Climate
Control

IMI Pneumatex

Zeparo Cyclone Max

Automatski odzračni ventil i separator

Nečistoće i magnetni separator sa ciklonskom tehnologijom

Breakthrough
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a better world

Zeparo Cyclone Max

Sveobuhvatni asortiman proizvoda za odvajanje taloga u vodenim grejnim i rashladnim sistemima. Raznovrsnost primene kao i njihova modularna konstrukcija su jedinstveni. Ciklonska tehnologija – podizanje efikasnosti separacije nečistoća na sledeći nivo.

Ključne karakteristike

Visoka efikasnost nezavisna od dimenzija

Efikasnost separatora nečistoća raste sa porastom brzine protoka. Pad pritiska ostaje stabilan za vreme rada, bez obzira na količinu prikupljenih nečistoća. Čak i veća zaštita za veće protoke, npr u rashladnim aplikacijama. Pogodan za grejne i rashladne instalacije.

Čisti i štiti instalaciju

Štiti kritičnu investicionu opremu od neispravnosti pa čak i kvara zbog nečistoća, kao što su kotlovi, pumpe, ventili, čileri, i kalorimetri. Bez akumulacije rizika - sakupljene nečistoće mogu se jednostavno i brzo ukloniti uz pomoć drenažnog ventila. Smanjuje troškove održavanja I povezane troškove.

Magnetni dodatak

Optimizuje efikasnost razdvajanja za mulj i magnetitne (oksid gvožđa) depozite koji se sastoje od finijih magnetitnih čestica. Jednostavno rukovanje i čišćenje.

Tehnički opis

Namena:
Zatvoreni sistemi grejni i hladne vode.

Medij:
Neagresivan, netoksičan fluid. Antifriz na bazi etilen ili propilen glikola do 50%.

Pritisak:
Maks. dopušteni pritisak, PS: 10 bar
Min. dopušteni pritisak, PSmin: 0 bar

Temperatura:
Maks. dopuštena temperatura, t_{Smax}:110 °C
Min. dopuštena temperatura, t_{Smin}: -10 °C

Materijal:
Čelik. Boja berilijum.

Označavanje:
Telo: smer protoka.
Etiketa: PN, DN, TS i TSmin.

Priključak:
Prirubnice PN 16 prema EN-1092-1.
Krajevi za zavarivanje.

Transport i skladištenje:
Na suvim mestima.

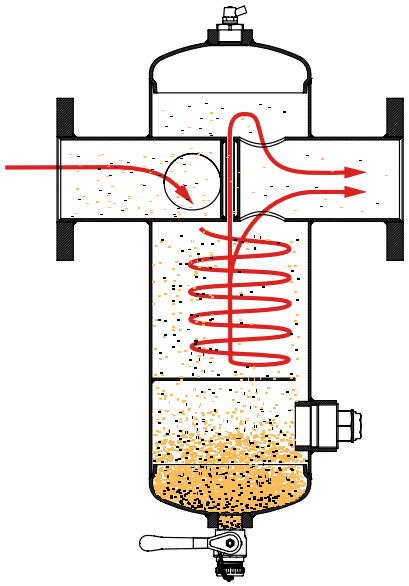
Standardi:
Konstruisano u skladu sa PED 2014/68/EU.

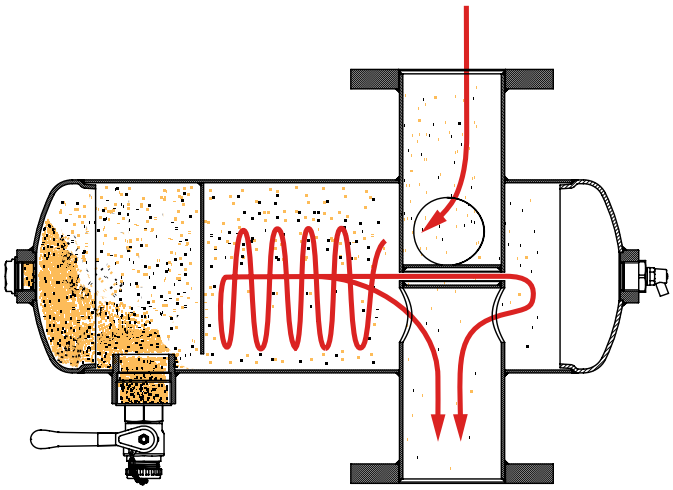
Princip separacije

Princip separacije

Zeparo Cyclone Max se zasniva na različitim principima separacije koji garantuju visoku efikasnost separacije:

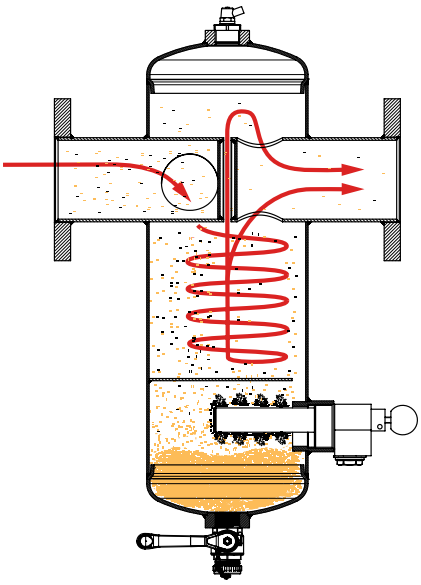
- Centrifugalne sile – ciklon kreira rotaciju unutar Zeparo separatora što rezultira dodatnim silama koje deluju na čestice nečistoća. Kombinacijom gravitacione i centrifugalnih sila dobijamo visoku efikasnost.
- Poredeći male gravitacione sile, centrifugalne sile su značajno veće a zasnovano na brzini unutar separatora.
- Razlika između gustine vode i čestica nečistoće (koje imaju veću gustinu) potiskuje nečistoće ka spoljnom zidu Zeparo.
- Protok prema dole: kretanje ka dole kreirano u Zeparo omogućuje skupljanje nečistoća u komori na dnu odakle se lako uklanjaju.
- Sa dodatkom ZCXM magnetnom šipkom porast efikasnosti separacije magnetita.

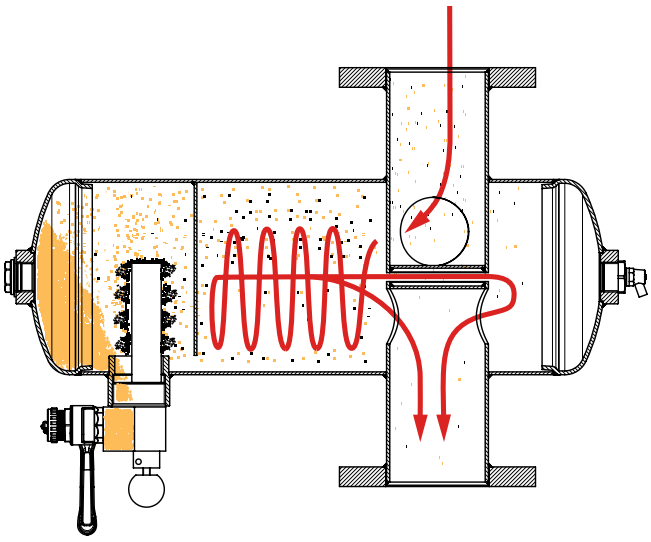




Ciklonalni princip funkcioniše nezavisno od načina ugradnje. Uređaj se može montirati u horizontalne cevi ili u vertikalne cevi sa smerom protoka nadole (videti stranu 9). Efikasnost separatora Zeparo Cyclone Max je najveća kada je separatorska komora postavljena uspravno.

