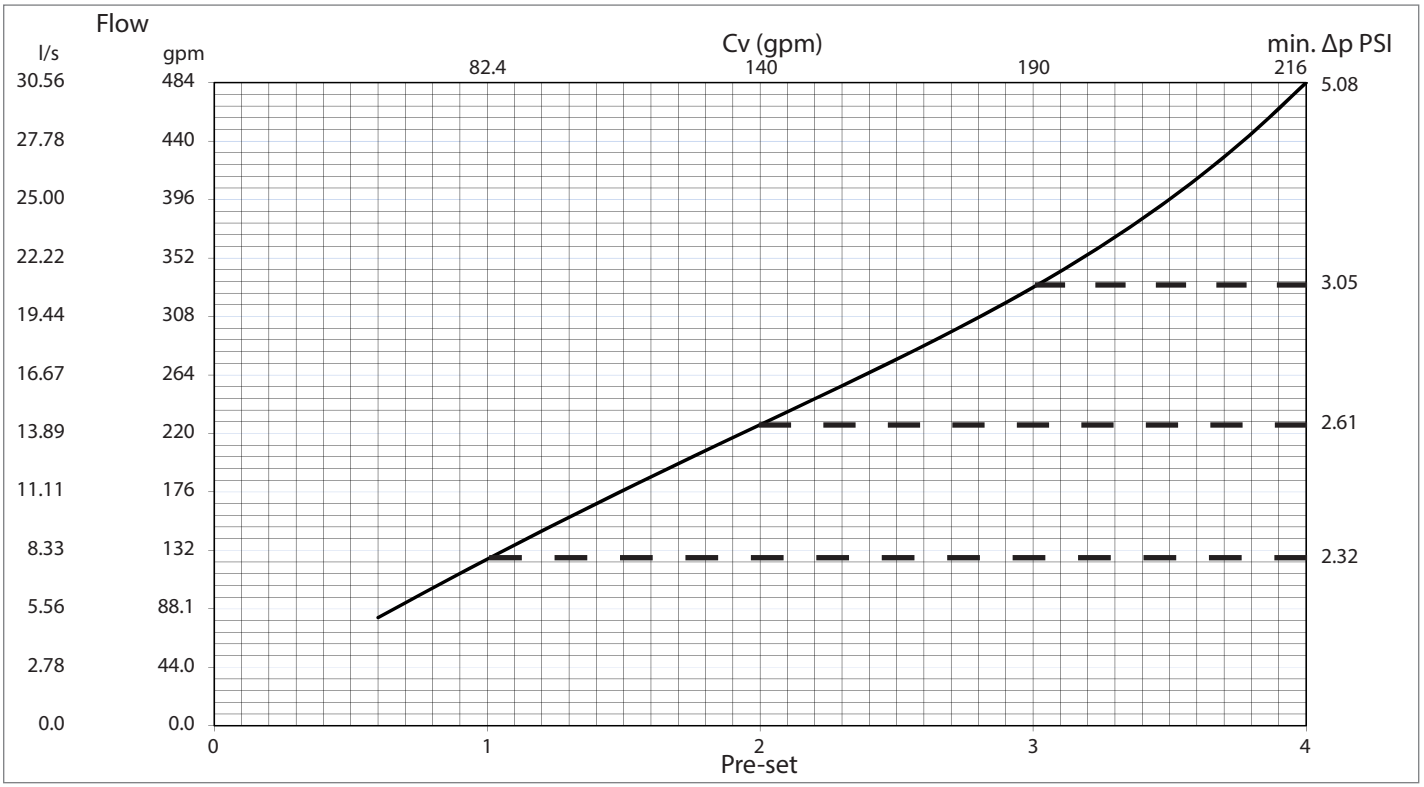
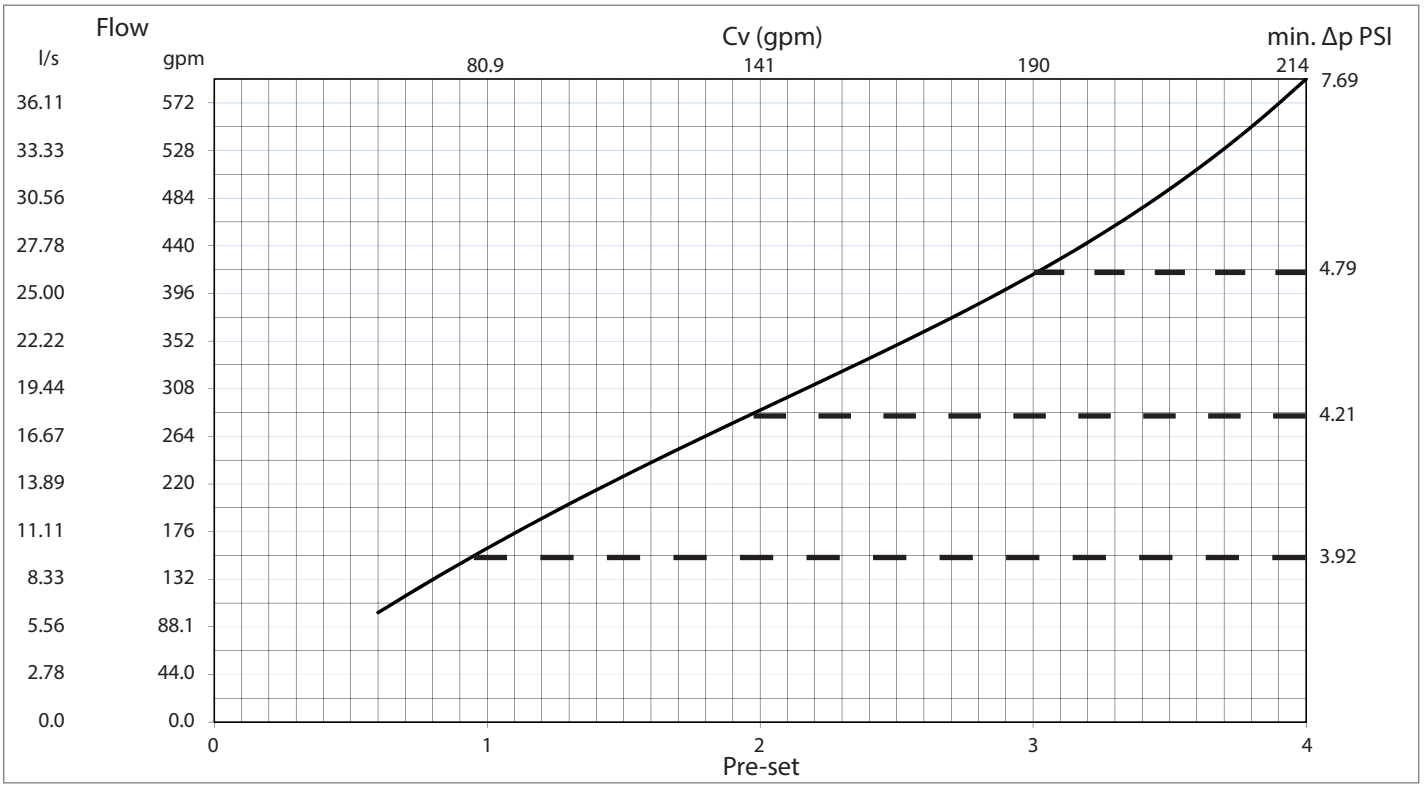
Frese OPTIMA Compact · Low Flow 5”



