

Residential Applications | Sanitary and Heating

General Catalogue

grünbeck

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Grünbeck water treatment – more than 70 years of experience

QUALITY MADE IN GERMANY

For more than 70 years now, Grünbeck Wasseraufbereitung has been one of the most renowned companies for water treatment in household, trade and industry in Europe. All around the globe, our customers trust in our expertise when it comes to ideal water qualities. The company's headquarters are located in the Bavarian city of Hoechstaedt/Donau, approximately 100 km west of Munich, where all of Grünbeck's products are manufactured – high-class German workmanship with high standards of quality. We have a tight net of sales and service locations in Europe and thus not only ensure the proximity to our customers, but also have quick response times.

Grünbeck offers the entire spectrum of water treatment for drinking water installations and industrial applications. Our product range covers filtration, softening and corrosion protection up to disinfection and pure water generation. Furthermore, Grünbeck also is in the position to offer an ideal solution for the treatment of heating water.



Grünbeck Forum
at headquarters in Hoechstaedt, Germany

General Catalogue | Residential Applications · Edition 1.0
Valid from January 1, 2020. The information in this catalogue supersedes all previous information. For our additional product range, please refer to our separate catalogues. All sales are always subject to the currently valid Standard Terms of Sale and Delivery of the country in which the respective order is placed and processed (as per order confirmation). As product availability varies from country to country, please address your Grünbeck representative for respective details, if required. Descriptions and illustrations in this catalogue are approximate and non-binding. Photographs may show products with special features or accessories that are not included in the standard product version. Grünbeck reserves the right to modify the products and deviate from the descriptions to the extent to which such modifications are reasonable and do not change the value of the product. The regulations and directives indicated in this catalogue refer to either European or German standards.

Subject to modifications and errors.

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Treatment of drinking water

Our water works provide us with drinking water that can be enjoyed without further treatment. However, only 2 - 5 % of the water used in a household is for drinking or cooking. Bathing and showering, flushing the toilet, washing, etc. account for a larger part of the water we need. When heated, hard water precipitates scale, which settles in the pipes. This may lead to clogging and energy losses and may damage fittings. The corrosion in pipes caused by aggressive water can have expensive consequences. Depending on the natural composition of the water and the intended usage, the water therefore has to be treated to prevent scaling and to protect against corrosion.

What do you need?	Dosing Technology exaliQ	Water Softeners softliQ
Anti-scaling for cold and warm water pipes		
Soft water • savings in detergents • effective protection against scaling in showers & at tap aerators • reliable protection against scaling in washing machines and kitchen appliances (e.g. coffee maker, tea maker, etc.)		
24-hour continuous operation		
Corrosion protection for metal pipes		
Process	**Dosing of minerals**	**Ion exchange**



The water filter as the first stage of water treatment

The water filter always serves as the basis and first stage of a water treatment system. Further planning or later measures for corrosion protection, prevention of scale deposits, water softening, nitrate/sulphate reduction, partial or full demineralisation of industrial water, deferrisation and demanganisation, etc. require the assistance of an expert for water treatment.

TIP

After the installation of a filter, Grünbeck also offers a complete filter service:

- Expert consulting with on-site visits and assessments
- 5 year warranty for filters (2 years for FME/FM and MX/MXA)
- Water analyses
- Corresponding filter elements available for 20 years
- More than 70 years of Grünbeck know-how

Therefore, always consider the experience and comprehensive service of an expert water treatment company when selecting a filter!

Reasons for installing a filter

DIN EN 806-2, B.4: "... At the beginning of the residential pipe system, filters as per DIN EN 13443-1 should be used... The entry of small solid particles such as rust particles or sand grains into the drinking water installation must be prevented. These particles may interfere with the proper functioning of, for example, drinking water heaters, shower heads, etc. or may induce corrosion damage in the pipes due to pitting. ..."

DIN 1988-200, 12.1: "... Aspects regarding the treatment of drinking water are included in DIN EN 806-2, appendix B (informative). If they are also stipulated in the present section, they – in combination with additional requirements in the present standard – shall obtain the status of normative regulations."

Proper time for installing a filter

DIN EN 806-4, 6.1.1: "... The hot or cold water installation may only be filled with drinking water which does not contain any particles ≥ 150 µm (e.g. removal by means of mechanical filters as per EN 13443-1). ..."

Distinctive features

Filters which cannot be backwashed = replacement filters (fine filters, cartridge filters)

The filter element has to be replaced as needed (impurities and/or increased differential pressure). For hygienic reasons, the filter element (replacement element) must be replaced at least every six months (DIN EN 806-5, A).