Opciona magnetna šipka tipa ZCXM unapređuje performanse procesa separacije, omogućavajući efikasno uklanjanje čestica magnetita granulacije do 5 µm.

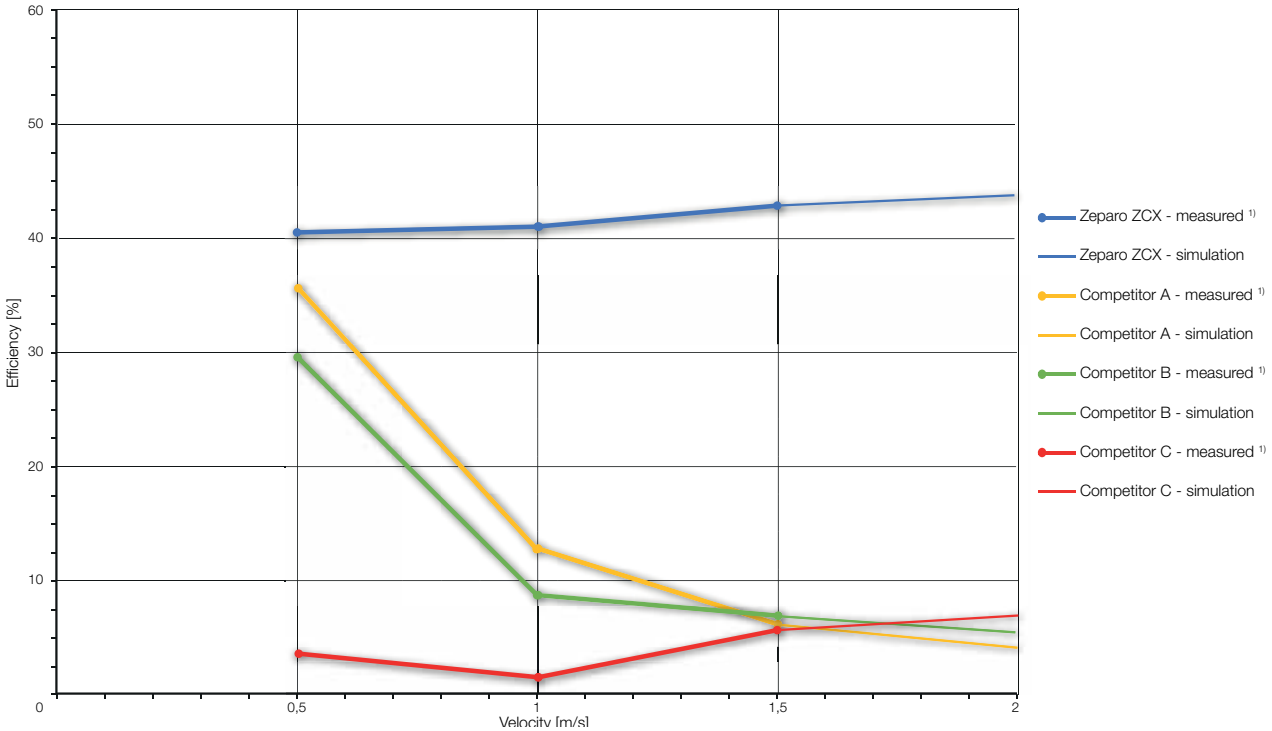




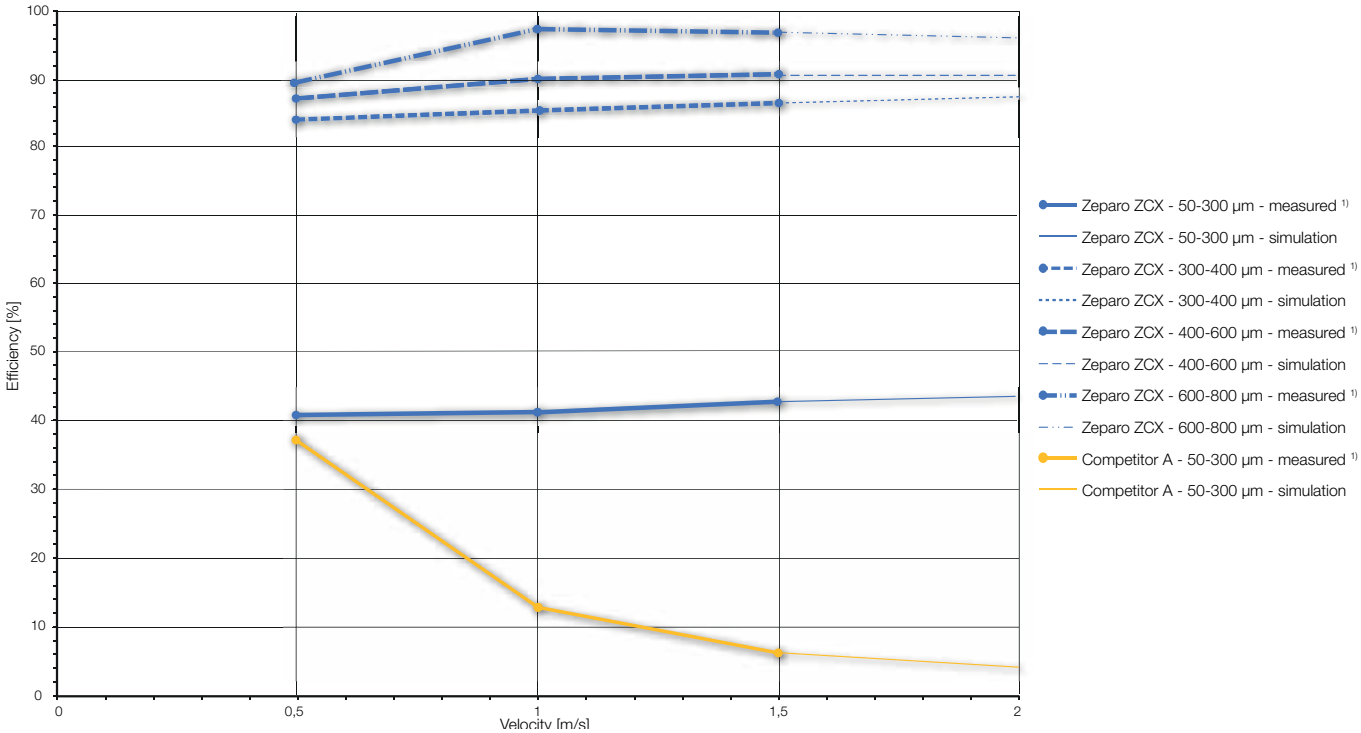
Efikasnost separacije

Poređenje Zeparo Cyclone Max sa separatorima koji imaju različite tehnologije

Separator [2] DN65 - Glass particles 50-300 µm



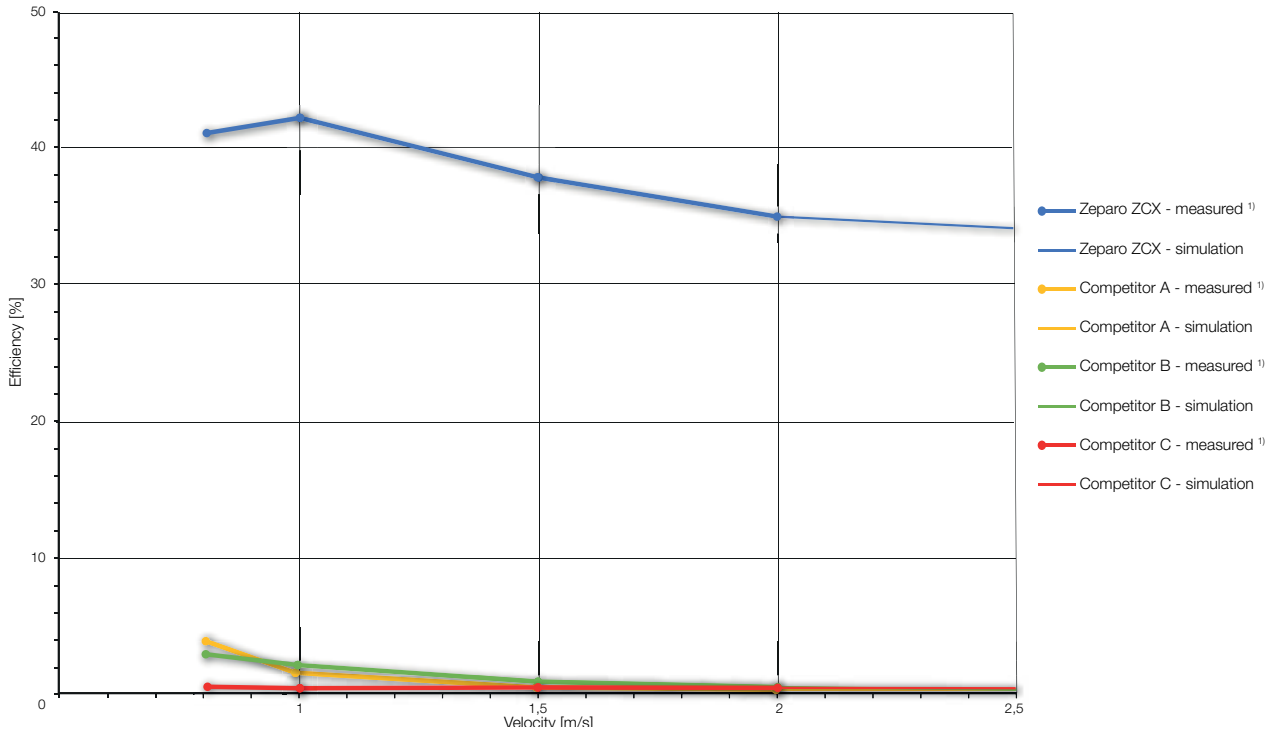
Separator [2] DN65 - Glass particles with batch differentiation 50-800 µm



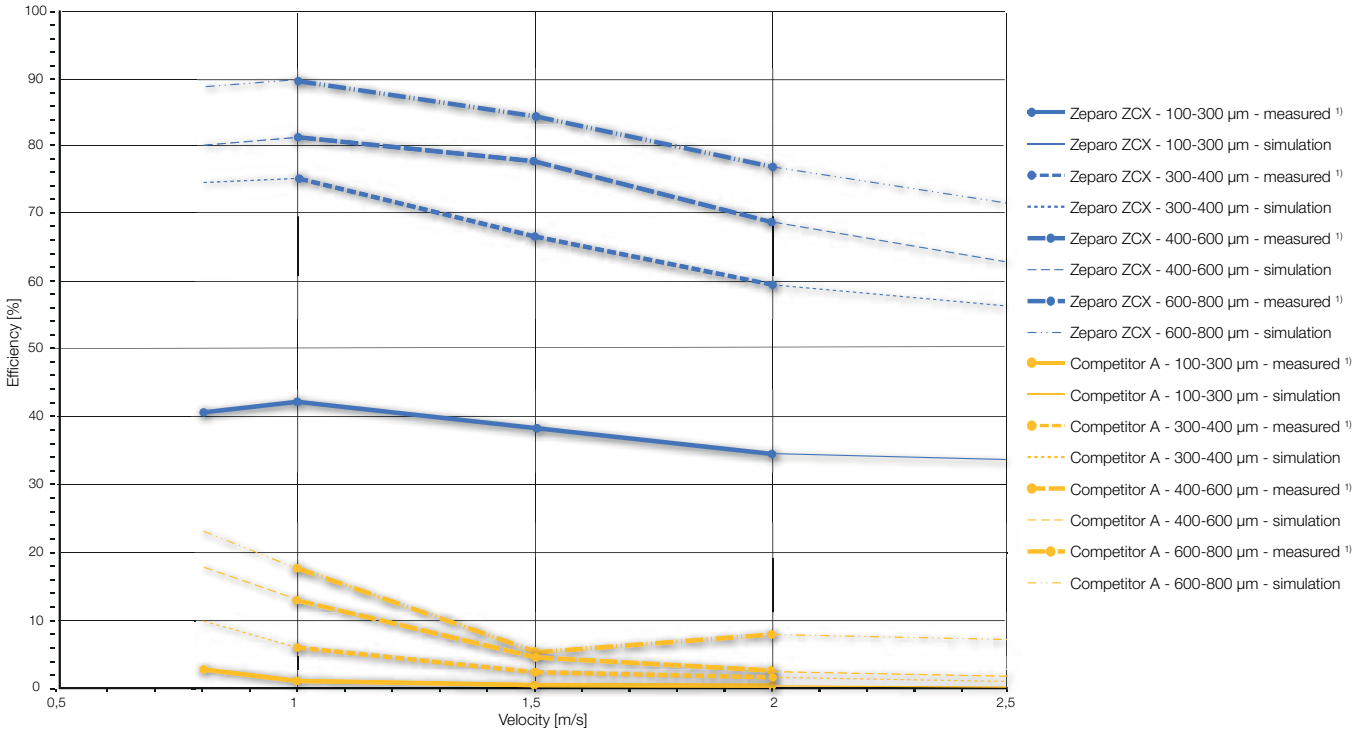
1) HLK Stuttgart GmbH, DAkkS Deutsche Akkreditierungsstelle D-PL-11026-01-00, Measured values according to test report No.: H.2412.P.817.IMI, 17.th January 2025.

2) Preporučena je horizontalna ugradnja, sa komorom za separaciju postavljenom uspravno

Separator [2] DN200 - Glass particles 100-300 µm



Separator [2] DN200 - Glass particles with batch differentiation 100-800 µm



1) HLK Stuttgart GmbH, DAkkS Deutsche Akkreditierungsstelle D-PL-11026-01-00, Measured values according to test report No.: H.2412.P.817.IMI, 17.th January 2025.

