

ALPHA HCR Wafer

Industrial

Application

The ALPHA HCR (High Corrosion Resistant) Valves are particularly designed and manufactured for automatic balancing in Industrial applications.

An integral part of the ALPHA HCR Valve is the ALPHA Flow Cartridge, which limits the flow to a specified level at all times, including under fluctuating pressure conditions.

The patented design of the stainless steel flow cartridge introduces a interchangeable orifice plate for design flexibility and a resistant diaphragm for accuracy operation.

The ALPHA HCR valve can also be installed with the ALPHA HCR cartridge for other highly corrosive applications such as seawater.

Available in sizes DN25 and DN40 to DN450. ALPHA HCR valve guarantees the hydraulic balance of the system regardless pressure fluctuations.



Benefits

Design

- No requirement for balancing valves in the distribution lines and supply lines
- Less time to define the necessary equipment for a hydraulic balanced system
- No impact if the calculated distribution of pressure in the installation is not accurate
- Security that the specified flow is also the real one

Installation

- Minimized commissioning time due to automatic balancing of the system
- Cartridge solution makes flushing procedure very easy
- No need for oversized pumps and oversized control valves
- No requirements for straight diameters of pipe upstream and downstream of the valve
- Can be easily installed where space is limited

Operation

- Balancing of the system takes place automatically even under fluctuating pressure conditions
- Performance optimization
- Distribution/balancing optimization

Features

- Valve housing manufactured in a range of stainless steels for industrial applications
- P/T plugs for differential pressure verification
- Modifications & extensions of the system do not affect the hydraulic balance in the other parts of the system
- Tamper resistant cartridge independent of flow regulation errors during commissioning and operation of the system
- Self-cleaning cartridge does not allow dirt to compromise the accuracy of the valve
- Resistant diaphragm between the moving parts of the cartridge eliminates friction, noise and impact from water hammer
- Delivered with 3.1 certificate in accordance with EN 10204 as an option. Other certificates on request
- Pressure test according to EN12266

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ALPHA & ALPHA HCR Cartridge Operation

When the pressure increases the spring will be compressed and thereby the piston will reduce the outlet area and vice versa. The result is a constant flow rate through the valve, independent of pressure fluctuations.



Function

The following applies to all flow control valves:

$$Q = K_v \cdot \sqrt{\Delta p}$$

Q = Flow (m³/h)
 K_v = Opening area
 Δp = Differential pressure (Bar)

The ALPHA cartridge reacts to pressure fluctuations in the system ensuring that the differential pressure across the pre-adjustment unit is kept constant. This ensures that the maximum flow limit is achieved in accordance with the design.

Flow Calculation

The flow through the valve can be identified by measuring the differential pressure (Δp) across the valve:

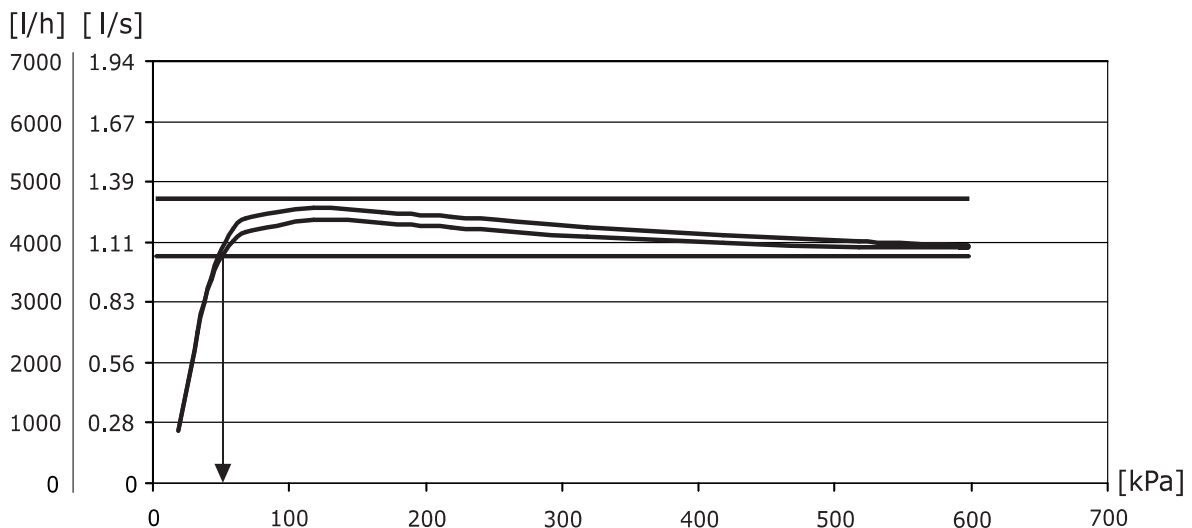
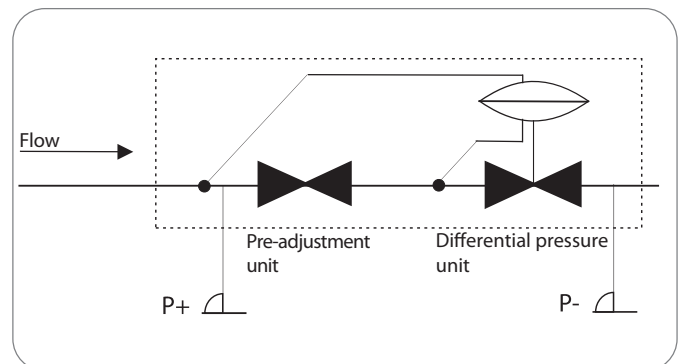
If the measured differential pressure is above the minimum Δp, the flow is the one stated on the graph for the valve.

If the measured differential pressure is below the minimum Δp, the flow can be found by using the formulas below.

Flow Calculation

$Q = K_v \cdot \sqrt{\Delta p}$	Q = m ³ /h Δp = Bar
$Q = K_v \cdot 100 \cdot \sqrt{\Delta p}$	Q = l/h Δp = kPa
$Q = \frac{K_v}{36} \cdot \sqrt{\Delta p}$	Q = l/s Δp = kPa

Simplified Outline



Schematic view of the flow characteristic for cartridge type Frese no. 58-65120. Nominal flow 1.111 l/s / 4.000 l/h. The cartridge enters the pressure range at 47 kPa and maintains the flow at a constant level to 600 kPa.

ALPHA HCR Wafer

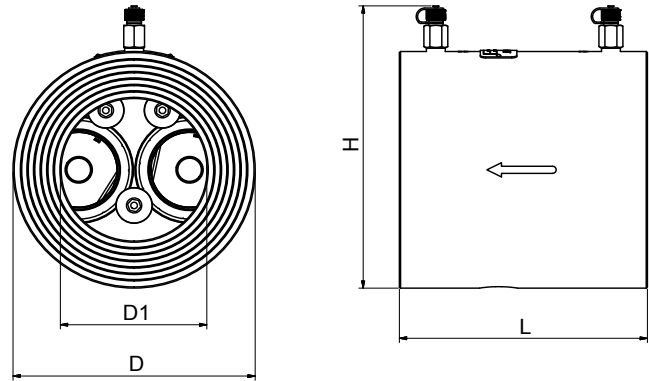
Industrial

ALPHA HCR Valve Housing

Technical Data

A wafer-type valve can contain up to 33 ALPHA HCR cartridges, depending on the size and the design flow.

Valve housing:	See material table below
P/T plugs:	AISI 316
Fasteners:	Duplex Steel
Pressure class:	PN16
Temperature:	-20°C to +110°C
Flow range:	Refer to cartridge programme
Flange compliance:	ANSI/ASME B16.5 ISO 7005-2 EN 1092-2



The pipe system shall be properly ventilated to avoid risk of air pockets. Glycolic mixtures up to 50% are applicable (both ethylene and propylene). Strainer is recommended.
Recommendation: Water treatment to VDI 2035.