Advantage: After the filter element has been replaced, the capacity is restored to a hundred per cent – "as new"! No special tools are required for the replacement of the filter element. Due to the follow-up business, the established contact with the end user can be maintained.

Filters which can be backwashed = backwash filters

During the backwash process, the filter elements are flushed with filtered drinking water. The particles collected in the filter are washed out of the system with the flushing water via an outlet. For hygienic reasons, a backwash must take place every 6 months at the latest (DIN EN 806-5, A).

Advantage: No need for a new filter element if the flushing removes the dirt at a hundred per cent. Disadvantage: For hygienic reasons in particular, persistent deposits may require a removal of the filter element and its additional cleaning and disinfection. The advantage of Grünbeck's **pureliQ:R/RD** and **A/AD filters** is that the removal of the filter element is simple and may be performed without any major effort.

GERMAN DESIGN AWARD WINNER 2019



pureliQ:	K			KD		
Point-of-entry filter to the house in smooth, organic design	✓			✓		
Nominal diameter [DN]	20	25	32	20	25	32
Nominal flow Δp = 0.2 bar [m³/h]	2.8	3.7	4.0		—	
Δp = 0.5 bar [m³/h]	4.5	6.0	6.3		—	
as per DIN EN 1567 [m³/h]		—		2.3	3.6	5.8
Filter fineness (as per DIN EN 13443-1) [µm]		100			100	
Nominal pressure		PN 16			PN 16	
Replaceable filter element		✓			✓	
Rotatable click-type connection flange		✓			✓	
UV protection with inspection window		✓			✓	
Pressure reducer with ergonomic hand wheel and pressure gauge (factory setting 4 bar)		—			✓	
Hose adapter		—			—	
Vortex backwash technology		—			—	
Flexible drain connection		—			—	
Automatic backwash with adjustable intervals		—			—	









R	RD	A	AD
✓	✓	✓	✓
20 25 32	20 25 32	20 25 32	20 25 32
3.2 4.2 5.0	–	3.2 4.2 5.0	–
5.1 6.7 8.0	–	5.1 6.7 8.0	–
–	2.3 3.6 5.8	–	2.3 3.6 5.8
100	100	100	100
PN 16	PN 16	PN 16	PN 16
–	–	–	–
✓	✓	✓	✓
✓	✓	✓	✓
–	✓	–	✓
✓	✓	–	–
✓	✓	✓	✓
✓	✓	✓	✓
–	–	✓	✓



Fine filter pureliQ:K[1]



Fine filter pureliQ:KD[1]

Fine filter pureliQ:K

For the protection of residential water installations according to DIN EN 806-2.

Fine filter with pre-assembled components for installation in mere minutes. Convenient installation in all kinds of mounting situations and with almost no tools thanks to the rotatable click-type connection flange. Integrated interval indicator as timely reminder of the replacement of the filter element (DIN EN 806-5). Flow-optimised filter head made of high-strength plastic. Closed design to protect the filter element from UV radiation, including inspection window to determine the filter element's degree of pollution. Scope of supply includes water meter screw connections, filter element and filter cylinder that can be screwed on and off manually.

Fine filter pureliQ:KD

For the protection of residential water installations according to DIN EN 806-2.

As above, however, including pressure reducer (noise-tested, group 1), continuously adjustable from 1 to 6 bar, outlet pressure indicator integrated in the filter head for shock-protection.

Specifications

- Nominal pressure PN 16
- Max. water temperature 30 °C
- Filter fineness acc. to DIN EN 13443-1: 0.1 mm (100 µm)
- May also be retrofitted with a filter fineness of 50 µm, 20 µm and 5 µm

Fine filter pureliQ:K/KD	**20**	**25**	**32**
Connection diameter	¾"	1"	1¼"
Flow rate pureliQ:K, Δp = 0.2 bar [m³/h]	2.8	3.7	4.0
Δp = 0.5 bar [m³/h]	4.5	6.0	6.3
Flow rate pureliQ:KD, according to DIN EN 1567 [m³/h]	2.3	3.6	5.8
Installation length without screw connections [mm]	100	100	100
with screw connections [mm]	185	182	191
Overall height pureliQ:K [mm]	335	335	335
Overall height pureliQ:KD [mm]	355	355	355
Height required for replacement of filter elements [mm]	150	150	150
Order no. pureliQ:K (RG-A)	**101 220**	**101 225**	**101 230**
Order no. pureliQ:KD (RG-A)	**101 270**	**101 275**	**101 290**

[1] *DVGW certification pending*

· ***Accessories: For recommended replacement element 100 µm (order no.: 101 272e) and other sizes, please refer to page 20.***



Backwash filter pureliQ:R



Backwash filter pureliQ:RD

Backwash filter pureliQ:R

For the protection of residential water installations according to DIN EN 806-2.