Frese OPTIMA Compact · High Flow 5”



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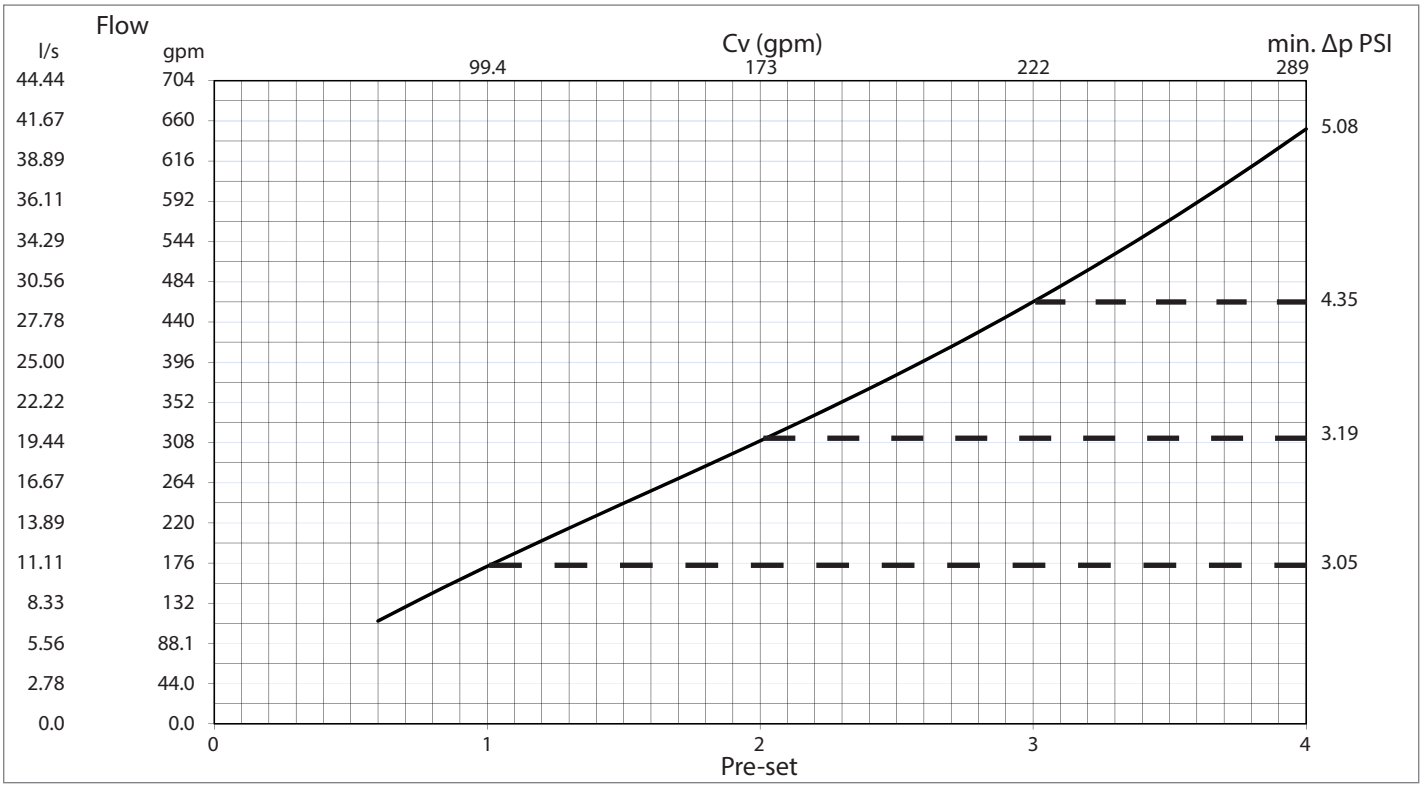
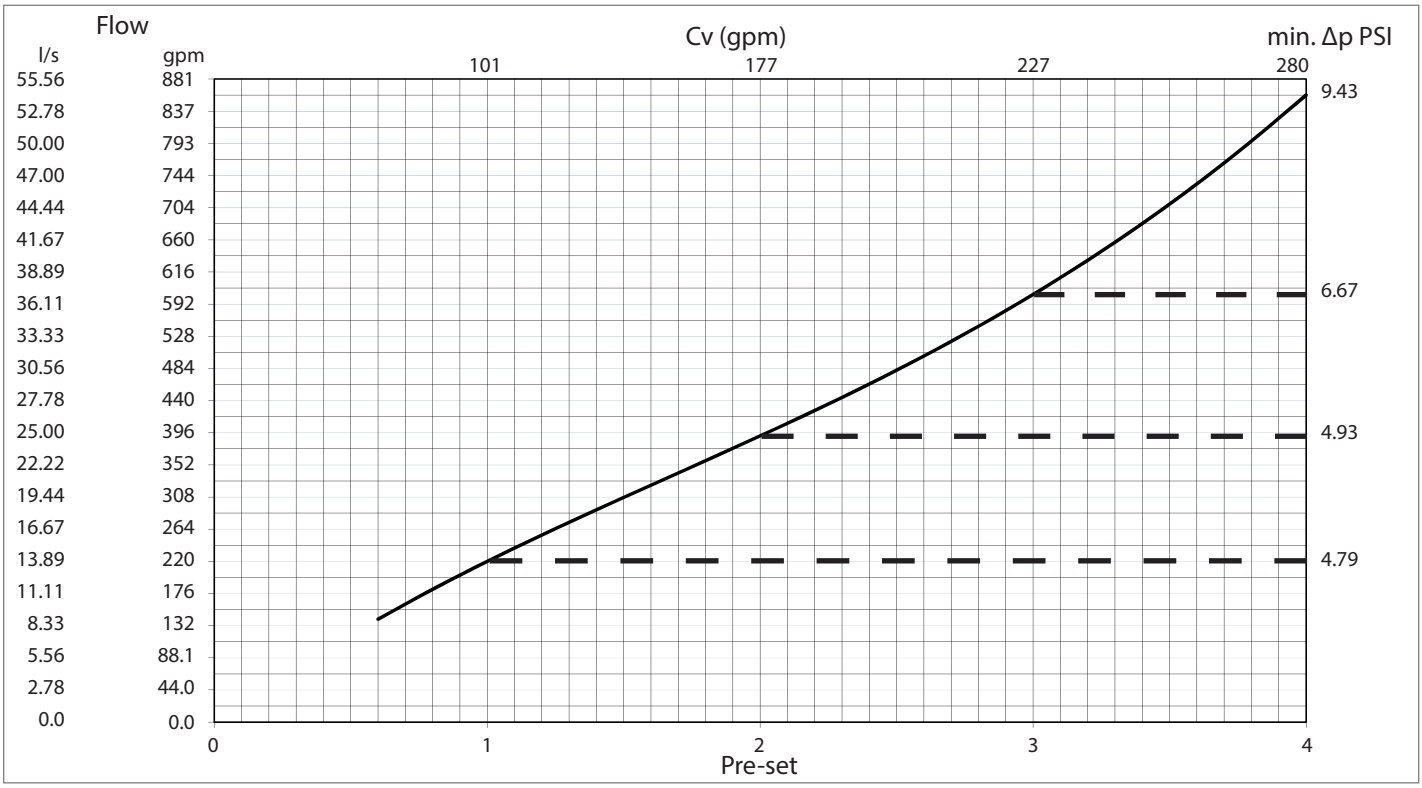
Frese OPTIMA Compact · Low Flow 6”



