

## Frese ALPHA Wafer HCR

### Application

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

An integral part of the Frese ALPHA HCR Valve is the Frese 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 Frese ALPHA HCR valve can also be installed with the Frese ALPHA HCR cartridge for other highly corrosive applications such as seawater.

Available in sizes DN25 and DN40 to DN450. Frese 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

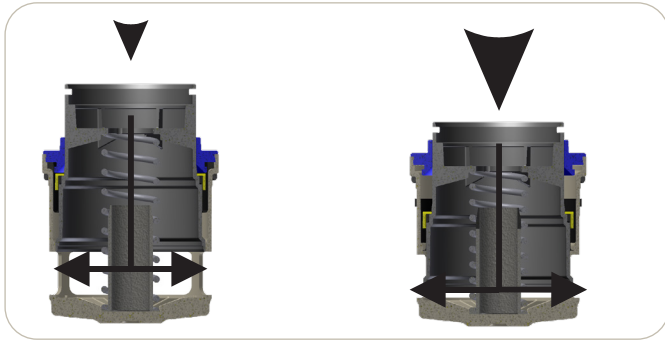
### Features

- 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

# Frese ALPHA Wafer HCR

## Frese ALPHA & Frese 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 (m<sup>3</sup>/h)  
 K<sub>v</sub> = Opening area  
 Δp = Differential pressure (Bar)

The Frese 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:

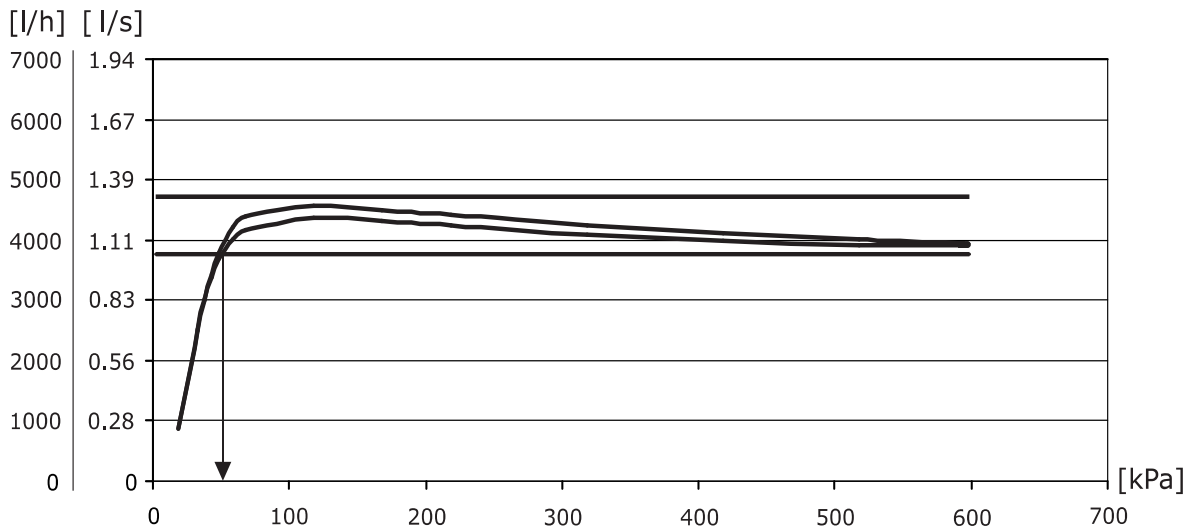
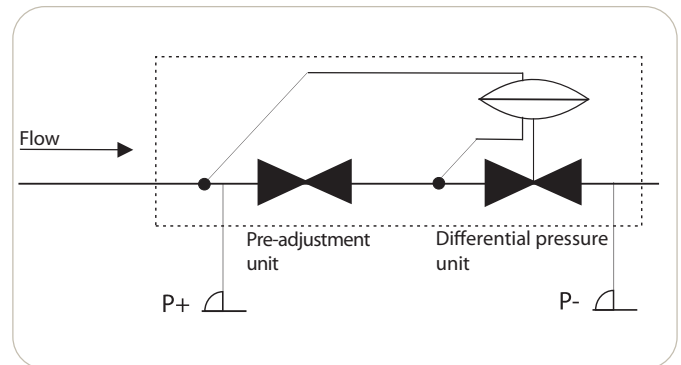
If the measured differential pressure is above the minimum Δp, the flow is the one stated on the graph for the valve.