Manually operated backwash filter with pre-assembled components for installation in mere minutes. Convenient installation in all kinds of mounting situations and with almost no tools thanks to the rotatable click-type connection flange. Integrated interval indicator as timely reminder of a required backwash (DIN EN 806-5). Anti-slip grip pads at the backwash hand wheel to ensure the convenient release of the backwash process even in case of high water pressure, closes automatically. Flexible drain connection as per DIN EN 1717 with integrated free outlet for precisely fitting installation and perfect tightness. Flow-optimised filter head made of high-strength plastic. Closed design to protect the filter element from UV radiation, including inspection window to determine the filter element's degree of pollution. Water meter screw connections and filter element (filter mesh made of stainless steel) included in the scope of supply. Hose adapter for a clean backwash even without drain connection.

Backwash filter pureliQ:RD

For the protection of residential water installations according to DIN EN 806-2.

As above, however, including pressure reducer (noise-tested, group 1), continuously adjustable from 1 to 6 bar, outlet pressure indicator integrated in the filter head for shock-protection.

Specifications

- Nominal pressure PN 16
- Max. water temperature 30 °C
- Filter fineness acc. to DIN EN 13443-1: 0.1 mm (100 µm)
- Operating pressure 2 - 16 bar

Backwash filter pureliQ:R/RD	**20**	**25**	**32**
Connection diameter	¾"	1"	1¼"
Flow rate pureliQ:R, Δp = 0.2 bar [m³/h]	3.2	4.2	5.0
Δp = 0.5 bar [m³/h]	5.1	6.7	8.0
Flow rate pureliQ:RD, according to DIN EN 1567 [m³/h]	2.3	3.6	5.8
Installation length without screw connections [mm]	100	100	100
with screw connections [mm]	185	182	191
Overall height pureliQ:R [mm]	385	385	385
Overall height pureliQ:RD [mm]	405	405	405
Order no. pureliQ:R (RG-A)	**101 320**	**101 325**	**101 330**
Order no. pureliQ:RD (RG-A)	**101 370**	**101 375**	**101 380**



Automatic filter pureliQ:A



Automatic filter pureliQ:AD

Automatic filter pureliQ:A

For the protection of residential water installations according to DIN EN 806-2.

Automatic backwash filter with pre-assembled components for installation in mere minutes. Convenient installation in all kinds of mounting situations and with almost no tools thanks to the rotatable click-type connection flange. Integrated interval indicator as timely reminder of a required maintenance (DIN EN 806-5). Flexible drain connection as per DIN EN 1717 with integrated free outlet for precisely fitting installation and perfect tightness. Flow-optimised filter head made of high-strength plastic. Closed design to protect the filter element from UV radiation, including inspection window to determine the filter element's degree of pollution. Water meter screw connections and filter element (filter mesh made of stainless steel) included in the scope of supply. Automatic backwash unit with LED display, 4 setting options (7, 30, 60 or 90 days) as well as manual realease of backwash. Power supply via power supply plug, integrated protection against power failure.

Automatic filter pureliQ:AD

For the protection of residential water installations according to DIN EN 806-2.

As above, however, including pressure reducer (noise-tested, group 1), continuously adjustable from 1 to 6 bar, outlet pressure indicator integrated in the filter head for shock-protection.

Specifications

- Nominal pressure PN 16
- Max. water temperature 30 °C
- Filter fineness acc. to DIN EN 13443-1: 0.1 mm (100 µm)
- Operating pressure 2 - 16 bar

Automatic filter pureliQ:A/AD	**20**	**25**	**32**
Connection diameter	¾"	1"	1¼"
Flow rate pureliQ:A, Δp = 0.2 bar [m³/h]	3.2	4.2	5.0
Δp = 0.5 bar [m³/h]	5.1	6.7	8.0
Flow rate pureliQ:AD, acc. to DIN EN 1567 [m³/h]	2.3	3.6	5.8
Installation length without screw connections [mm]	100	100	100
with screw connections [mm]	185	182	191
Overall height pureliQ:A [mm]	385	385	385
Overall height pureliQ:AD [mm]	405	405	405
Order no. pureliQ:A (RG-A)	**101 420**	**101 425**	**101 430**
Order no. pureliQ:AD (RG-A)	**101 470**	**101 475**	**101 480**



NEW



Fine filter BOXER KX 1"[1]

Fine filter BOXER KDX 1"[1]

Fine filter BOXER KX

For the protection of residential water installations according to DIN EN 806-2.

