

# ALPHA HCR Wafer

DN25-DN450

## Application

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

The Frese ALPHA HCR Cartridges - the third generation cartridges - are an integral part of the Frese ALPHA HCR Valve limiting the flow at the specified level even under fluctuating pressure conditions.

The patented design of these cartridges introduces a interchangeable orifice plate for design flexibility and a resistant diaphragm for high accuracy operation.

The high quality alloy ensures a long lifecycle and low maintenance in arduous applications such as seawater.

Available in sizes DN25 & DN40 to DN450, Frese ALPHA HCR wafer 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

- Sizes up to to DN450
- 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 as an option. Other certificates on request.
- Heat treatment acc. to 02747 Part 2#4 a+b
- Pressure test acc. to EN12266

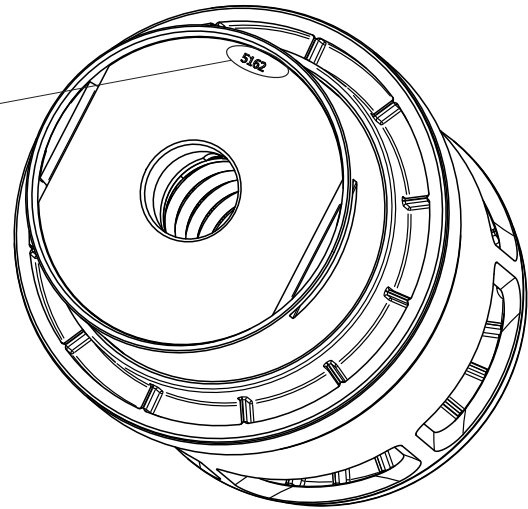
## ALPHA HCR Wafer

DN25-DN450

### Indication of flow rate on orifice plate

The four-digit number on the orifice plate is identical with the last four digits of the Frese product code. The orifice can be identified by this number and the corresponding flow rate can be read from the flow rate tables.

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]
59-35 <b>162</b>	3404	0.946	15.0	16
59-35200	4769	1.325	21.0	19
59-35227	5678	1.577	25.0	21



### Identification of cartridge

The three-digit number on the cartridge is identical with the first three digits of the Frese product code. The cartridge can be identified by this number and the corresponding flow rate can be read from the flow rate tables.

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]
<b>59-3</b> 5162	3404	0.946	15.0	16
59-35200	4769	1.325	21.0	19
59-35227	5678	1.577	25.0	21

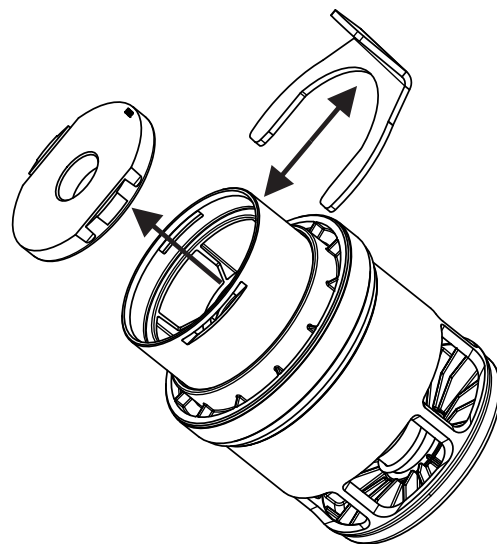


### Removal of orifice plate

The orifice plate can be removed by the special orifice-tool by sliding it in the grooves on the cartridge and back again. Then the orifice plate can be taken out.

The orifice plate can be clicked back into the cartridge again.

The orifice tool can be ordered under Frese part number: 08-0289.