Material	Code	Standard/On request	Suffix (X)* See product programme below
AISI 316 TI	EN 10088-2 1.4571	On request	K
AISI 316 L	EN 10088-2 1.4404	Standard DN25 - DN125	L
AISI 316	EN10213 1.4408	Standard DN150 - DN450	M
SMO 254	RN 10088-2 1.4547	On request	N
Steel	ASTM A350 LF2	On request	P

Product Programme

Frese no. (PN16)	Dimensions	L [mm]	D [mm]	D1 [mm]	H [mm]	Cart./Valve (Pcs.)	Max. flow rate m ³ /h
58-9038X*-01	DN25	62	62	32	78	1	3
58-9058X*-01	DN40	62	73	40	84	1	3
58-9073X*-01	DN50	170	100	80	132	1	48
58-9083X*-01	DN65	170	119	80	151	1	48
58-9093X*-01	DN80	170	131	80	163	1	48
58-9103X*-01	DN100	170	163	100	195	2	96
58-9163X*-01	DN125	170	193	125	225	3	144
58-9113X*-01	DN150	167	216	150	248	4	192
58-9123X*-01	DN200	167	271	200	303	7	336
58-9133X*-01	DN250	167	328	250	360	12	576
58-9143X*-01	DN300	167	383	315	415	15	720
58-9153X*-01	DN350	170	443	355	475	19	912
58-9173X*-01	DN400	170	496	405	528	26	1,248
58-9183X*-01	DN450	170	545	455	577	33	1,584

ALPHA HCR Wafer

Industrial

ALPHA HCR Cartridge

Technical Data

ALPHA HCR Type 60

Suitable for wafer:	DN50-DN450
Cartridge material:	PPS 40% glass-reinforced
O-rings:	EPDM 281
Spring:	Hastelloy C276 (high corrosion resistant)
Diaphragm:	HNBR reinforced
Medium temperature:	-20°C to +80°C
Diff. pressure range:	47 - 600 kPa
For Valve Housing:	DN50 to DN450

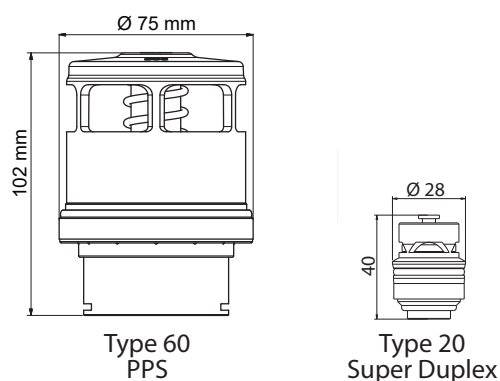
ALPHA HCR Type 20 - Super Duplex

Suitable for wafer:	DN25-DN40
Cartridge material:	Super Duplex, EN 1.4410
O-rings:	EPDM 281
Spring:	Hastelloy C276 (high corrosion resistant)
Diaphragm:	HNBR reinforced
Medium temperature:	-20°C to +110°C
Diff. pressure range:	21 - 600 kPa
For Valve Housing:	DN25 & DN40

ALPHA HCR Type 20 - AISI 316

Suitable for wafer:	DN25-DN40
Cartridge material:	AISI 316, EN 1.4408
O-rings:	EPDM 281
Spring:	Stainless Steel
Diaphragm:	HNBR
Medium temperature:	-20°C to +120°C
Diff. pressure range:	9 - 350 kPa
For Valve Housing:	DN25 & DN40