Flow-optimised fine filter made of high-strength industrial plastic, integrated 12-digit date indicator as timely reminder of the required replacement of the filter element (DIN EN 806-5), with transparent blue filter cylinder – resistant to household cleaners, including rotatable connection flange for installation into horizontal or vertical pipes, including water meter screw connections and filter element, filter cylinder can be screwed on and off manually.

Fine filter BOXER KDX

For the protection of residential water installations according to DIN EN 806-2.

As above, however, including pressure reducer (noise-tested, group 1), continuously adjustable from 1 to 6 bar, outlet pressure indicator integrated in the filter head for shock-protection.

Specifications

- Nominal pressure PN 16
- Max. water temperature 30 °C
- Filter fineness acc. to DIN EN 13443-1: 0.1 mm (100 µm)
- May also be retrofitted with a filter fineness of 80 µm, 50 µm, 20 µm and 5 µm

Fine filter BOXER KX/KDX [R]	**¾"**	**1"**	**1¼"**
Flow rate BOXER KX, Δp = 0.2 bar [m³/h]	2.8	3.7	4.0
Δp = 0.5 bar [m³/h]	4.5	6.0	6.3
Flow rate BOXER KDX, according to DIN EN 1567 [m³/h]	2.3	3.6	5.8
Installation length without screw connections [mm]	100	100	100
with screw connections [mm]	185	182	191
Overall height BOXER KX [mm]	260	260	260
Overall height BOXER KDX [mm]	277	277	277
Height for replacement of filter element [mm]	150	150	150
Order no. BOXER KX (RG-A)	**101 830**	**101 835**	**101 840**
Order no. BOXER KDX (RG-A)	**101 815**	**101 820**	**101 825**

· *Accessories: For replacement filter elements, please refer to page 20.*

[1] *DVGW certification pending.*



Backwash filter BOXER RX 1"[1]

NEW



Backwash filter BOXER RDX 1"[1]

Backwash filter BOXER RX

For the protection of residential water installations according to DIN EN 806-2.

Flow-optimised, manually operated backwash filter made of high-strength industrial plastic, integrated 12-digit date indicator as timely reminder of a required backwash (DIN EN 806-5), with transparent blue filter cylinder – resistant to household cleaners – and backwash valve which is low on water hammer, including rotatable connection flange for installation into horizontal or vertical pipes, including water meter screw connections and filter element, filter mesh made of stainless steel, outer filter cylinder can be screwed on and off manually, ergonomic handle for easy release of backwash even in case of high water pressure. Flexible drain connection according to DIN EN 1717 with integrated free outlet for perfect tightness.

Backwash filter BOXER RDX

For the protection of residential water installations according to DIN EN 806-2.

As above, however, including pressure reducer (noise-tested, group 1), continuously adjustable from 1 to 6 bar, outlet pressure indicator integrated in the filter head for shock-protection.

Specifications

- Nominal pressure PN 16
- Max. water temperature 30 °C
- Filter fineness acc. to DIN EN 13443-1: 0.1 mm (100 µm)
- Operating pressure 2 - 16 bar

Backwash filter BOXER RX/RDX [R]	¾"	1"	1¼"
Flow rate BOXER RX, Δp = 0.2 bar [m³/h]	2.9	3.8	4.2
Δp = 0.5 bar [m³/h]	4.7	5.9	6.7
Flow rate BOXER RDX, according to DIN EN 1567 [m³/h]	2.3	3.6	5.8
Installation length without screw connections [mm]	100	100	100
with screw connections [mm]	185	182	191
Overall height incl. outlet funnel DN 40 BOXER RX [mm]	315	315	315
Overall height incl. outlet funnel DN 40 BOXER RDX [mm]	330	330	330
Order no. BOXER RX (RG-A)	**101 510**	**101 515**	**101 520**
Order no. BOXER RDX (RG-A)	**101 525**	**101 530**	**101 535**

· *Accessories: For new drain conection DN 50 with siphon acc. to DIN 1717, please refer to page 39.*

[1] *DVGW certification pending.*



GENO-fine filter FS-B 1"



GENO-fine filter FS-B 2"

GENO-fine filter FS-B

For the protection of residential water installations according to DIN EN 806-2.