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 <sup>3</sup> /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.

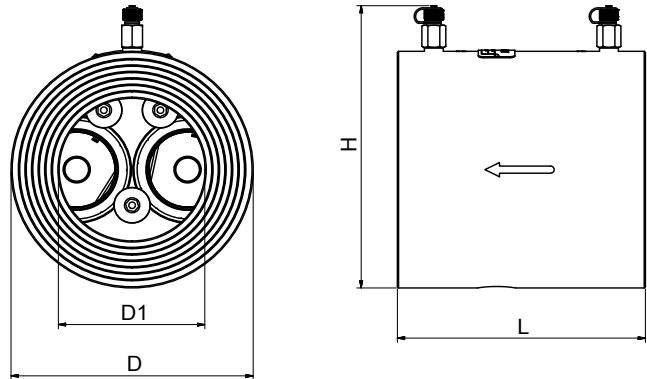
# Frese ALPHA Wafer HCR

## Frese ALPHA HCR Valve Housing

### Technical Data

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

<b>Valve housing:</b>	See material table below
<b>P/T plugs:</b>	AISI 316
<b>Fasteners:</b>	Duplex Steel
<b>Pressure class:</b>	PN16
<b>Temperature:</b>	-20°C to +110°C
<b>Flow range:</b>	Refer to cartridge programme
<b>Flange compliance:</b>	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	Suffix (X)* See product programme below
AISI 316 TI	EN 10088-2 1.4571	K
AISI 316 L	EN 10088-2 1.4404	L
AISI 316	EN10213 1.4408	M
SMO 254	RN 10088-2 1.4547	N
Steel	ASTM A350 LF2	P

### Product Programme

Frese no. (PN16)	Dimensions	L [mm]	D [mm]	D1 [mm]	H [mm]	Cart./Valve (Pcs.)	Max. flow rate m <sup>3</sup> /h
58-9038(X)*	DN25	62	62	32	78	1	2.44
58-9058(X)*	DN40	62	73	40	84	1	2.44
58-9073(X)*	DN50	170	100	80	132	1	48
58-9083(X)*	DN65	170	119	80	151	1	48
58-9093(X)*	DN80	170	131	80	163	1	48
58-9103(X)*	DN100	170	163	100	195	2	96
58-9163(X)*	DN125	170	193	125	225	3	144
58-9113(X)*	DN150	167	216	150	248	4	192
58-9123(X)*	DN200	167	271	200	303	7	336
58-9133(X)*	DN250	167	328	250	360	12	576
58-9143(X)*	DN300	167	383	315	415	15	720
58-9153(X)*	DN350	170	443	355	475	19	912
58-9173(X)*	DN400	170	496	405	528	26	1,248
58-9183(X)*	DN450	170	545	455	577	33	1,584

# Frese ALPHA Wafer HCR

## Frese ALPHA HCR Cartridge

### Technical Data

#### Frese 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

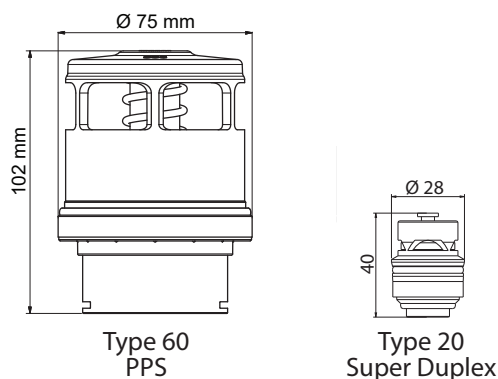
#### Frese ALPHA HCR Type 20 - Super Duplex