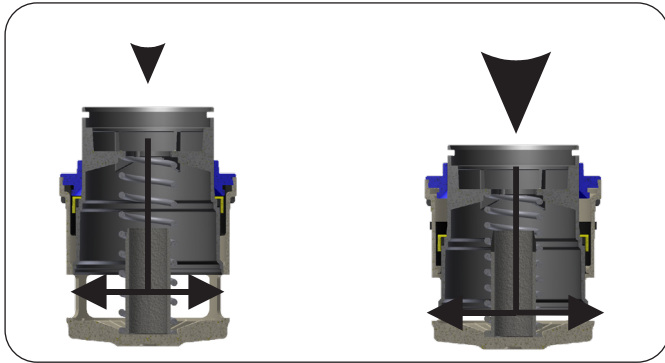


# ALPHA HCR Wafer

DN25-DN450

## 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 HCR 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:

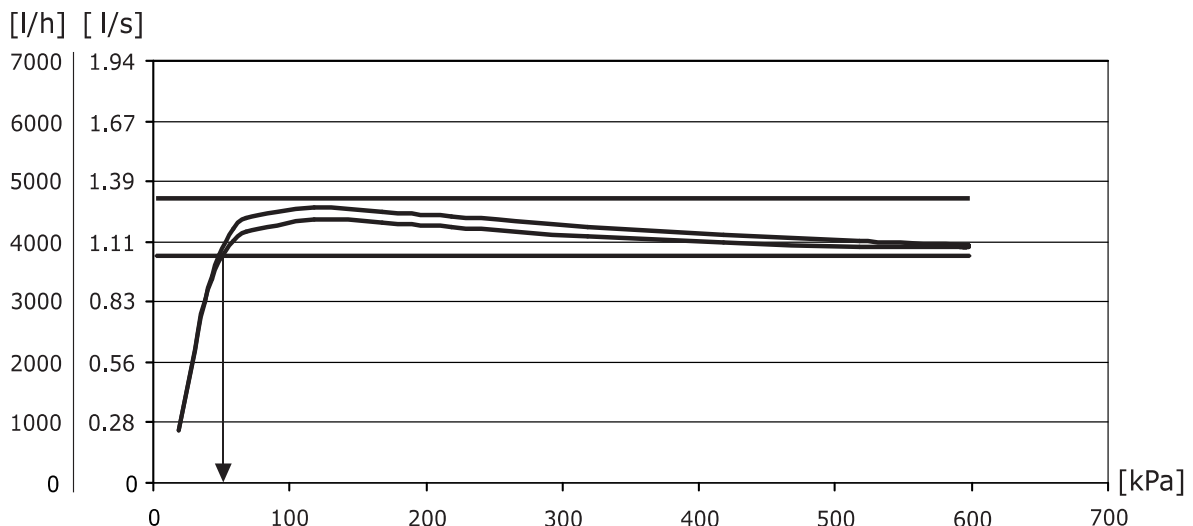
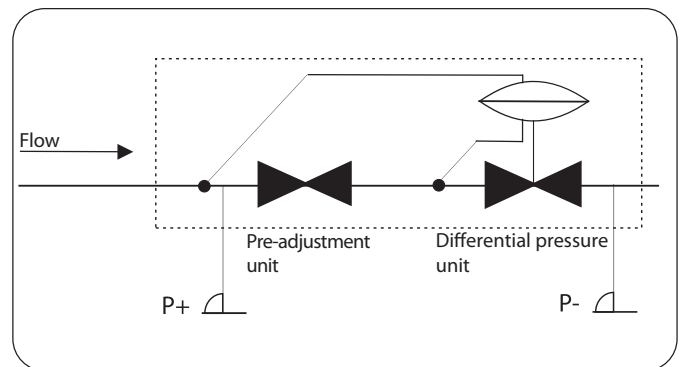
If the measured differential pressure is above the minimum Δp, the flow is the one stated on the graph for the valve.

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.

# ALPHA HCR Wafer

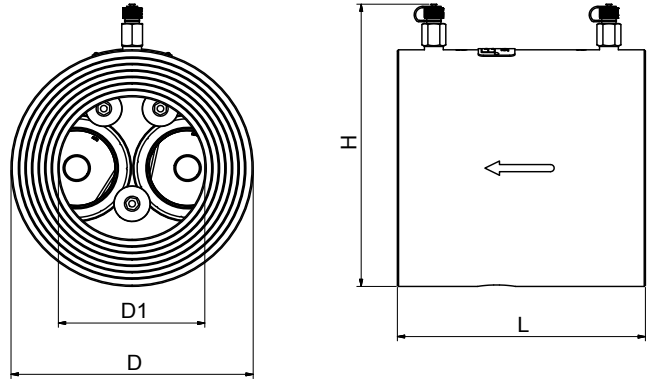
DN25-DN450

## Frese ALPHA HCR Valve Housing, Flanged Connection

### 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>	Nickel Aluminium Bronze EN 1982 CC333G-GS, ASTM B505 C95800
<b>P/T plugs:</b>	Nickel Aluminium Bronze EN 1982 CC333G-GS
<b>Fasteners:</b>	Duplex Steel
<b>Pressure class:</b>	PN16
<b>Temperature:</b>	-20°C to +50°C
<b>Flow range:</b>	56 l/h - 1,584 m <sup>3</sup> /h
<b>Flange compliance:</b>	ANSI/ASME B16.5 ISO 7005-2 EN 1092-2