2) Preporučena je horizontalna ugradnja, sa komorom za separaciju postavljenom uspravno

Magnetic flux density and typified magnetic flux on magnetic rods

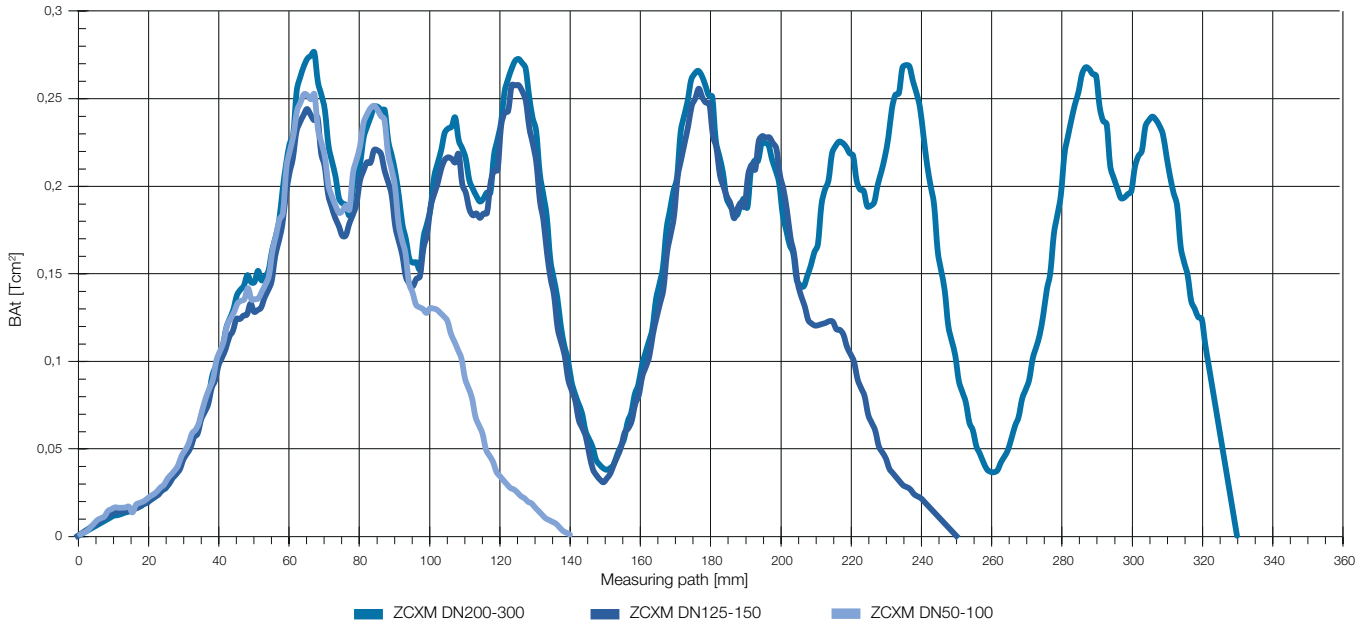
The characteristic measurable physical quantity for evaluating the separation potential of a magnetite separator is the magnetic flux density B on the magnetic rod used. The magnetic flux density is an areal density. If this is measured over the magnetically effective surface of a magnetic rod and related to the surface under consideration as a product, an indivudial key parameter is obtained which we refer to here as “typified magnetic flux BAt”.

The typified magnetic flux BAt is therefore the relevant parameter for the absorption potential of magnetite on the magnetic bar. The typed magnetic flux BAtcum accumulated over the entire effective surface correlates with the maximum magnetite actually adhering to the magnetic rod and can be used as a simple and meaningful characteristic parameter for determining the quality of a magnetic bar. The mere use of a maximum value or average value for the magnetic flux density B, on the other hand, is not meaningful.

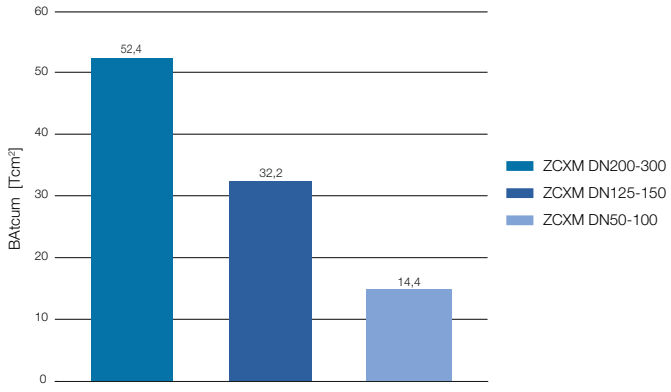
In some cases, individual magnetic rods absorb significantly more magnetite than would be expected from the values of the cumulative magnetic flux BAtcum, e.g. with the ZCXM DN 125-150, with the Competitor C and also when comparing all ZCXMs with competitors. This is mainly due to the magnetic bar geometry and also to the test procedure.

An overview of Zeparo ZCXM magnetic rods

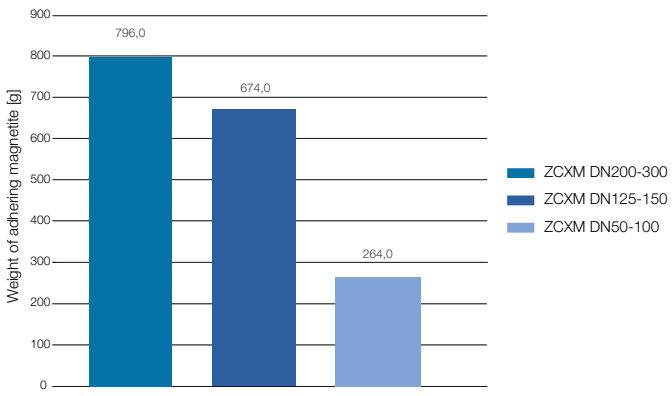
Magnetic flux distribution over effective rod surface
- application range for Zeparo ZCXM DN50-300 [2]



Cumulative magnetic flux over effective rod surface
- application range for Zeparo ZCXM DN50-300 [2]



Maximum dry absorption capacity of magnetite powder
- application range for Zeparo ZCXM DN50-300 [3]

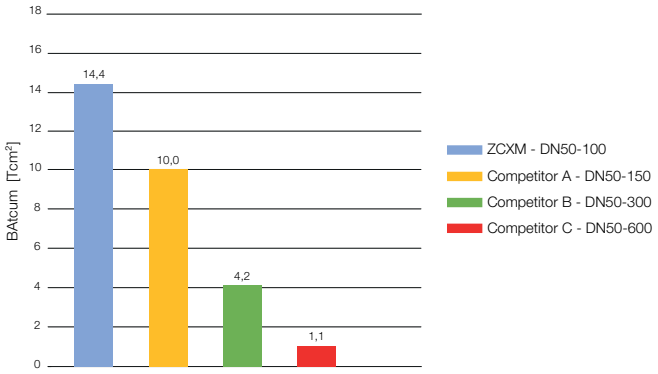


2) Measured values for BAt calculation taken from the investigation report: Thyssenkrupp Magnettechnik - Zweigniederlassung der Thyssenkrupp Schulte GmbH, M. Schlottke, Untersuchungsbericht: “Magnetische Chararakterisierung von 4 Filterstäben”, 20th January 2025.

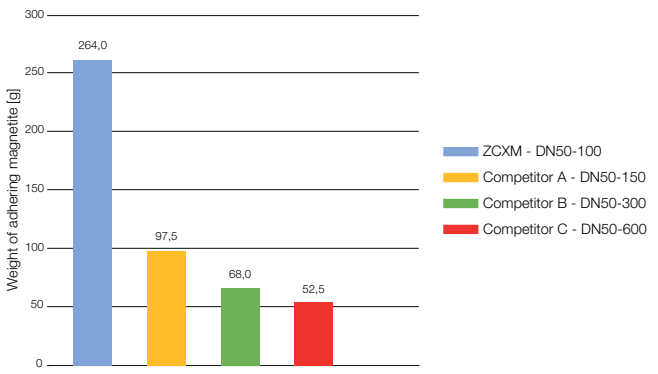
3) Measured values taken from the investigation report: Thyssenkrupp Magnettechnik - Zweigniederlassung der Thyssenkrupp Schulte GmbH, M. Schlottke, “Untersuchung von 4 Filterstäben hinsichtlich Magnetitanhanftung”, 21st January 2025.