Dimensions



ALPHA Cartridge

Technical Data

ALPHA Type 50-60

Suitable for wafer:	DN50-DN450
Cartridge material:	AISI316, EN 1.4401
O-rings:	EPDM 281
Spring:	AISI 316, EN 1.4404
Diaphragm:	HNBR reinforced
Medium temperature:	-20°C to +110°C
Diff. pressure range:	13 - 600 kPa
For Valve Housing:	DN50 - DN450

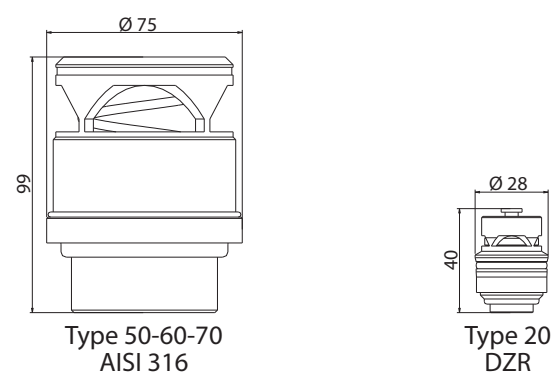
ALPHA Type 70

Suitable for wafer:	DN50-DN450
Cartridge material:	AISI316, EN 1.4401
O-rings:	EPDM 281
Spring:	AISI 316, EN 1.4404
Diaphragm:	HRT reinforced
Medium temperature:	-20°C to +110°C
Diff. pressure range:	18 - 350 kPa
For Valve Housing:	DN50 - DN450

ALPHA Type 20

Suitable for wafer:	DN25-DN40
Cartridge material:	DZR Brass CW602N
O-rings:	EPDM 281
Spring:	Stainless Steel 1.4310
Diaphragm:	HNBR reinforced
Medium temperature:	-20°C to +110°C
Diff. pressure range:	7 - 600 kPa
For Valve Housing:	DN25 & DN40

Dimensions



ALPHA HCR Wafer

Industrial

ALPHA HCR Cartridge

Product Programme

Type 60 - PPS

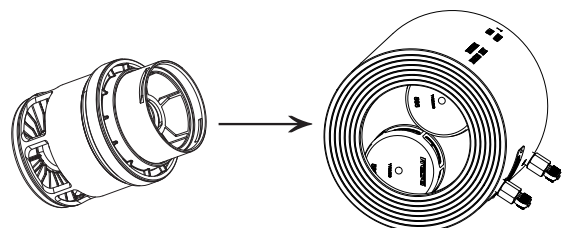
Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
58-65120	4,000	1.111	17.61	47	5.8
58-65132	4,500	1.250	19.81	47	6.6
58-65140	5,000	1.389	22.02	47	7.3
58-65148	5,500	1.528	24.22	47	8.0
58-65156	6,000	1.667	26.42	47	8.8
58-65168	6,750	1.875	29.72	47	9.8
58-65175	7,500	2.083	33.02	47	10.9
58-65200	8,500	2.361	37.42	47	12.4
58-65208	9,200	2.556	40.51	47	13.4
58-65220	10,000	2.778	44.03	47	14.6
58-65235	11,000	3.056	48.43	47	16.0
58-65240	12,500	3.472	55.03	47	18.2
58-65252	13,800	3.833	60.76	47	20.1
58-65264	15,300	4.250	67.36	47	22.3
58-65274	16,300	4.528	71.77	47	23.8
58-65280	18,000	5.000	79.25	47	26.3
58-65303	19,000	5.278	83.66	47	27.7
58-65313	20,300	5.639	89.38	47	29.6
58-65320	21,500	5.972	94.66	47	31.4
58-65333	23,200	6.444	102.15	47	33.8
58-65341	24,300	6.750	106.99	47	35.4
58-65349	25,300	7.028	111.39	47	36.9
58-65356	27,000	7.500	118.88	47	39.4
58-65362	28,500	7.917	125.49	47	41.6
58-65365	30,500	8.472	134.29	47	44.5
58-65385	32,000	8.889	140.90	47	46.7
58-65396	34,000	9.444	149.70	49	48.6
58-65409	37,500	10.417	165.11	49	53.6
58-65413	38,500	10.694	169.52	50	54.4
58-65417	39,500	10.972	173.92	50	55.9
58-65420	40,500	11.250	178.32	52	56.2
58-65425	41,750	11.597	183.83	53	57.3
58-65430	43,000	11.944	189.33	54	58.5
58-65433	44,000	12.222	193.73	55	59.3
58-65440	48,000	13.333	211.34	60	62.0