Frese OPTIMA Compact · High Flow 6”



Frese OPTIMA Compact ANSI
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Setting and Flow 2½" - 3"

	Frese OPTIMA Compact 2½" LF			Frese OPTIMA Compact 2½" HF		
Pre-set	**Flow m³/h**	**Flow l/s**	**Flow gpm**	**Flow m³/h**	**Flow l/s**	**Flow gpm**
0.6	4.4	1.216	19.27	6.0	1.654	26.21
0.8	5.6	1.544	24.47	7.6	2.108	33.41
1.0	6.6	1.846	29.25	9.1	2.530	40.09
1.2	7.7	2.129	33.73	10.5	2.929	46.42
1.4	8.6	2.399	38.02	11.9	3.314	52.52
1.6	9.6	2.663	42.21	13.3	3.692	58.52
1.8	10.5	2.927	46.39	14.7	4.072	64.53
2.0	11.5	3.195	50.63	16.0	4.458	70.66
2.2	12.5	3.472	55.03	17.5	4.858	76.99
2.4	13.5	3.763	59.64	19.0	5.277	83.63
2.6	14.7	4.071	64.52	20.6	5.719	90.63
2.8	15.8	4.400	69.73	22.3	6.188	98.07
3.0	17.1	4.753	75.32	24.1	6.688	105.99
3.2	18.5	5.132	81.33	26.0	7.222	114.45
3.4	19.9	5.539	87.78	28.0	7.791	123.47
3.6	21.5	5.976	94.71	30.2	8.397	133.08
3.8	23.2	6.445	102.13	32.5	9.042	143.29
4.0	25.0	6.945	110.06	35.0	9.724	154.11