A comparison of the Zeparo ZCXM with other magnetic rod designs

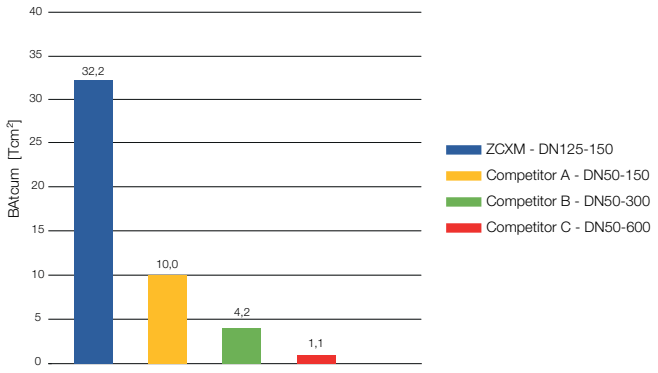
Cumulative magnetic flux over effective rod surface - application range DN50-100 [2]



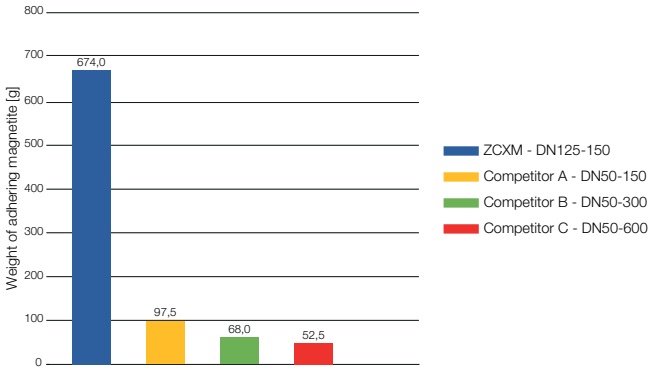
Maximum dry absorption capacity of magnetite powder - application range DN50-100 [3]



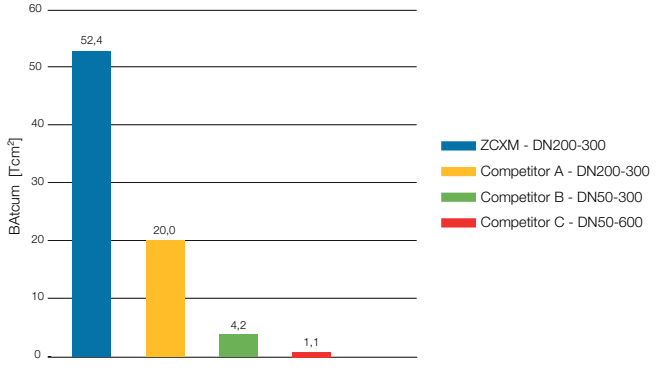
Cumulative magnetic flux over effective rod surface - application range DN125-150 [2]



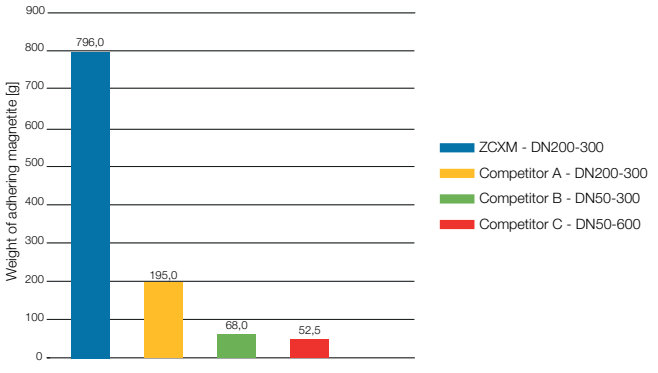
Maximum dry absorption capacity of magnetite powder - application range DN125-150 [3]



Cumulative magnetic flux over effective rod surface - application range DN200-300 [2]



Maximum dry absorption capacity of magnetite powder - application range DN200-300 [3]

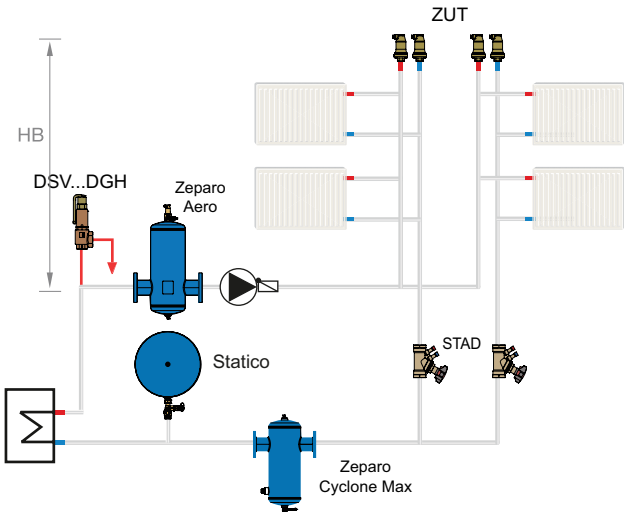


2) Measured values for BAt calculation taken from the investigation report: Thyssenkrupp Magnettechnik - Zweigniederlassung der Thyssenkrupp Schulte GmbH, M. Schlottke, Untersuchungsbericht: “Magnetische Chararakterisierung von 4 Filterstäben”, 20th January 2025..

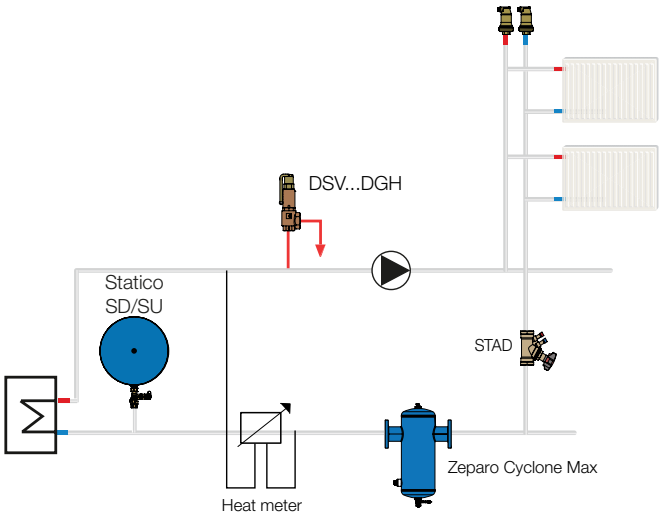
3) Measured values taken from the investigation report: Thyssenkrupp Magnettechnik - Zweigniederlassung der Thyssenkrupp Schulte GmbH, M. Schlottke, “Untersuchung von 4 Filterstäben hinsichtlich Magnetitanhanftung”, 21st January 2025.