Type 20 - Super Duplex

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
58-20170	56	0.016	0.25	21	0.12
58-20230	102	0.028	0.45	21	0.22
58-20260	129	0.036	0.57	21	0.28
58-20300	180	0.050	0.79	21	0.39
58-20350	236	0.066	1.04	21	0.51
58-20400	321	0.089	1.41	22	0.68
58-20460	422	0.117	1.86	22	0.90
58-20510	499	0.139	2.20	22	1.06
58-20540	584	0.162	2.57	22	1.25
58-20580	668	0.186	2.94	22	1.42
58-20620	750	0.208	3.30	22	1.60
58-20660	874	0.243	3.85	22	1.86
58-20700	1,020	0.283	4.49	22	2.17
58-20740	1,081	0.300	4.76	22	2.30
58-20770	1,195	0.332	5.26	22	2.55
58-20820	1,335	0.371	5.88	23	2.78
58-20860	1,483	0.412	6.53	23	3.09
58-20880	1,581	0.439	6.96	23	3.30
58-20920	1,774	0.493	7.81	24	3.62
58-20940	1,833	0.509	8.07	24	3.74
58-20990	2,080	0.578	9.16	25	4.16
58-21030	2,251	0.625	9.91	26	4.41
58-21060	2,319	0.644	10.21	27	4.46
58-21090	2,448	0.680	10.78	28	4.63
58-21090H	3,000	0.833	13.21	46	4.42

Other materials on request

Cartridge Material	Availability	Programme
SMO	On request	Type 60
Super Duplex	On request	Type 60



ALPHA HCR Wafer

Industrial

ALPHA HCR Cartridge

Product Programme

Type 20 - AISI 316

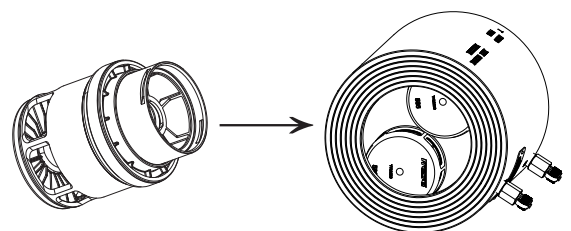
Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
47-20120	20	0.006	0.09	9	0.07
47-20170	40	0.011	0.18	9	0.13
47-20200	60	0.017	0.26	12	0.17
47-20230	80	0.022	0.35	13	0.22
47-20260	105	0.029	0.46	14	0.28
47-20300	135	0.038	0.59	14	0.36
47-20350	180	0.050	0.79	14	0.48
47-20400	240	0.067	1.06	14	0.64
47-20460	310	0.086	1.36	14	0.83
47-20510	410	0.114	1.81	15	1.06
47-20530	450	0.125	1.98	16	1.13
47-20570	500	0.139	2.20	17	1.21
47-20590	550	0.153	2.42	18	1.30
47-20620	600	0.167	2.64	19	1.38
47-20680	700	0.194	3.08	20	1.57
47-20740	800	0.222	3.52	20	1.79

