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Magnetic-Dynamic Separator



The leading brand for individual hot water, steam & solar systems for hotels, hospitals and industrial applications.

Customization

ECOTHERM produces extensive turnkey systems as well as separate components. Each plant is specifically aligned to the customer's individual requirements. The base is our own production facility in Austria and a wide product portfolio, which enables the combination of all relevant energy sources such as oil, gas, electricity and renewable energies.

Premium quality

Amongst others, our High Capacity Water Heaters are made of high quality stainless steel and guarantee a long-life cycle and perfect hygiene. ECOTHERM is certified to ISO 9001 : 2015 with all European standards. Our products fully comply with the requirements of the European Pressure Equipment Directive 2014/68/EC or ASME Sect. VIII Div. 1. Our own test bench assures highest quality and reliability.

Innovation

We are always open to new ideas, we constantly investigate new technologies and we develop path-breaking and future-oriented products. Many patents are the result of the in-house innovation management. With an elaborated 3D visualization and Virtual Reality, ECOTHERM systems can be guided and controlled at all times.

Premium service

Clients benefit from our extensive service at consulting, planning, engineering, supervision and training. ECOTHERM regularly improves the know-how of its partners and clients with selective trainings.

Efficiency

ECOTHERM has slim decision-making structures. Consequent research and development work permanently optimize the energy efficiency and the durability of the products. ECOTHERM turnkey solutions offer an optimal cost-benefit ratio.

Experience

With thousands of installations in the last 30 years in Europe, the Middle East, Asia, North Africa and Central America, ECOTHERM has become the leading brand in technology and innovation for individual hot water, steam and solar solutions. The ECOTHERM team is continuously refreshing their know-how with exceptional trainings and seminars that the ECOTHERM Academy provides.

Reliability

ECOTHERM systems can be monitored all around the clock and can be serviced at low cost, quickly and efficiently with an advanced control panel. Our products and plants have low maintenance requirements.

Sustainability

We save valuable resources by using renewable energies. ECOTHERM high-performance plants have minimal space requirements and provide maximum energy savings. When planning new products, ECOTHERM engineers take all the qualitative and economic principles into account in accordance with the ecological principles.

Partnership

We live in a partnership with all our customers, suppliers and employees. This relationship is characterized by honesty, commitment, openness, trust and reliability. The object is a joint long-term success.

Internationality

The international alignment of ECOTHERM with branches in Dubai, Mexico and Hungary and further partners in more than 25 countries is the base for our flexible and efficient project implementation.

ECOTHERM®

Magnetic-Dynamic Separator EMDS

Magnetic-Dynamic Separator EMDS

Requirements

Advantages

4

Magnetic-Dynamic Separator EMDS 01 - 07

Units for pipeline installation, 1 m³/h to 28 m³/h

6

Magnetic Dynamic Separator EMDS 08 - 14

Floor standing units, 23 m³/h to 235 m³/h

Space requirement

7

Magnetic-Dynamic Separator EMDS

Selection and pressure loss diagram

9

Magnetic-Dynamic Separator EMDS 15 -20

Dimensions

Space requirements

Selection and pressure loss diagram

10

Maintenance and cleaning

13

References

14

ECOTHERM Magnetic-Dynamic Separator EMDS Requirements

Due to its unique thermal properties and easy availability, water is an indispensable energy carrier that is indispensable in plant engineering. The wetting of metallic plant components with water leads to electrochemical processes known as corrosion.

Water with its constituents causes material removal on metallic materials, which is transported with the medium in the form of loose particles. Modern plants often no longer provide settling niches for these oxidation products, and the disruptive freight remains in circulation.