Primeri aplikacija

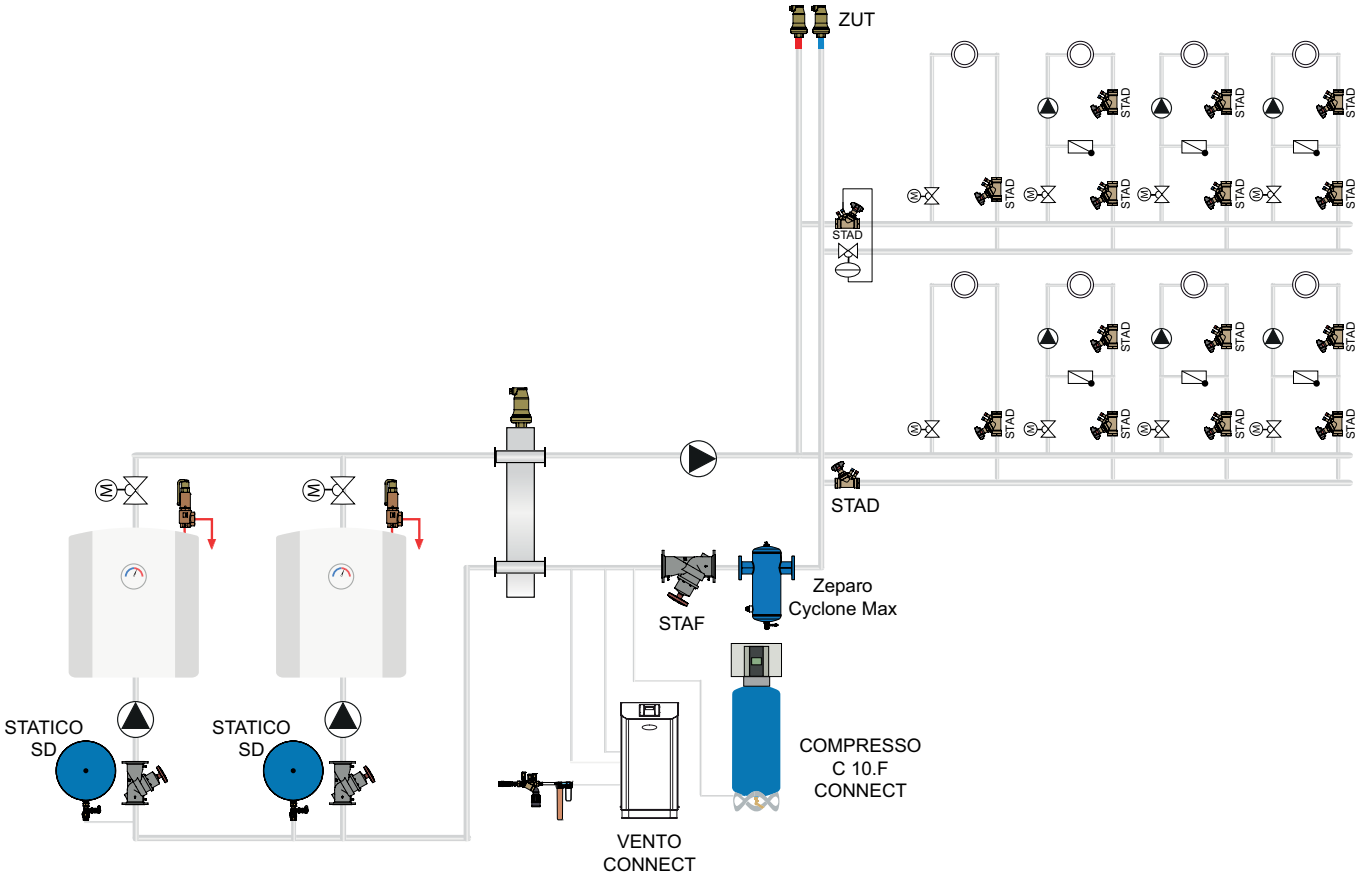
Sistem sa kotlom - PN16



Sistem sa razmenjivačem toplote

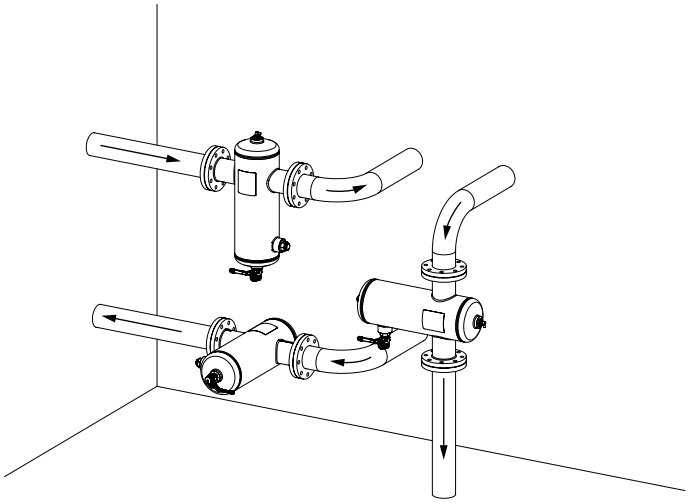


Sistem sa kotlom - PN25



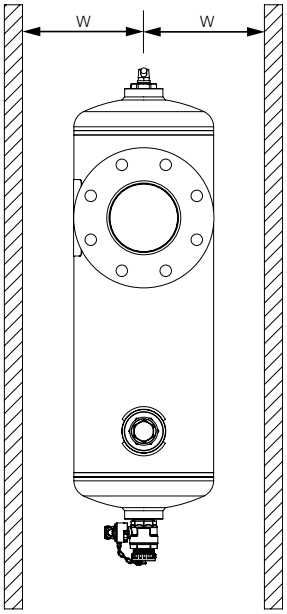
Zeparo Cyclone Max separator može se montirati kako na povratu tako i direktno na toplotnom izvoru. Nema zahtevanih minimalnih rastojanja između npr. cevnih lukova pre i posle Zeparo Cyclone Max.

Montaža



Rastojanje od zida (sve verzije)

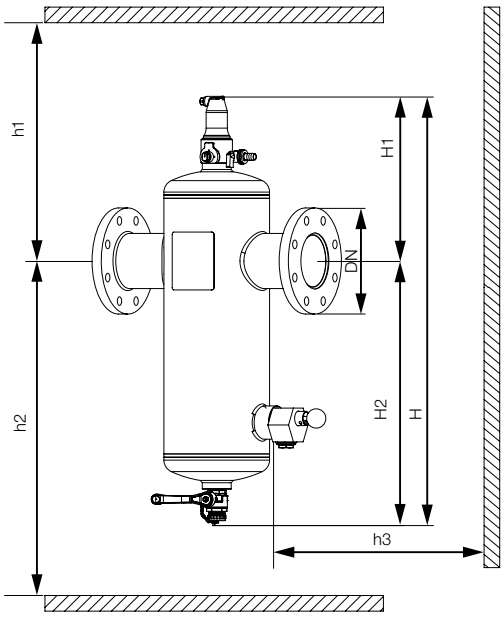
Tip	W	sa izolacijom
ZCX 50	134	175
ZCX 65	134	175
ZCX 80	160	200
ZCX 100	160	200
ZCX 125	212	250
ZCX 150	212	250
ZCX 200	279	320
ZCX 250	355	395
ZCX 300	355	395



razmaci zid-plafon-pod (sa ugrađenim ZUTX-om)

Tip	DN	H	H1	H2	h1	h2	h3
ZCX 50	50	770	325	445	575	698	377
ZCX 65	65	770	325	445	575	695	377
ZCX 80	80	910	355	555	605	805	377
ZCX 100	100	910	355	555	605	805	377
ZCX 125	125	1130	415	715	665	965	487
ZCX 150	150	1130	415	715	665	965	487
ZCX 200	200	1440	490	950	740	1200	600
ZCX 250	250	1680	545	1135	795	1385	600
ZCX 300	300	1830	585	1245	835	1495	600

Za ostale dimenzije, pogledajte odeljak Artikli.