	Frese OPTIMA Compact 3" LF			Frese OPTIMA Compact 3" HF		
Pre-set	**Flow m³/h**	**Flow l/s**	**Flow gpm**	**Flow m³/h**	**Flow l/s**	**Flow gpm**
0.6	5.3	1.484	23.53	7.0	1.951	30.92
0.8	6.9	1.906	30.21	9.0	2.513	39.83
1.0	8.3	2.301	36.48	11.0	3.043	48.23
1.2	9.6	2.677	42.44	12.8	3.547	56.23
1.4	10.9	3.040	48.19	14.5	4.034	63.94
1.6	12.2	3.396	53.83	16.2	4.510	71.48
1.8	13.5	3.751	59.46	18.0	4.982	78.96
2.0	14.8	4.113	65.19	19.6	5.457	86.49
2.2	16.2	4.486	71.11	21.4	5.943	94.19
2.4	17.6	4.878	77.32	23.2	6.446	102.17
2.6	19.1	5.295	83.93	25.1	6.973	110.53
2.8	20.7	5.744	91.04	27.1	7.533	119.40
3.0	22.4	6.230	98.74	29.3	8.131	128.88
3.2	24.3	6.760	107.15	31.6	8.775	139.09
3.4	26.4	7.341	116.35	34.1	9.473	150.15
3.6	28.7	7.978	126.46	36.8	10.230	162.15
3.8	31.2	8.679	137.57	39.8	11.055	175.22
4.0	34.0	9.450	149.78	43.0	11.954	189.47

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Setting and Flow 4" - 5" - 6"

	Frese OPTIMA Compact 4" LF			Frese OPTIMA Compact 4" HF		
Pre-set	**Flow m³/h**	**Flow l/s**	**Flow gpm**	**Flow m³/h**	**Flow l/s**	**Flow gpm**
0.6	12.1	3.369	53.41	14.8	4.100	64.99
0.8	15.3	4.247	67.32	18.9	5.246	83.15
1.0	18.1	5.040	79.88	22.6	6.276	99.48
1.2	20.8	5.764	91.36	26.0	7.216	114.37
1.4	23.2	6.439	102.06	29.1	8.090	128.22
1.6	25.5	7.083	112.26	32.1	8.924	141.44
1.8	27.8	7.713	122.24	35.1	9.743	154.42
2.0	30.0	8.347	132.30	38.1	10.572	167.57
2.2	32.4	9.004	142.71	41.2	11.438	181.29
2.4	34.9	9.701	153.75	44.5	12.364	195.97
2.6	37.6	10.456	165.73	48.2	13.377	212.03
2.8	40.6	11.288	178.91	52.2	14.501	229.85
3.0	44.0	12.214	193.59	56.7	15.763	249.84
3.2	47.7	13.253	210.05	61.9	17.186	272.41
3.4	51.9	14.422	228.58	67.7	18.798	297.94
3.6	56.7	15.739	249.46	74.2	20.622	326.85
3.8	62.0	17.222	272.98	81.7	22.684	359.54
4.0	68.0	18.891	299.41	90.0	25.009	396.40