Type 60 - AISI 316

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
51-66285	17,037	4.733	75.02	34	29.2
51-66292	18,148	5.041	79.90	34	31.1
51-66301	18,797	5.221	82.75	35	31.8
51-66305	19,467	5.408	85.72	35	32.9
51-66312	20,464	5.684	90.09	35	34.6
51-66319	21,527	5.980	94.79	36	35.9
51-66326	22,449	6.236	98.84	36	37.4
51-66332	23,482	6.523	103.39	36	39.1
51-66338	24,531	6.815	108.02	37	40.3
51-66344	25,621	7.117	112.81	38	41.6
51-66349	26,528	7.369	116.80	38	43.0
51-66356	27,686	7.690	121.89	38	44.9
51-66362	29,157	8.099	128.37	38	47.3
51-66367	29,954	8.320	131.88	39	48.0
51-66373	30,976	8.605	136.39	39	49.6
51-66379	32,260	8.961	142.04	40	51.0
51-66385	33,565	9.324	147.79	40	53.0
51-66391	34,953	9.709	153.89	40	55.3
51-66393	36,336	10.093	159.98	42	56.1
51-66398	37,685	10.468	165.92	43	57.5
51-66400	38,607	10.724	169.98	44	58.2
51-66407	40,971	11.381	180.39	46	60.4
51-66407H	45,000	12.500	198.13	49	64.3

Type 50 - AISI 316

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
51-55179	3,820	1.061	16.82	13	10.6
51-55184	3,931	1.092	17.31	13	10.9
51-55189	4,049	1.125	17.83	13	11.2
51-55194	4,199	1.167	18.50	13	11.7
51-55200	4,399	1.222	19.37	13	12.2
51-55206	4,640	1.289	20.43	14	12.4
51-55213	4,951	1.375	21.79	14	13.2
51-55220	5,310	1.475	23.38	14	14.2
51-55227	5,700	1.583	25.09	14	15.2
51-55235	6,209	1.725	27.34	14	16.6
51-55243	6,511	1.808	28.66	14	17.4
51-55251	7,081	1.967	31.18	14	18.9
51-55260	7,901	2.194	34.78	15	20.4
51-55269	8,900	2.472	39.18	16	22.3
51-55279	10,399	2.889	45.79	19	23.9
51-55287	11,355	3.154	49.99	22	24.2
51-55292	12,491	3.470	55.00	23	26.1
51-55298	13,399	3.722	59.00	24	27.4
51-55303	14,762	4.100	64.99	27	28.4
51-55308	15,999	4.444	70.44	29	29.7



ALPHA HCR Wafer

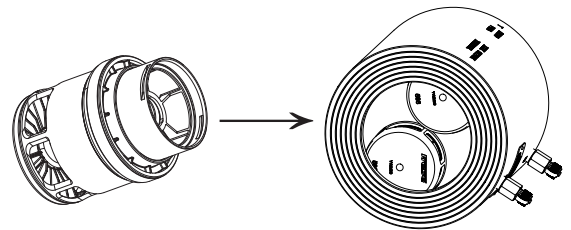
Industrial

ALPHA HCR Cartridge

Product Programme

Type 70 - AISI 316

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
51-76285	11,725	3.257	51.62	18	27.6
51-76292	12,200	3.389	53.71	19	28.0
51-76301	13,100	3.639	57.68	19	30.1
51-76305	13,625	3.785	59.99	19	31.3
51-76312	14,175	3.938	62.41	20	31.7
51-76319	14,775	4.104	65.05	20	33.0
51-76326	15,700	4.361	69.12	20	35.1
51-76332	16,100	4.472	70.88	20	36.0
51-76338	16,950	4.708	74.63	21	37.0
51-76344	17,975	4.993	79.14	21	39.2
51-76349	18,250	5.069	80.35	21	39.8
51-76356	19,100	5.306	84.09	22	40.7
51-76362	20,000	5.556	88.06	22	42.6
51-76367	20,470	5.686	90.12	22	43.6
51-76373	21,290	5.914	93.74	22	45.4
51-76379	22,225	6.174	97.85	23	46.3
51-76385	23,000	6.389	101.26	23	48.0
51-76391	24,000	6.667	105.67	23	50.0
51-76393	24,350	6.764	107.21	23	50.8
51-76398	25,150	6.986	110.73	23	52.4
51-76400	25,725	7.146	113.26	23	53.6
51-76407	26,800	7.444	117.99	23	55.9
51-76407H	30,600	8.500	134.73	23	63.8
51-76420	32,450	9.014	142.87	23	67.7