Flow-optimised fine filter made of high-strength industrial plastic, with integrated threaded brass connections for horizontal installation, integrated 12-digit date indicator as timely reminder of the replacement of the filter element (DIN EN 806-5), with transparent filter cylinder – resistant to household cleaners, including water meter screw connections and filter element; filter cylinder can be screwed on and off manually.

Specifications

- Nominal pressure PN 16
- Max. water temperature 30 °C
- Filter fineness according to DIN EN 13443-1: 0.08 mm (80 µm)
- May also be retrofitted with a filter fineness of 50 µm, 20 µm and 5 µm (1" + 1¼")
- May also be retrofitted with a filter fineness of 50 µm and 5 µm (1½" + 2")

GENO-fine filter FS-B [R]	1"	1¼"	1½"	2"
Flow rate, Δp = 0.2 bar [m³/h]	3.7	4.0	11.1	13.9
Δp = 0.5 bar [m³/h]	6.0	6.2	19.9	23.3
Installation length without screw connection [mm]	100	100	160	160
with screw connection [mm]	182	191	283	277
Overall height [mm]	265	265	508	508
Height for replacement of filter element [mm]	150	150	390	390
Order quantity per pallet, 800 x 1,200 mm [pcs]	150	150	48	48
Order no. (RG-A)	**101 170**	**101 175**	**101 180**	**101 185**

· *For GENO-fine filters DN 50 - DN 200, please refer to page 17.*

· ***Accessories: For replacement filter elements, please refer to page 20.***

Pressure gauges

For indication of operating pressure (0 - 10 bar) with brass insert for inlet or outlet side, suitable for **pureliQ** and **GENO-fine filters FS-B/BOXER**

	Order no. (RG-B)
Pressure gauge to indicate operating pressure 1"	**100 860**
Pressure gauge to indicate operating pressure 1¼"	**100 865**
Pressure gauge to indicate operating pressure 1½"	**100 870**
Pressure gauge to indicate operating pressure 2"	**100 875**



Backwash filter KICKER

Backwash filter KICKER

For the protection of residential water installations according to DIN EN 806-2

Manually operated backwash filter, degree of pollution easily detectable from the outside thanks to transparent filter cylinder. Housing including water meter screw connections (made of brass) with seals. Flow-optimised filter head made of high-strength industrial plastic, integrated 12-digit date indicator as timely reminder of a required backwash (DIN EN 806-5). Filter mesh made of stainless steel, transparent blue filter cylinder (resistant to common household cleaners), incl. one-hand turning handle for easy release of backwash (even in case of high water pressure). Particularly low in wear and tear due to ceramic discs as well as child-proof backwash valve which closes automatically. Splash-proof drain connection DN 50 according to DIN EN 1717.

Specifications

- Nominal pressure PN 16
- Max. water temperature 30 °C
- Filter fineness acc. to DIN EN 13443-1: 0.1 mm (100 µm)
- Operating pressure 2 - 16 bar

Backwash filter KICKER [R]	**1½"**	**2"**
Nominal connection diameter [DN]	40	50
Flow rate, Δp = 0.2 bar [m^3/h]	8.0	8.9
Δp = 0.5 bar [m^3/h]	12.5	13.5
Installation length without screw connection [mm]	160	160
with screw connection [mm]	283	277
Distance to wall (centre of pipe) [mm]	65	65
Max. water temperature [°C]	30	30
Order no. (RG-A)	**101 080**	**101 085**

Pressure gauges

For indication of operating pressure (0 - 10 bar) with brass insert for inlet or outlet side, suitable for backwash filter **KICKER**.

	Order no. (RG-B)
Pressure gauge to indicate operating pressure 1½"	**100 870**
Pressure gauge to indicate operating pressure 2"	**100 875**



GENO-backwash filter MX with screw connections



GENO-backwash filter MXA with screw connections

GENO-backwash filter MX

Manually backwashable protection filter according to DIN EN 806-2 for filtration of drinking water. Particularly suited for trade and industry as well as for large residential buildings. All parts coming into contact with the medium are made of brass or high-grade industrial plastic. Modular filter element made of high-grade industrial plastic with stainless steel filter mesh, brushes for supplementary mechanical cleaning of the filter element during backwash, including backwash water connection to clamp HT pipe DN 50, two pressure gauges.

GENO-backwash filter MXA

Fully automatic version of the backwashable protection filter. Particularly suited for trade and industry as well as for large residential buildings. In addition with integrated drive unit and freely programmable **GENO-RS-tronic** controller, error detection and voltage-free contact. Can be programmed as required with maintenance interval for service request, including connecting cable and power cable with shock-proof plug, controlled via differential pressure and timer for release of backwash. Backwash process can also be released via an external, voltage-free contact or a button at the **GENO-RS-tronic**.