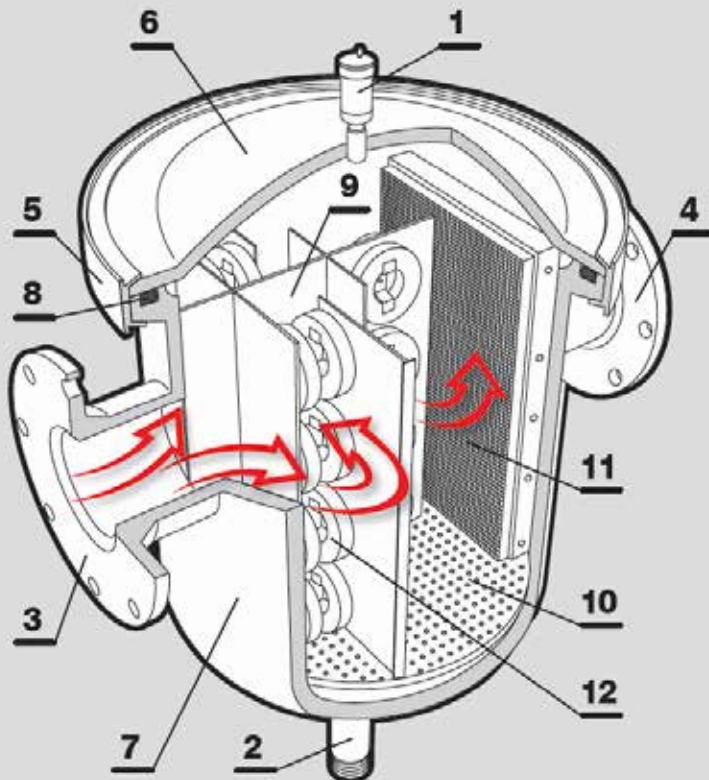
Its existence is only noticed when it has caused damage. Other water-side disturbances include incrustations, which

are formed from corrosion foci, and deposits, which consist of corrosion particles. A significant amount of deposition comes from water hardness.

A response of the professional circles to the leaner equipment and plant construction is the amendment of the guideline VDI 2035 part 1 "Prevention of damage in hot water heating systems" (Dec. 2005), which is dedicated to the quality of the filling and make-up water. Softening devices using the ion exchange process have become established on the market. In this process, the hardness constituents calcium and magnesium are exchanged for sodium. However, the sodium hydrogen carbonate formed in the process remains in the system. This sodium hydrogen

carbonate, commonly known as sodium bicarbonate, is thermally unstable and forms new insoluble compounds on the hot boiler wall.

The Magnetic-Dynamic Separator is a proven device to permanently protect systems from corrosion, scale and sludge loads without chemical additives. The content of mineral substances and the electrical conductivity of the water are reduced and the pH value is corrected. Wherever the EMDS is used, the water quality required by the VDI 2035 guideline is sustainably achieved and maintained.



Device description

The EMDS consists of a pressure vessel (7) with a removable lid (6) for internal inspection. The lid contains the vent (1), the curved bottom contains the discharge connection (2). The metal baffles (9) in the tank guide the flowing water past the permanent magnets (12) attached to it. The baffles divide the tank into zones with different flow velocities. In the lower part of the tank there is a perforated plate (10) which separates the sediment basin from the top. The filter screen (11) is removable and attached to the protruding outlet connection (4).

Functional description

The medium flows through several strong magnetic fields of the unit. The magnets continuously withstand corrosion products, which are nothing other than mixed iron oxides. The particle size is irrelevant, from the smallest corrosion to large particles. The permanent magnetic water treatment leads to the formation of oxide coatings that passivate the metallic plant components. This corrosion protection is produced without external energy and without the use of chemicals.

Advantages of the Magnetic-Dynamic Separator



Shortly after installation



A few weeks later

- Flushing of new plants is not necessary. *After switching on the water circuit, the mobilized impurities are quickly and effectively separated.
- Filling and make-up water does not need to be pretreated.
- The water quality according to guideline VDI 2035 is achieved within a short time.
- The plant is supported in the formation of a corrosion-inhibiting oxide coating.
- Once designed, the plant efficiency is maintained by the EMDS during the entire operating time.
- Clear water operated plant, thus optimum heat transfer in boilers and heat exchangers. Significant reduction in electrical conductivity.
- Correction of the pH value
- Water hardness is reduced to a negligible level. All properties also apply to existing plants.
- Incrustations and deposits are broken down and decomposed.
- Surface heating systems become sludge-free. Existing systems are rehabilitated.
- System separation between heating and heat generator is not required.

***) For brazed copper tube installations, this recommendation is limited due to the fluxes used.**

Device selection

The EMDS is a dynamically acting device. It requires a defined media flow in order to develop its full effect. A good separation result is achieved when the EMDS is installed in the largest circuit with continuous output. The product range covers throughput ranges from 1 m³/h to 235 m³/h and more. The standard units are approved for operating conditions of max. allowable pressure 10 bar and max. allowable temperature 110°C. Other sizes and operating conditions are available on request. The units are designed and built according to the Pressure Vessel Ordinance. They comply with the European Directive on Pressure Equipment 97/23/EC.