ALPHA Cartridge

Product Programme

Type	Cartridge Material	Availability	Programme
50-60	Stainless Steel AISI 304	Standard	Please refer to ALPHA cartridge technote
20	Brass CW602N	Standard	Please refer to ALPHA cartridge technote

ALPHA HCR Wafer

Industrial

ALPHA High Temperature Cartridge

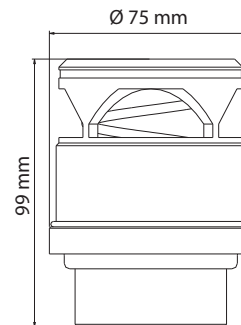
Technical Data

ALPHA Type 50-60

Suitable for wafer:	DN50 to DN800
Cartridge material:	AISI304
O-rings:	FKM
Spring:	Stainless steel AISI 316 1.4401
Diaphragm:	FKM reinforced
Medium temperature:	0°C to +180°C
Diff. pressure range:	13 - 300 kPa

Dimensions

Type 50/60 - AISI316



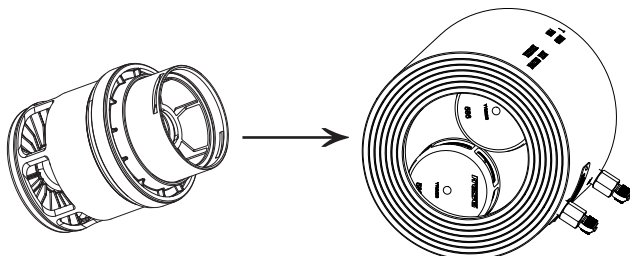
Product Programme

AISI316 Type 50 for DN50-DN800

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
51-55179T	3820	1.061	16.82	13	10.6
51-55184T	3931	1.092	17.31	13	10.9
51-55189T	4049	1.125	17.83	13	11.2
51-55194T	4199	1.167	18.49	13	11.7
51-55200T	4399	1.222	19.37	13	12.2
51-55206T	4640	1.289	20.43	14	12.4
51-55213T	4951	1.375	21.80	14	13.2
51-55220T	5310	1.475	23.38	14	14.2
51-55227T	5700	1.583	25.10	14	15.2
51-55235T	6209	1.725	27.34	14	16.6
51-55243T	6511	1.808	28.67	14	17.4
51-55251T	7081	1.967	31.18	14	18.9
51-55260T	7901	2.194	34.79	15	20.4
51-55269T	8900	2.472	39.19	16	22.3
51-55279T	10399	2.889	45.79	19	23.9
52-55287T	11355	3.154	50.00	22	24.2
5155292T	12491	3.470	55.00	23	26.1
51-55298T	13399	3.722	59.00	24	27.4
51-55303T	14762	4.100	65.00	27	28.4
51-55308T	15999	4.444	70.45	29	29.7