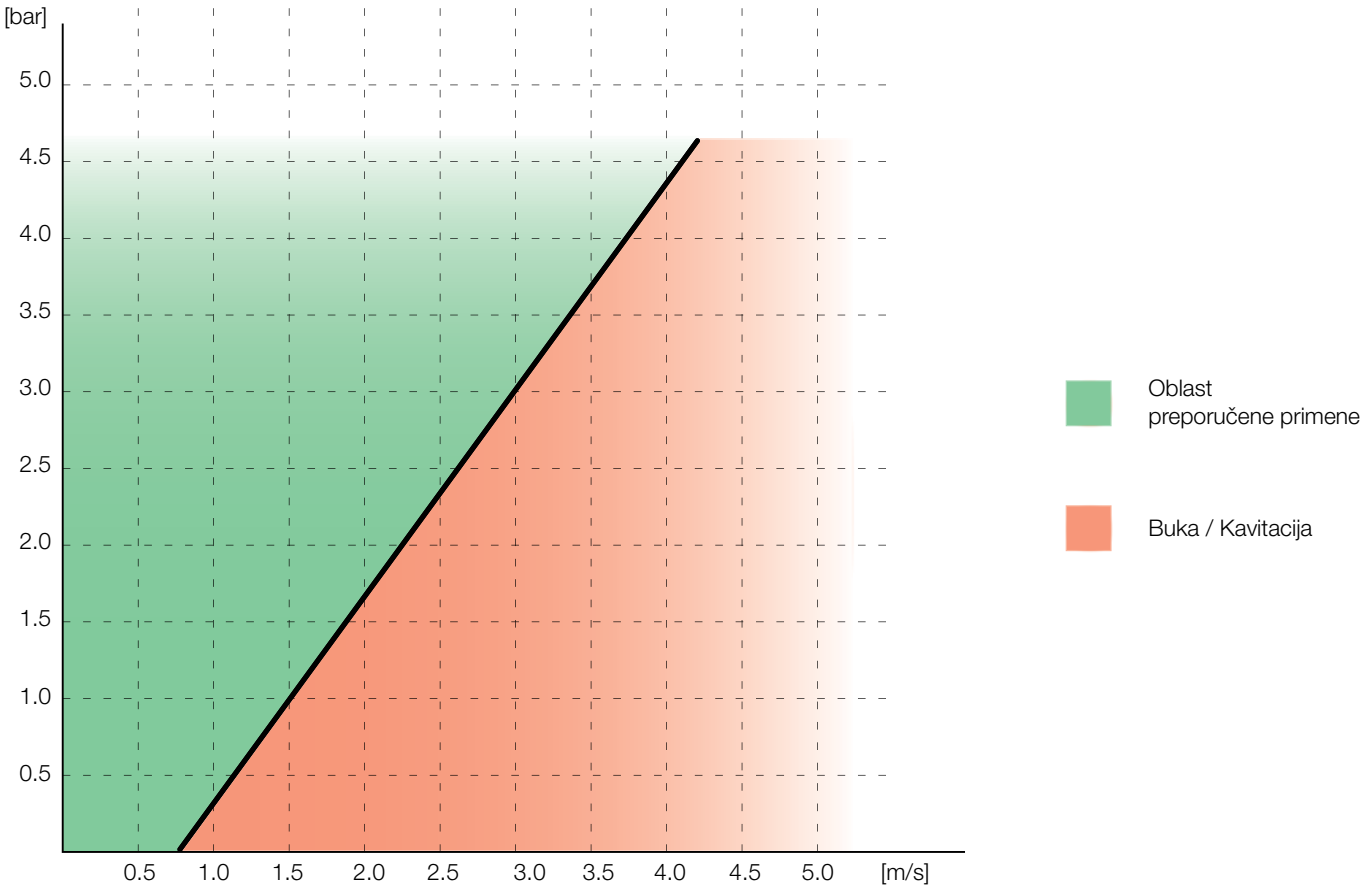
Veličine i Protoci

DN	VN [l]	qN [m³/h]	q_{max} [m³/h]
50	11	6	24
65	11	11	40
80	23	18	56
100	24	33	95
125	70	58	148
150	73	93	216
200	175	184	375
250	370	336	575
300	430	535	815

VN = Nominalna veličina
qN = Nominalni protok/protok
qN_{max} = Maksimalni protok

Minimalni pritisak u sistemu

Pritisak u sistemu



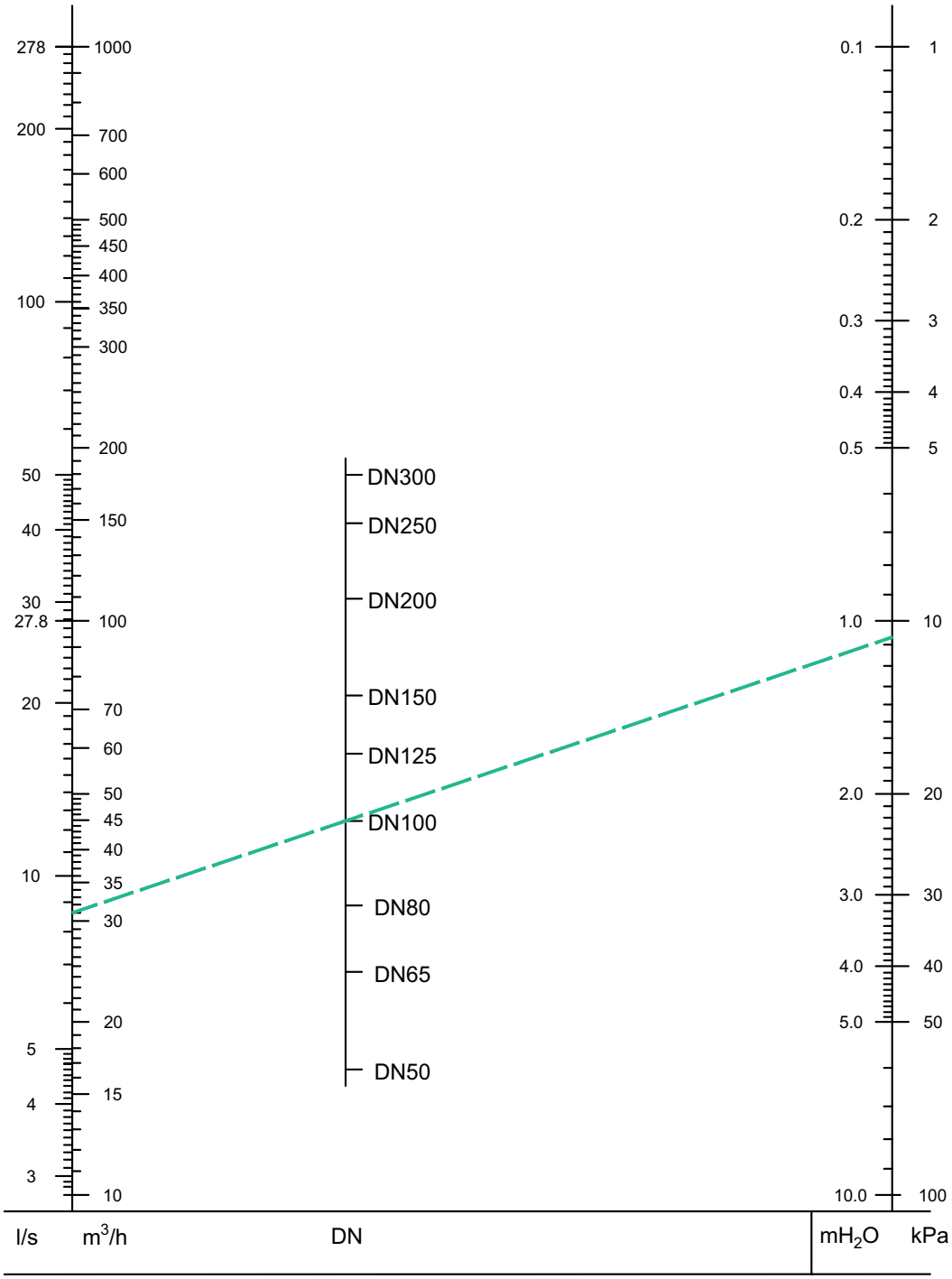
Brzina

Kao što se vidi na gornjem grafiku, pri brzini fluida od 2 m/s potrebno je održavati minimalni statički+dinamički pritisak od 1,7 bar na ulazu u Cyclone Max kako bi se izbegla kavitacija.