Hot water heating systems: Not all

circuits of a heating system have the calculated amount of water flowing through them all the time. The control system demands only as much water as is necessary for the momentary heat demand. The following diagrams provide information about the choice of the installation location. The flow rate is decisive for the selection of the EMDS.

Cold water systems: Due to the lower temperature spread, larger quantities of media are circulated in cold water systems. If antifreeze is used, the density and viscosity of the medium may have to be taken into account.

Open cooling water systems, recooling plants: Due to the high input of bio-

mass from the air into the cooling water, it is recommended to install a mechanical filter upstream of the EMDS.

Hot water: The unit size should also be selected here according to the water flow rate. Special units are used according to the operating conditions.

Condensate: Very fine double iron oxides (magnetite) are formed in the condensate. The Magnetic-Dynamic Separator is characterized here by a high separation rate. The unit should be installed as close as possible to the degasser of the feed water.

ECOTHERM Magnetic-Dynamic Separator EMDS 01 - 07

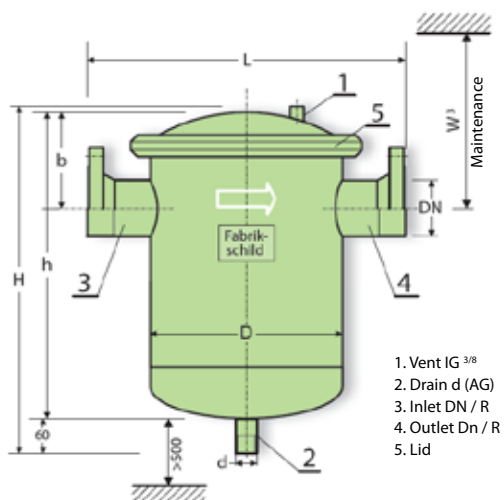
Units for pipeline installation, 1 m³/h to 28 m³/h

Magnetic-Dynamic Separator EMDS
Magnetic field-supported fine sludge separator for permanent separation of ferrous solid particles from <1µm from circulation systems, for sustainable cleanliness of the circulation medium, to build up a passivation layer and to prevent corrosion in metallic plant components. The strong permanent magnets are located directly in the circuit medium! Due to optimized flow

guide plates, the circuit medium flows slowly past the permanent magnets in a defined manner in order to achieve the highest possible separation efficiency. Integrated 4-fold system: sedimentation, magnetic separation, water treatment for lime separation and mechanical filtration. For maintenance work, the unit can be completely opened to clean the magnet insert as well as the stainless steel filter!

Design: Welded steel tank, St 37, with inlet and outlet flange according to DIN 2501/PN 16, as suspended unit for installation in pipelines. Venting sleeve, drainage nozzle, removable lid, unit painted on the outside (cold water units protected against condensation), stainless steel internal fittings, filter mesh 0.5 mm Mesh size, separation particle size = 0,001 mm

EMDS Type	Connection size ²		Water flow rate Q from - to max ¹	Tank Volume V ca.	D	H	L	h	b	d	W ³	Weight ⁴	Separation Grain Size
	Flange PN 16	Threaded connection											
	DN	R											
EMDS 01	-	1"	0,9 - 2,0	5	159	360	300	235	40	1"	300	11	1
EMDS 02	-	1 1/4"	1,9 - 3,3	5	159	360	300	220	55	1"	300	11	1
EMDS 03	-	1 1/2"	2,8 - 5,0	5	159	360	300	215	60	1"	300	11	1
EMDS 04	50	-	4,5 - 9,5	12	219	545	375	320	90	1 1/4"	500	28	1
EMDS 05	65	-	8,0 - 13	12	219	545	375	310	100	1 1/4"	500	29	1
EMDS 06	80	-	11 - 18	27	273	650	430	390	115	1 1/4"	600	52	1
EMDS 07	100	-	16,5 - 28	46	324	755	570	485	120	1 1/2"	700	98	1



Standard units are approved for maximum permitted pressure PS = 10 bar and maximum permitted temperature TS = 110 °C. Higher operating temperature and higher nominal pressure available on request.

- 1) Pressure drop Δp is to be determined according to the selection and pressure drop diagram.
- 2) Other connection dimensions available on request.
- 3) Recommended maintenance height
- 4) Operating weight = sum of weight + vessel capacity.