Specifications

- Nominal pressure PN 16
- Drain connection DN 50
- Max. water temperature 90 °C
- Filter fineness acc. to DIN EN 13443-1: 0.1 mm (100 µm)
- Power supply 230 V, 50 Hz (MXA)

GENO-backwash filter MX/MXA [R]	**1"**	**1¼"**	**1½"**	**2"**
Flow rate, Δp = 0.2 bar [m^3/h]	8.5	12.0	22.0	27.0
Δp = 0.5 bar [m^3/h]	13.0	18.5	30.0	38.5
K_v value [m^3/h]	18	25	46	56
Installation length without screw connections [mm]	190	190	206	206
with screw connections [mm]	276	281	342	323
Order no. MX (RG-A)	**107 400**	**107 405**	**107 410**	**107 415**
Order no. MXA (RG-A)	**107 450**	**107 455**	**107 460**	**107 465**

GENO-backwash filter MX Extra charge for versions with modified filter fineness

Order no. Example	**Version**	**Designation**	**Filter type 1" - 1¼" (RG-A)**	**Filter type 1½" - 2" (RG-A)**	**Filter type DN 65 (RG-B)**	**Filter type DN 80 - 100 (RG-B)**
107 4xx	.11	50 µm filter	**Available at extra cost. Please inquire.**			
	.21	200 µm filter				
	.31	500 µm filter				

· *Please indicate the version number when ordering.*



GENO-backwash filter MX with flange connection (according to DIN EN 1092-1)



GENO-backwash filter MXA with flange connection (according to DIN EN 1092-1)

GENO-backwash filter MX/MXA [DN]	**65**	**80**	**100**
Flow rate, Δp = 0.2 bar [m³/h]	30	60	60
Δp = 0.5 bar [m³/h]	47	96.5	98
K_v value [m³/h]	69	124	138
Installation length without counter-flanges [mm]	220	250	250
Order no. MX (RG-B)	**107 420**	**107 425**	**107 430**
Order no. MXA (RG-B)	**107 470**	**107 475**	**107 480**

GENO-backwash filter MXA Extra charge for versions with/without safety device (solenoid valve to interrupt the backwash in case of power failure)

Order no. **Example**	**Version**	**Designation**		**Filter type 1" - 1¼" (RG-A)**	**Filter type 1½" - 2" (RG-A)**	**Filter type DN 65 (RG-B)**	**Filter type DN 80 - 100 (RG-B)**
107 4xx	.011	100 µm filter	with safety device	**Available at extra cost. Please inquire.**			
	.110	50 µm filter	without safety device				
	.111	50 µm filter	with safety device				
	.210	200 µm filter	without safety device				
	.211	200 µm filter	with safety device				
	.310	500 µm filter	without safety device				
	.311	500 µm filter	with safety device				

· *Please indicate the version number when ordering.*



GENO-fine filter FME



GENO-fine filter FM

GENO-fine filter FME/FM

Stainless steel version, for commercial and industrial applications, from DN 50 - DN 200.

Protection filter with several filter elements and stainless steel housing. User-friendly cover fastener, discharge valve, deaeration, pressure gauges for raw and pure water, with initial equipment of filter elements 80 µm (50 µm for FM 200).

FME = pure stainless steel made of 1.4404 (DN 50, 65, 80, 100)

FM = inside and outside plastic-coated (DN 150, 200)

GENO-fine filter FME/FM-WW

Identical to FME/FM, but hot water-resistant, for temperatures up to 90 °C at 6 bar.

GENO-fine filter FME/FM-KW

Identical to FME/FM-WW, but with 500 µm stainless steel filter elements for cooling water and other special applications.

Specifications

- Nominal pressure PN 10 (PN 6 for the FME/FM-WW version), flange type as per DIN 1092-1
- Max. water temperature 30 °C (90 °C for the FME/FM-WW and FME/FM-KW version)
- Also available with a filter fineness of 50 µm, 100 µm and 500 µm - please inquire

GENO-fine filter	FME				FM	
[DN]	50	65	80	100	150	200
Flow rate, Δp = 0.2 bar [m³/h]	30	40	50	70	150	280
Installation length [mm]	360	360	360	484	690	690
Filter elements [pcs]	2	2	3	5	14	14 x 2[1]
Empty weight [kg]	22	23	23.5	32.5	100	124
Order no. FME/FM (RG-B)	**102 190**	**102 290**	**102 390**	**102 490**	**102 400**	**102 500**
Order no. FME/FM-WW[2] (RG-B)	**102 185**	**102 285**	**102 385**	**102 485**	**102 401**	**102 501**
Order no. FME/FM-KW[3] (RG-B)	**102 195**	**102 295**	**102 395**	**102 495**	**102 470**	**102 570**

[1] *For FM-KW 200, only order the pack of 14 filter elements once.* [2] *Hot water* [3] *Cooling water*

Accessories for cartridge and backwash filters

For connection of a visual and/or acoustic remote indicator to a building management system for required filter maintenance.