**PLEASE NOTE!**

The pipe system shall be properly ventilated to avoid risk of air pockets. Seawater for HCR cartridge shall be filtered with filter mesh of max of 5 mm. In case HCR cartridges are immersed in water without flow, special cautions to prevent marine growth is to be taken, to maintain correct functionality of flow limiting valve.

### Product Programme

Frese no. (PN16)	Dimensions	L [mm]	D [mm]	D1 [mm]	H [mm]	Cartridge/ Valve/ Pcs.)	Max. flow rate m <sup>3</sup> /h
58-9038T-01	DN25	62	62	32	78	1	3
58-9058T-01	DN40	62	73	40	84	1	3
58-9073T-01	DN50	170	100	80	132	1	48
58-9083T-01	DN65	170	119	80	151	1	48
58-9093T-01	DN80	170	131	80	163	1	48
58-9103T-01	DN100	170	163	100	195	2	96
58-9163T-01	DN125	170	193	125	225	3	144
58-9113T-01	DN150	170	216	150	248	4	192
58-9123T-01	DN200	170	271	200	303	7	336
58-9133T-01	DN250	170	326	260	354	12	576
58-9143T-01	DN300	170	383	315	415	15	720
58-9153T-01	DN350	170	443	355	475	19	912
58-9173T-01	DN400	170	496	405	528	26	1,248
58-9183T-01	DN450	170	545	455	577	33	1,584

# ALPHA HCR Wafer

DN25-DN450

## Frese ALPHA HCR Cartridge

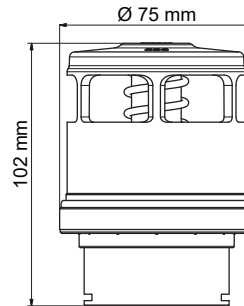
### Technical Data

#### Frese ALPHA HCR Type 60

<b>Suitable for wafer:</b>	DN50 to DN450
<b>HCR cartridge material:</b>	PPS glass-reinforced
<b>O-rings:</b>	EPDM 281
<b>Spring:</b>	Hastelloy C276 (high corrosion resistant)
<b>Diaphragm:</b>	HNBR reinforced
<b>Medium temperature:</b>	-20°C to +50°C (Seawater)
<b>Diff. pressure range:</b>	47 - 600 kPa (max 300 kPa recommended)

### Dimensions

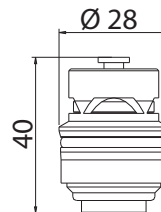
#### Type 60 - PPS



#### Frese ALPHA HCR Type 20

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

#### Type 20 - Super Duplex



# ALPHA HCR Wafer

DN25-DN450

## Frese ALPHA HCR Cartridge

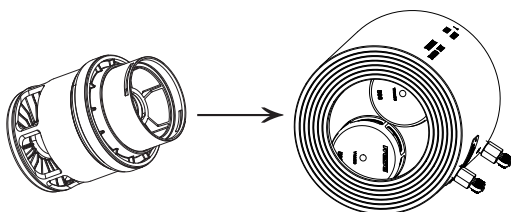
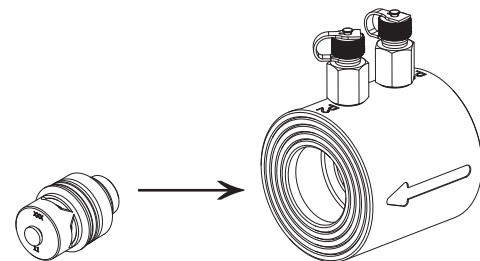
Product Programme

### PPS - Type 60 for DN50-DN450

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	134.28	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