ECOTHERM Magnetic-Dynamic Separator EMDS 08 - 14

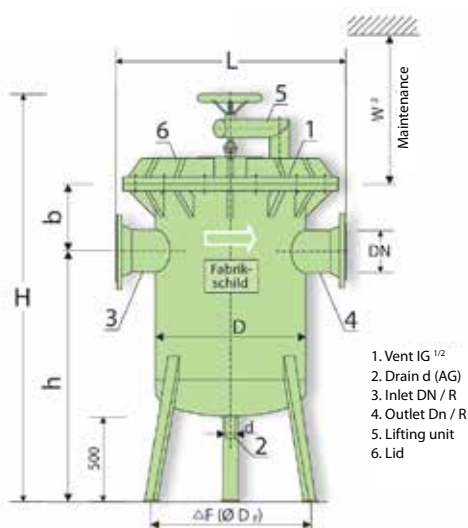
Floor standing units, 23 m³/h to 235 m³/h

Magnetic-Dynamic Separator EMDS
Magnetic field-supported fine sludge separator for the permanent separation of ferrous solid particles from <1 µm from circulation systems, for sustainable cleanliness of the circulation medium, for the build-up of a passivation layer and for the prevention of corrosion in metallic system parts. The strong permanent magnets are located directly in the circuit medium. The cir-

cuit medium flows slowly past the permanent magnets in a defined manner due to optimised flow guide plates in order to achieve the highest possible separation efficiency. Integrated 4-fold separation system: sedimentation, magnetic separation, water treatment for lime separation and mechanical filtration. The unit can be opened completely for maintenance work in order to clean the magnet insert and the stainless steel filter.

Design: Welded steel tank, St 37, with inlet and outlet flanges according to DIN 2501/PN 16, as a stand-alone unit for installation in pipes. Venting sleeve, drainage nozzle, removable lid, unit painted on the outside (cold water unit protected against splash water), stainless steel inner fittings, filter mesh 0.5 mm, separation particle size = 0,001 mm

EMDS Type	Connection size	Water flow rate Q from - to max ¹	Tank Volume V ca.	D	H	L	h	b	d	W ³	Weight ⁴	Separation Grain Size
	Flange PN 16											
EMDS 08	100	23 - 34	84	406	1430	680	1050	160	1 1/2"	910	196	1
EMDS 09	125	28 - 43	117	457	1550	735	1090	200	1 1/2"	1000	244	1
EMDS 10	150	40 - 62	167	508	1660	800	1175	210	1 1/2"	1060	305	1
EMDS 11	150	59 - 90	302	620	1955	900	1405	220	2"	770	436	1
EMDS 12	200	85 - 110	308	620	1950	900	1375	250	2"	800	443	1
EMDS 13	200	94 - 150	500	718	2200	1015	1565	250	2"	850	620	1
EMDS 14	250	130 - 235	752	820	2450	1185	1735	280	2"	1030	775	1

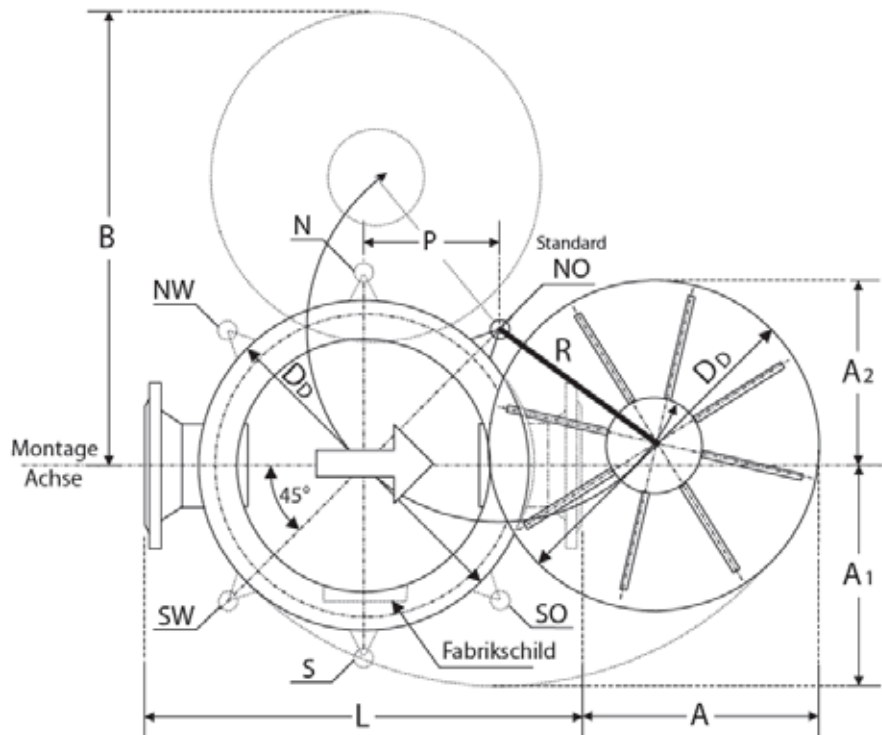


Standard units are approved for maximum permitted pressure PS = 10 bar and maximum permitted temperature TS = 110 °C. Higher operating temperature and higher nominal pressure available on request.