	Order no. (RG-B)
Differential pressure switch	**102 870**
Hose extension kit for FM 150 - 200, 500 mm	**102 850**

· ***Accessories: For replacement filter elements, please refer to page 20.***

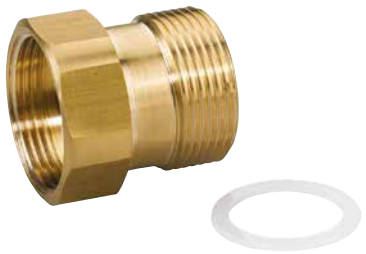


Seal kits

Accessories

Seal kit, suitable for filter type	PU	Order no. (RG-I)
Fine filter FS 1"	3 sets	**100 001**
Fine filter FS 1¼" - 2"	3 sets	**100 002**
Fine filter FS-B 1½" + 2"	1 set	**101 639e**
Fine filter pureliQ/BOXER/FS-B 1" + 1¼"	1 set	**101 641e**
KOMBI-filter GENO-pur	1 set	**108 601**
KOMBI-backwash filter GENO-jet/ASTRO	1 set	**108 614**
KOMBI-fine filter FSV	2 sets	**107 660**

Tools for filters	Order no. (RG-B)
Belt wrench for all filters up to R 2"	**105 805**
Spigot wrench for pressure reducers (wrench size 48)	**104 805**



Adapter kit



Adjusting piece 1"

Adapter kits for the replacement of an older Grünbeck filter by a new Grünbeck filter	**Extended by [mm]**	**Order no. (RG-B)**
Adapter kit from FS 1" to pureliQ 1", BOXER 1", FS-B 1"	37	**101 647e**
Adapter kit from FS 1¼" to pureliQ 1¼", BOXER 1¼", FS-B 1¼"	103	**101 852**
Adapter kit from FS 1½" to KICKER 1½", FS-B 1½"	42	**101 651e**
Adapter kit from FS 2" to KICKER 2", FS-B 2"	46	**101 652e**
Adapter kit KOMBI ¾" from[1] to pureliQ ¾", BOXER ¾"	10	**101 862**
Adapter kit KOMBI 1" from[1] to pureliQ 1", BOXER 1"	10	**101 646e**
Adapter kit KOMBI 1¼" from[1] to pureliQ 1¼", BOXER 1¼"	10	**101 864**
Adapter kit KOMBI (V1) 1" from[2] to pureliQ 1", BOXER 1"	50	**101 865**
Adapter kit KOMBI (V1) 1¼" from[2] to pureliQ 1¼", BOXER 1¼"	50	**101 866**
Adapter kit from MS DN 80 to MX/MXA (A) DN 80	80	**106 804e**
Adapter kit from MS DN 100 to MX/MXA (A) DN 100	80	**106 805e**

[1] Kombi connection flange for filter series GENO-pur, GENO-PS, GB, ASTRO, GENO-FSV
[2] Kombi connection flange (V1) with pressure reducer for filter series GBS, ASTRO, GB-D, GENO-FSV, GENO-PS-D
· For additional adapter kits, please inquire.

System separators	**Extended by [mm]**	**Order no. (RG-B)**
Adapter kit from DK-standard ½" to DK 2	87	**132 870**
Adapter kit from DK-standard ¾" to DK 2	87	**132 875**
Adapter kit from DK-standard 1" to DK 2	103	**132 880**
Adapter kit from DK-standard 1¼" to DK 2	103	**132 885**
Adapter kit from DK-standard 1½" to DK 2	16	**132 890**
Adapter kit from DK-standard 2" to DK 2	16	**132 895**

· For additional adapter kits, please inquire.

Adjusting pieces

For installation downstream of the point-of-entry filter to the house, e.g. to integrate a water softener.