Izbor

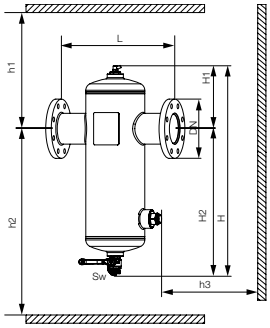
Grejanje

Primer:
Grejni sitem sa cevi DN 100 i protokom 31 m^3/h. Povucite liniju od tačke 31 m^3/h do zahtevane dimenzije DN 100 i pročitajte pad pritiska 10,08 kPa.



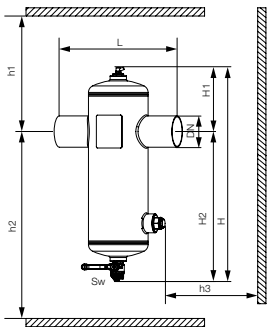
Protok ne sme biti veći od maksimalnog protoka predviđenog za datu dimenziju.
Za tačnu kalkulaciju, molimo koristite softver HySelect.

Artikli



Prirubnički spoj
Instalacija: horizontalna, vertikalna (smer protoka na dole).

Tip	DN*	Sw	H	H1	H2	h1**	h2	h3	L	q_N [m³/h]	q_{max} [m³/h]	Težina [kg]	Kvs [m³/h]	Kataloški broj
ZCX 50	50	G1	655	210	445	460	695	377	350	6	24	19	21,3	303041-10900
ZCX 65	65	G1	655	210	445	460	695	377	350	11	40	21	38,5	303041-11001
ZCX 80	80	G1	795	240	555	490	805	377	470	18	56	29	57,1	303041-11101
ZCX 100	100	G1	795	240	555	490	805	377	470	33	95	33	94,9	303041-11201
ZCX 125	125	G1	1015	300	715	550	965	487	635	58	148	59	142,0	303041-11301
ZCX 150	150	G1	1015	300	715	550	965	487	635	93	216	63	201,5	303041-11401
ZCX 200	200	G2	1325	375	950	625	1200	600	775	184	375	167	361,0	303041-11501
ZCX 250	250	G2	1565	430	1135	680	1385	600	890	336	575	242	570,0	303041-11601
ZCX 300	300	G2	1715	470	1245	720	1495	600	1005	535	815	277	731,8	303041-11701

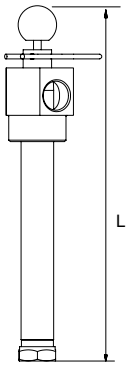


Veza za zavarivanje
Instalacija: horizontalna, vertikalna (smer protoka na dole).

Tip	DN	Sw	H	H1	H2	h1**	h2	h3	L	q_N [m³/h]	q_{max} [m³/h]	Težina [kg]	Kvs [m³/h]	Kataloški broj
ZCX 50 W	50	G1	655	210	445	460	695	377	340	6	24	15	21,3	303041-20900
ZCX 65 W	65	G1	655	210	445	460	695	377	340	11	40	17	38,5	303041-21002
ZCX 80 W	80	G1	795	240	555	490	805	377	460	18	56	22	57,1	303041-21102
ZCX 100 W	100	G1	795	240	555	490	805	377	460	33	95	24	94,9	303041-21202
ZCX 125 W	125	G1	1015	300	715	550	965	487	625	58	148	48	142,0	303041-21302
ZCX 150 W	150	G1	1015	300	715	550	965	487	625	93	216	50	201,5	303041-21402
ZCX 200 W	200	G2	1325	375	950	625	1200	600	755	184	375	125	361,0	303041-21502
ZCX 250 W	250	G2	1565	430	1135	680	1385	600	870	336	575	202	570,0	303041-21602
ZCX 300 W	300	G2	1715	470	1245	720	1495	600	985	535	815	237	731,8	303041-21702

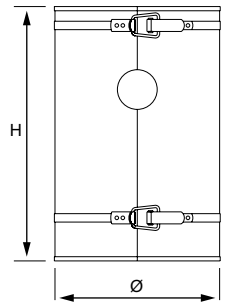
*) Prirubnice PN16
**) +115 kada se koristi ZUTX

Pribor



Zeparo Magnet ZCXM
Magnetni Dodatak. Za naknadnu montažu na licu mesta na Zeparo Cyclone Max.
T-račva sa magnetnom šipkom i uloškom. Za povećanje separacije magnetita.
Grejni i sistemi hladne vode.
Antifriz na bazi etilen ili propilen glikola do 50%.

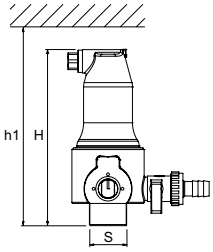
Tip	PS [bar]	ts [°C]	Težina [kg]	L	Kataloški broj
ZCXM 50-100	10	110	3,6	277	303051-10004
ZCXM 125-150	10	110	4,0	387	303051-10005
ZCXM 200-300	10	110	4,5	500	303051-10006



Zeparo ZCXAI
Termička izolacija za Zeparo Cyclone Max and Zeparo Aero.
Za sisteme grejanja.

Tip	DN	Ø	H	S*	Težina [kg]	Kataloški broj
ZCXAI 50/65	50/60	250	540	40	3,7	303040-70000
ZCXAI 80/100	80/100	300	680	40	7,3	303040-70001
ZCXAI 125/150	125/150	400	900	40	14,4	303040-70002
ZCXAI 200	200	535	1135	40	22,3	303040-70003
ZCXAI 250	250	690	1380	40	38,0	303040-70004
ZCXAI 300	300	690	1530	40	41,5	303040-70005

*) Debljina izolacije
Dodatne dimenzije dostupne na zahtev.



Zeparo ZUTX eXtra-lockable
Spoljni navoj. Vertikalna instalacija.

Tip	H	h1	Težina [kg]	D	PS [bar]	Kataloški broj
ZUTX 25	159	184	1,3	R1	10	789 1325

dpu = Opseg radnog pritiska

Proizvodi, tekstovi, fotografije, grafikoni i dijagrami u ovom dokumentu mogu biti predmet promene od strane IMI bez prethodnog obaveštenja ili obrazloženja. Za najažurnije informacije o našim proizvodima i specifikacijama, molimo Vas posetite climatecontrol.imiplc.com.

SRB Zeparo Cyclone Max ed.2b 02.2026