- 1) Pressure drop Δp is to be determined according to the selection and pressure drop diagram.
- 2) Other connection dimensions available on request.
- 3) Recommended maintenance height
- 4) Operating weight = sum of weight + vessel capacity

ECOTHERM Magnetic-Dynamic Separator EMDS 08 - 14

Space requirement



Space requirement for maintenance work

To perform EMDS cleaning, the unscrewed lid is tilted to the side. Due to its heavy weight, a lifting device (HV) is provided for this purpose. The space requirement can be taken from the table. By default, the axis of rotation of this device is located 45° from the pipeline assembly axis (NO). Other points of rotation of the HV are possible according to the dashed points indicated by cardinal points. The direction of flow must be observed.

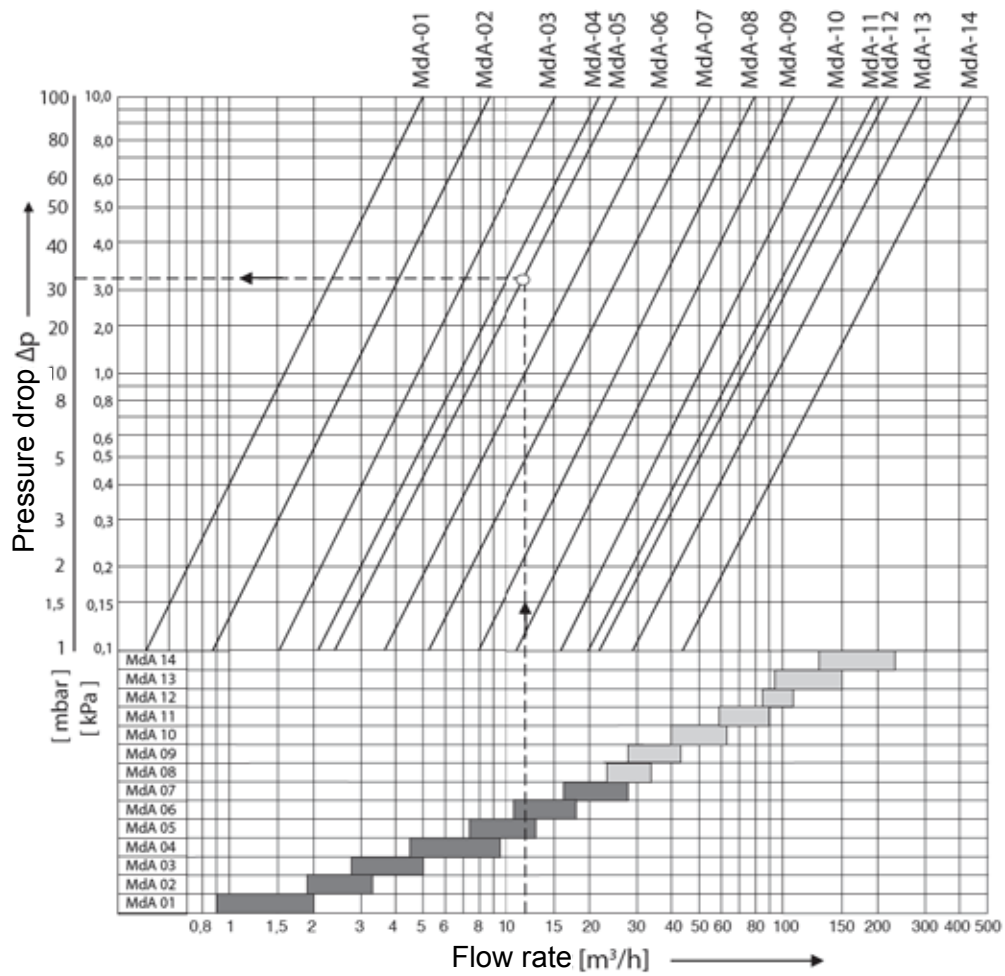
Nr.	Connection DN	L mm	D ₀ mm	A mm	A ₁ mm	A ₂ mm	P mm	B mm
EMDS 08	100	680	580	440	425	340	240	980
EMDS 09	125	735	640	500	465	370	262	860
EMDS 10	150	800	705	550	505	400	285	950
EMDS 11	150	900	790	640	570	445	315	1090
EMDS 12	200	900	790	640	570	445	315	1090
EMDS 13	200	1015	900	740	632	500	500	1250
EMDS 14	250	1185	1010	820	703	555	555	1410

Projection "A" or "B" of the lid tilted to the side in mm.