	Frese OPTIMA Compact 5" LF			Frese OPTIMA Compact 5" HF		
Pre-set	**Flow m³/h**	**Flow l/s**	**Flow gpm**	**Flow m³/h**	**Flow l/s**	**Flow gpm**
0.6	18.5	5.139	81.45	23.0	6.389	101.26
0.8	23.6	6.543	103.71	29.9	8.312	131.74
1.0	28.5	7.917	125.48	36.5	10.139	160.70
1.2	33.3	9.255	146.69	42.8	11.878	188.26
1.4	38.0	10.558	167.35	48.7	13.539	214.59
1.6	42.6	11.830	187.50	54.5	15.134	239.88
1.8	47.1	13.075	207.24	60.0	16.680	264.38
2.0	51.5	14.305	226.74	65.5	18.194	288.38
2.2	55.9	15.534	246.21	70.9	19.697	312.20
2.4	60.4	16.778	265.94	76.4	21.213	336.23
2.6	65.0	18.059	286.24	82.0	22.767	360.86
2.8	69.8	19.402	307.51	87.8	24.389	386.57
3.0	75.0	20.833	330.20	94.0	26.111	413.86
3.2	80.6	22.385	354.80	100.7	27.966	443.26
3.4	86.7	24.092	381.86	108.0	29.991	475.36
3.6	93.6	25.994	412.01	116.0	32.226	510.79
3.8	101.3	28.133	445.91	125.0	34.714	550.22
4.0	110.0	30.555	484.29	135.0	37.500	594.37

	Frese OPTIMA Compact 6" LF			Frese OPTIMA Compact 6" HF		
Pre-set	**Flow m³/h**	**Flow l/s**	**Flow gpm**	**Flow m³/h**	**Flow l/s**	**Flow gpm**
0.6	25.6	7.111	112.71	32.0	8.889	140.89
0.8	32.6	9.049	143.42	41.3	11.480	181.96
1.0	39.2	10.889	172.59	50.0	13.889	220.14
1.2	45.6	12.660	200.66	58.2	16.162	256.16
1.4	51.8	14.389	228.06	66.0	18.341	290.70
1.6	58.0	16.100	255.18	73.7	20.468	324.42
1.8	64.1	17.815	282.37	81.3	22.583	357.94
2.0	70.4	19.555	309.95	89.0	24.723	391.86
2.2	76.8	21.337	338.20	96.9	26.922	426.71
2.4	83.4	23.177	367.36	105.2	29.214	463.04
2.6	90.3	25.088	397.65	113.9	31.630	501.33
2.8	97.5	27.081	429.24	123.1	34.198	542.04
3.0	105.0	29.166	462.28	133.0	36.945	585.59
3.2	112.9	31.348	496.87	143.6	39.897	632.37
3.4	121.1	33.632	533.07	155.1	43.076	682.75
3.6	129.7	36.021	570.94	167.4	46.502	737.05
3.8	138.7	38.515	610.46	180.7	50.194	795.57
4.0	148.0	41.110	651.59	195.0	54.168	858.56

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Documentation formula

Valve ID (own choice)	Valve type	Dimension	Pre-setting	Verified Δp [PSI]	Min. Δp (see flow rate graph) [PSI]	Flow GPM

Pump type	Regulation mode	Set point
Installation		
Signature	Date	

Text for technical specifications

The length of the modulating stroke shall be independent of flow setting. The valve shall have full stroke modulating control at all flow settings and the stroke should not be restricted by the flow setting position.

The modulation and flow setting shall be one combined unit with a linear modulating motion and a rotational flow setting motion.

The valve characterization shall not be changed at different flow settings.

The combined flow setting and modulating control unit shall be pressure independent.

The Pressure Independent Control Valve shall contain a combined flow setting, differential pressure control and modulating bonnet assembly.

The valve housing shall be ASTM A 126 Class B.

The valve shall have a spring made of stainless steel, a diaphragm made of reinforced EPDM and O-rings made of EPDM.

The valve shall have a maximum operating differential pressure of 116 PSI (8 Bar).

The valve shall have an external adjustable analogue step less presetting scale from minimum to maximum flow.

P/T plugs shall be available.

The valve shall be capable of closing against a maximum differential pressure of 116 PSI (8 bar) with a leakage rate at maximum 0,01% of max rated volumetric flow and comply to EN1349 Class IV.

Pressure independent control valves must be tested in accordance with the BSRIA document BTS.1 'Test Method for Pressure Independent Control Valves' and manufacturers must be able to provide the test results upon request.

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