AISI316 Type 60 for DN50-DN800

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
51-66285T	17037	4.733	75.02	34	29.2
51-66292T	18148	5.041	79.91	34	31.1
51-66301T	18797	5.221	82.77	35	31.8
51-66305T	19467	5.408	85.72	35	32.9
51-66312T	20464	5.684	90.11	35	34.6
51-66319T	21527	5.980	94.79	36	35.9
51-66326T	22449	6.236	98.85	36	37.4
51-66332T	23482	6.523	103.40	36	39.1
51-66338T	24531	6.815	108.02	37	40.3
51-66344T	25621	7.117	112.82	38	41.6
51-66349T	26528	7.369	116.81	38	43.0
51-66356T	27686	7.690	121.91	38	44.9
51-66362T	29157	8.099	128.39	38	47.3
51-66367T	29954	8.320	131.90	39	48.0
51-66373T	30976	8.605	136.40	39	49.6
51-66379T	32260	8.961	142.05	40	51.0
51-66385T	33565	9.324	147.80	40	53.0
51-66391T	34953	9.709	153.91	40	55.3
51-66393T	36336	10.093	160.00	42	56.1
51-66398T	37685	10.468	165.94	43	57.5
51-66400T	38607	10.724	170.00	44	58.2
51-66407T	40971	11.381	180.41	46	60.4
51-66407HT	45000	12.500	198.19	49	64.3



ALPHA HCR Wafer

Industrial

Documentation

Documentation	Standard	On request
2.1 Certificate - EN 10204		X
3.1 Certificate - EN 10204		X
3.2 Certificate - EN 10204		X
Corrosion test		X
Dye Penetrant		X
PMI (Magneflux)		X
Ultra Sonic (NDT)		X
Surface treatment		X
Class Society review or inspection		X
Pressure test acc. to EN12266	X	

ALPHA HCR Dynamic Balancing Valve

Specification Text

- The valve shall comply with flanges according to EN/ANSI standards
- The pressure class for the valve housing shall be PN16
- The valve shall contain pressure independent flow cartridges
- The valve shall operate up to a maximum differential pressure of 600 kPa
- The temperature medium working range for the valve shall be -20°C to +80°C (ALPHA HCR Cartridge Type 60) and -20°C to +120°C (ALPHA HCR Cartridge Type 20 & ALPHA Cartridge) and 0°C to +180°C (ALPHA High temperature Cartridge Type 50 & 60)
- The valve shall be supplied with 1" PT plugs
- The PT plugs shall be made of Stainless steel AISI 316
- The fasteners shall be made of duplex steel
- The valve shall be fitted with the ALPHA, ALPHA HCR or ALPHA High Temperature pressure independent flow cartridge

ALPHA HCR Wafer

Industrial

ALPHA HCR Cartridge

Specification text

Type 20 & 60

- The ALPHA HCR cartridge should be made of PPS glass-reinforced or Super Duplex
- The flow rate should be defined by interchangeable orifice plate within the cartridge
- The cartridge diaphragm should be made of reinforced HNBR
- The cartridge O-rings should be made of EPDM 281
- The cartridge spring shall be made of Hastelloy C276 stainless steel

ALPHA High Temperature Cartridge

Specification text

- The ALPHA High Temperature cartridge should be made of stainless steel
- The flow rate should be defined by interchangeable orifice plate within the cartridge
- The cartridge diaphragm should be made of reinforced FKM
- The cartridge O-rings should be made of FKM
- The cartridge spring shall be made of AISI 316 stainless steel

ALPHA Cartridge (Standard)

Specification text

Type 10, 11, 20 high pressure cartridges (DN25 & DN40)

- The cartridge (for automatic balancing valve) should be made of DZR brass CW602N
- There should be only one differential pressure control range up to 600kPa
- The flow rate should be defined by replaceable orifice plate
- The diaphragm should be made of reinforced HNBR
- The O-rings should be made of EPDM

Type 10, 11, 20 low pressure cartridges (DN25 & DN40)

- The cartridge (for automatic balancing valve) should be made of DZR brass CW602N
- There should be only one differential pressure control range up to 350kPa
- The flow rate should be defined by replaceable orifice plate
- The diaphragm should be made of HNBR
- The O-rings should be made of EPDM

Type 50-60 cartridges (DN50 - DN450)

- The cartridge for automatic balancing valve (flanged housing) should be made of stainless steel
- There should be only one differential pressure control range up to 600kPa
- The flow rate should be defined by replaceable orifice plate
- The diaphragm should be made of reinforced HNBR
- The O-rings should be made of EPDM

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