The lid may only be tilted to the side when the tank is firmly mounted, danger of tipping!

ECOTHERM Magnetic-Dynamic Separator EMDS

Selection and pressure loss diagram



Example

Required: EMDS for flow rate of 12 m^3/h

Selected: EMDS 05

Unit resistance at given flow rate is 32 mbar

ECOTHERM Magnetic-Dynamic Separator EMDS 15 - 20

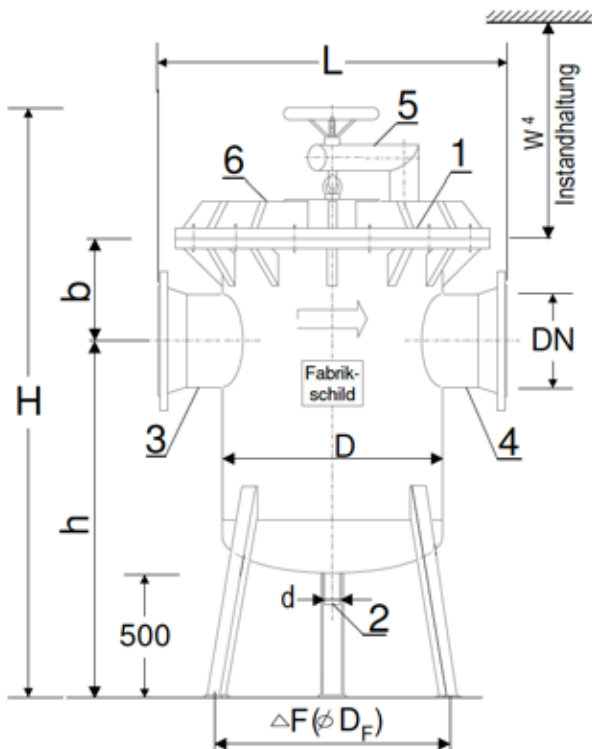
Dimensions

Magnetic-Dynamic Separator EMDS
Magnetic field assisted separator for permanent separation of solid particles from closed circuit systems, for sustainable cleaning of the energy medium and for building up a passivation layer to prevent corrosion in metallic plant com-

ponents. Integrated 4-fold system: sedimentation, magnetic separation and water treatment, mechanical filtration.
Design: Steel tank welded, St 37, with inlet and outlet flanges according to DIN 2501/PN 16, as floor-mounted unit for installation in pipelines. Vent-

ing sleeve, drainage nozzle, removable lid with lifting device, painted on the outside, (cold water units protected against condensation), stainless steel interior, filter mesh 0.5 mm

EMDS Type	Connection Flange PN 16 DN2	Water Flow Q bis max. ¹	Initial Pressure loss DP max. ¹	Tank Volume V ca.	D	H	L	h	d	W ⁴ min.	Empty weight ³	Separation Grain Size
	mm	m ³ /h	mbar	l	mm	mm	mm	mm	R Gew	mm	kg	µm = 0,001 mm
EMDS 15	250	205 - 325	50-115	170	508	1660	770	1120	1½ "	400	330	1
EMDS 16	250	305 - 490	50-120	320	620	1950	900	1330	2 "	600	460	1
EMDS 17	300	480 - 700	66-130	515	718	2200	1020	1485	2 "	800	650	1
EMDS 18	400	600 - 950	62-146	780	820	2450	1160	1630	2 "	1150	820	1
EMDS 19	500	920 - 1465	67-157	1470	1016	2890	1380	1950	3 "	1200	1450	1
EMDS 20	600	1300 - 2100	126-305	2500	1216	3300	1620	2210	3 "	1500	2150	1