- 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

#### Frese 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



## Frese ALPHA Cartridge

### Technical Data

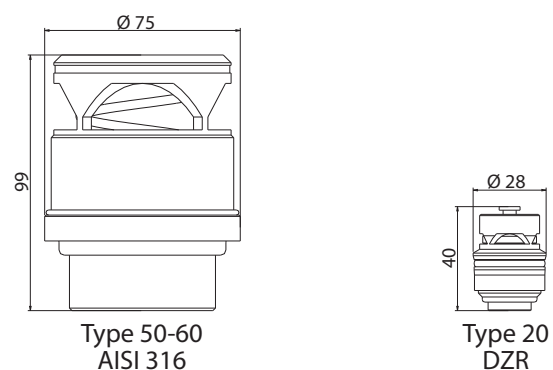
#### Frese ALPHA Type 50-60

- Suitable for wafer:** DN50-DN450
- Cartridge material:** AISI316, EN 1.4401
- O-rings:** EPDM 281
- Spring:** AISI 316, EN 1.4404
- Diaphragm:** HNBR (low pressure cartridges)  
HNBR reinforced (high pressure cartridges)
- Medium temperature:** -20°C to +110°C
- Diff. pressure range:** 7 - 600 kPa
- For Valve Housing:** DN50 - DN450

#### Frese ALPHA Type 20

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

### Dimensions



# Frese ALPHA Wafer HCR

## Frese 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
58-65175	7,500	2.083	33.02	47	10.9
58-65200	8,500	2.361	37.42	47	12.4
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
58-65365	30,500	8.472	134.28	47	44.5
58-65385	32,000	8.889	140.89	47	46.7
58-65396	34,000	9.444	149.70	49	48.6
58-65409	37,500	10.417	165.10	49	53.6
58-65413	38,500	10.694	169.51	50	54.4
58-65417	39,500	10.972	173.91	50	55.9
58-65420	40,500	11.250	178.31	52	56.2
58-65425	41,750	11.597	183.82	53	57.3
58-65430	43,000	11.944	189.32	54	58.5
58-65433	44,000	12.222	193.72	55	59.3
58-65440	48,000	13.333	211.33	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

#### Type 20 - AISI 316

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
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

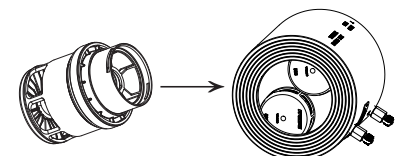
### Other materials on request

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

## Frese ALPHA Cartridge

### Product Programme

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



# Frese ALPHA Wafer HCR

## Frese ALPHA Cartridge

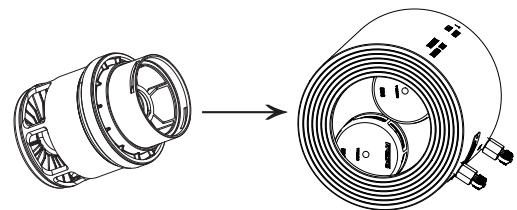
### Product Programme

#### 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

#### 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



## Frese ALPHA Wafer HCR

### 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	

### Frese 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 (Frese ALPHA HCR Cartridge Type 60) and -20°C to +120°C (Frese ALPHA HCR Cartridge Type 20 & Frese ALPHA Cartridge)
- 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 Frese ALPHA or Frese ALPHA HCR pressure independent flow cartridge
- The Frese 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

# Frese ALPHA Wafer HCR

## Frese ALPHA HCR Cartridge

### Specification text

- The Frese 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

## Frese ALPHA Cartridge

### Specification text

#### **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

#### **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

#### **High pressure 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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