### Super Duplex - Type 20 for DN25-DN40

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



# ALPHA HCR Wafer

DN25-DN450

## Frese ALPHA Cool Cartridge

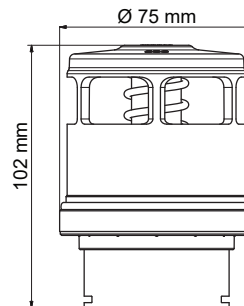
### Technical Data

Frese ALPHA Cool Type 60

- Suitable for wafer:** DN50 to DN800  
**HCR cartridge material:** PPS glass-reinforced  
**O-rings:** EPDM  
**Spring:** Stainless steel 1.4310  
**Diaphragm:** HNBR reinforced  
**Medium temperature:** -20°C to +80°C  
**Diff. pressure range:** 11 - 600 kPa

### Dimensions

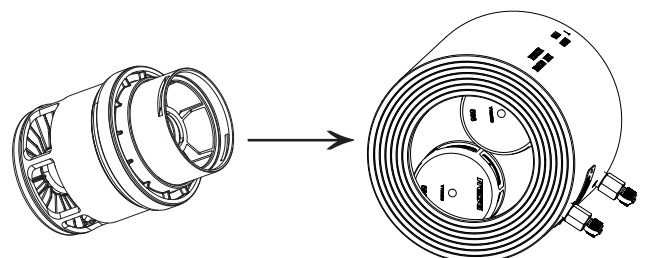
Type 60 - PPS



### Product Programme

#### PPS - Type 60 for DN50-DN800

Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
59-35162	3404	0.946	15.0	16	8.5
59-35200	4769	1.325	21.0	15	12.3
59-35227	5678	1.577	25.0	13	15.7
59-35252	6813	1.893	30.0	12	19.7
59-35274	7721	2.145	34.0	11	23.3
59-45252	9084	2.523	40.0	21	19.8
59-45274	10,220	2.839	45.0	18	24.1
59-45296	11,355	3.154	50.0	16	28.4
59-45303	12,491	3.470	55.0	18	29.4
59-45320	13,399	3.722	59.0	18	31.6
59-45333	14,762	4.101	65.0	16	36.9
59-45341	15,897	4.416	70.0	17	38.6
59-55296	17,033	4.731	75.0	36	28.4
59-55303	18,168	5.047	80.0	38	29.5
59-55313	19,304	5.362	85.0	37	31.7
59-55320	20,439	5.678	90.0	40	32.3
59-55333	21,575	5.993	95.0	36	36.0
59-55341	22,710	6.308	100.0	36	37.9
59-55349	24,300	6.750	107.0	38	39.4
59-55356	24,981	6.939	110.0	37	41.1
59-55371	27,600	7.667	121.5	40	43.6
59-55385	30,204	8.390	133.0	40	47.8
59-55396	31,794	8.832	140.0	41	49.7
59-55409	34,400	9.556	151.5	43	52.5
59-55417	36,570	10.158	161.0	46	53.9
59-55425	38,607	10.724	170.0	47	56.3
59-55433	40,878	11.355	180.0	50	57.8
59-65425	42,922	11.923	189.0	59	55.9
59-65433	45,420	12.617	200.0	62	57.7
59-65440	47,691	13.248	210.0	59	62.1



# ALPHA HCR Wafer

DN25-DN450

## 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	
Heat treatment acc. to 02747 Part 2#4 a+b	X	

## Specification Text

- The valve shall comply with flanges according to ANSI/ASME B16.5 standards
- The pressure class for the valve housing shall be PN16
- The valve housing shall be made of Nickel Aluminium Bronze - EN 1982 CC333G-GC
- The valve shall contain pressure independent flow cartridges
- The valve shall operate up to a maximum differential pressure of 600 kPa
- The temperature medium (sea water applications) working range for the valve shall be -20°C to +32°C
- The valve shall be supplied with 1" PT plugs
- The PT plugs shall be made of Nickel Aluminium Bronze
- The fasteners shall be made of duplex steel
- The valve shall be fitted with the Frese ALPHA HCR pressure independent flow cartridge
- The Frese ALPHA HCR cartridge for sizes DN50-DN800 shall be made of PPS glass-reinforced
- The Frese ALPHA HCR cartridge for sizes DN25 and DN40 shall be made of 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
- The Frese ALPHA HCR cartridge spring shall be made of Hastelloy C276 stainless steel
- The Frese ALPHA Cool cartridge spring shall be made of 1.4310 stainless steel

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Frese A/S  
Tel: +45 58 56 00 00  
info@frese.dk