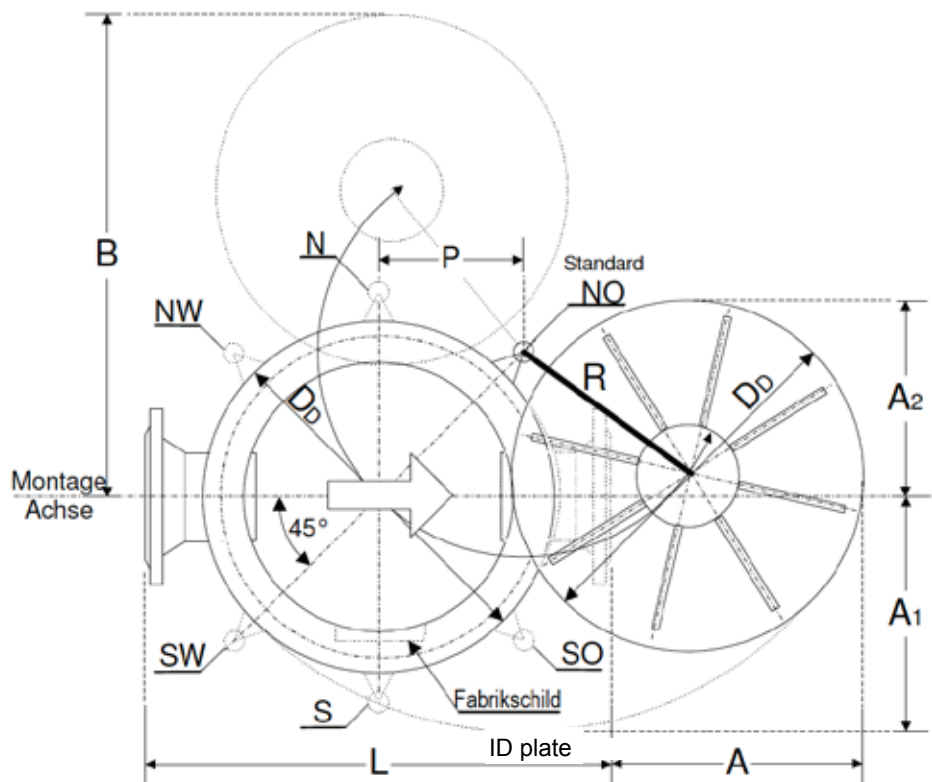


Standard devices are approved for maximum permitted pressure PS = 10 bar and maximum permitted temperature TS = 110 °C, higher operating temperatures and higher pressure on request.

- 1) Initial pressure drop ΔP [mbar] to be determined according to selection diagram.
- 2) Other connections on request
- 3) Sum of empty weight and tank capacity = operating weight.
- 4) Recommended maintenance height

ECOTHERM Magnetic-Dynamic Separator EMDS 15 - 20

Space requirement



Space requirement for maintenance work

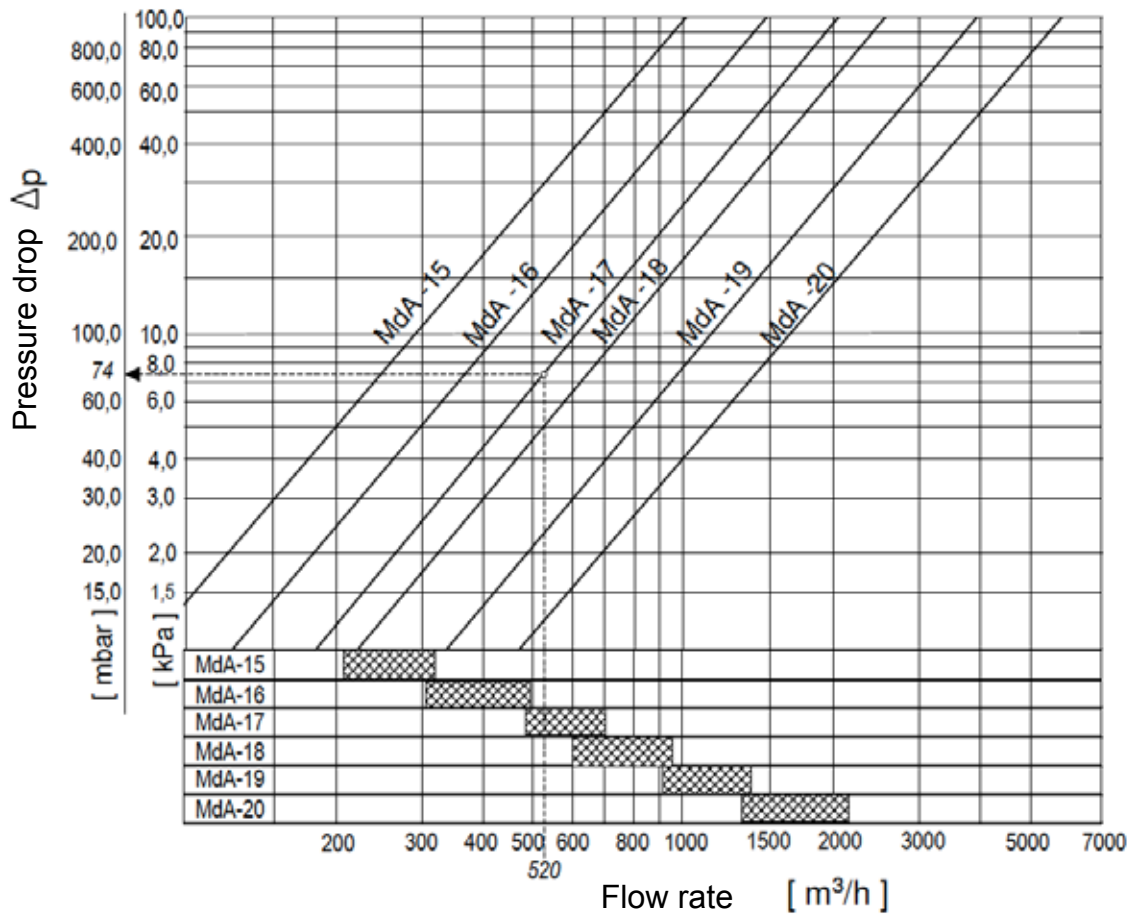
For cleaning the separator, the unscrewed cover is tilted to the side. Due to its heavy weight, a lifting device (HV) is provided for this purpose. The space requirement can be taken from the chart. By default, the axis of rotation of this device is located 45° from the pipe mounting axis (NO). Other rotation points of the HV are possible at the dashed locations indicated by cardinal points. The direction of flow must be observed.

Nr.	Shell/Connection DN	L	D	D _A	A1	A ₂ ≈R	P	B
EMDS-15	500/250	800	705	550	505	385	285	950
EMDS-16	600/250	900	790	640	570	430	315	1090
EMDS-17	700/300	1015	900	740	632	485	355	1250
EMDS-18	800/400	1185	1010	820	703	535	395	1410
EMDS-19	1000/500	1380	1230	1150	820	740	525	1740
EMDS-20	1200/600	1620	1620	1380	970	830	590	2070

The lid may only be tilted to the side when the tank is firmly mounted, danger of tipping over!

ECOTHERM Magnetic-Dynamic Separator EMDS 15 - 20

Selection and pressure loss diagram



Example

Required: EMDS for flow rate of 520 m³/h

Selected: EMDS 17

Unit resistance at given flow rate is 74 mbar

Maintenance and cleaning

ECOTHERM Magnetic-Dynamic Separator EMDS

Maintenance and cleaning of the separator

In the first four weeks after commissioning, the magnetic and sieve filter insert of the separator must be cleaned 1x / week,

- 2. - 3. month every 14 days
- 4th - 6th month every 21 days
- 7th - 12th month 1x / month

in the following period the separator must be cleaned at least 2x / year. This position is to be calculated for 1 year. Total number of cleanings in the first year = 18 complete with travel and all necessary seals and other materials (O-ring seals can be used several times) The cleaning is to be carried out according to the manufacturer's technical documentation and recorded in it.

The maintenance work on the unit requires a time investment:

- 1 man from approx. 1 hr. EMDS 01 (DN25) to EMDS 07 (DN100)
- 1 man from approx. 1½ hrs. EMDS 08 (DN100) to EMDS 14 (DN250)
- 2 men from approx. 2 hrs. EMDS 15 (DN 250) to EMDS 20 (DN 600)



Magnetic insert before cleaning



Magnetic insert after cleaning

ECOTHERM® References

Metal Industry for Central Heating

EMDS 17 - DN350



Automotive Industry - Chiller Cycle for Cooling

EMDS 17 - DN350





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Philosophy

Mission

ECOTHERM amazes its customers with individual solutions for hot water, steam and solar systems.

Vision

The leading brand for individual hot water, steam & solar systems for hotels, hospitals & industrial applications.

Values

Quality
Sustainability
Experience
Innovation
Individuality
Partnership

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