Adjusting pieces	**Order no. (RG-B)**
Adjusting piece 1" (installation length without screw connection 190 mm) suitable for softliQ:SD, softliQ:PA20; safeliQ:EA30, softliQ:MD32	**128 001**
Adjusting piece 1¼" (installation length without screw connection 190 mm) suitable for softliQ:MD38	**128 401**

Size of filter element →		(–)	(1)	(1)	(1)	(3)	(1)	(2)	(3)	(1)	(1)	(–)	(6)	(2)	(1)	(5)	(5)	(1)	(2)	(3)	(4)			
Suitable for filter type →		pureliQ:K/KD	BOXER KX/KDX	BOXER K/KD	FS-B 1" and FS-B 1¼"	FS-B 1½" and 2"	FS 1"	FS 1¼" and 1½"	FS 2"	GENO-pur/GENO-KOMBI GB	GENO-KOMBI FSV	GBS	GN ¾", 1", 1½"	GN 1¼" and 2"	S ¾" (up to year of constr. 1978)	S 1" (up to year of constr. 1978)	S 1" WW (up to year of constr. 1990)	S 1" WW-K (up to year of constr. 1990)	S 1¼"	S 1½" and 2"; FME/FM 50 - 150[1]	FM 200[1]	Order no.	Packing unit [pcs]	RG-
WITH protective cylinder and cylinder seal																								
80 µm							•				•											**103 007**	2	I
80 µm								•														**103 008**	2	I
80 µm									•													**103 009**	2	I
50 µm							•				•											**103 001**	2	I
50 µm								•														**103 002**	2	I
50 µm									•													**103 003**	2	I
20 µm							•				•											**103 067**	2	I
5 µm							•				•											**103 061**	2	I
5 µm								•														**103 062**	2	I
5 µm									•													**103 063**	2	I
WITHOUT protective cylinder																								
80 µm			•	•	•		•			•	•				•			•				**103 075**	2	I
80 µm								•											•			**103 076**	2	I
80 µm						•			•											•		**103 077**	2	I
50 µm		•	•	•	•		•			•	•				•			•				**103 068**	2	I
50 µm								•						•					•			**103 069**	2	I
50 µm						•			•											•		**103 070**	2	I
50 µm																•	•					**103 044**	2	I
50 µm													•									**103 100**	2	I
50 µm																					•	**103 153**	28	I
20 µm		•	•	•	•		•			•	•											**103 071**	2	I
5 µm		•	•	•	•		•			•	•				•			•				**103 081**	2	I
5 µm								•											•			**103 082**	2	I
5 µm						•			•											•		**103 083**	2	I
NEW 100 µm		•	•																			**101 272e**	2	A
100 µm												•										**100 651**	2	I
100 µm																					•	**103 150**	14	I
100 µm																				•		**103 110**	2	I
500 µm																				•		**103 111**	2	I
500 µm																					•	**103 151**	14	I

[1] *Note: Please take into consideration the quantities required for the different sizes of the GENO-fine filters FME/FM, refer to page 17.*

Safety devices

Installation situation protectliQ:A with pureliQ:AD



Optimum protection against water damage

Uncontrolled water leakages cause enormous costs in damage. Installing or retrofitting a safety fitting provides reliable protection. The **protectliQ** safety fitting monitors the installation site by means of a wired sensor. It detects impending damage and shuts off the water pipe.
In order to monitor an additional room, a second wired water sensor can be connected. The easy-to-install safety device is used as a pipe fitting. The **protectliQ** is suitable for installation next to a filter of the **pureliQ** filter series or any other filter in Grünbeck's product range. As it is operated by batteries, reliable monitoring is also ensured in case of a power failure.



Installation situation of safety device protectliQ:A

protectliQ safety device

Grünbeck's safety device **protectliQ** is a stand-alone safety device. It conveniently provides maximum protection against water damage for buildings and appliances without major maintenance efforts. The **protectliQ** can either be installed in horizontal or vertical pipes and can be equiped with up to two wired sensors.

The **protectliQ** is easy to operate via one single button. Power is supplied via customary AA batteries, a power connection is not required. By means of an optional power unit, the service life of the batteries can be prolonged considerably. The valve is a long-life ball valve which can also be operated manually at any time.

Specifications

- Nominal pressure PN 16
- Optional power unit Micro-USB, 5 V, 1 A
- Batteries 4 x Mignon AA
- Conductivity of leakage water min. 20 µS/cm
- Water sensor with cable of 2 m in length

Safety device protectliQ:A	**20**	**25**	**32**	**40**
Connection diameter	¾"	1"	1¼"	1½"
Nominal connection diameter [DN]	20	25	32	40
Installation length with screw connection [mm]	165	152	251	283
without screw connection [mm]	70	70	160	160
Nominal flow [m³/h]	6.5	8.0	9.0	12.0
Pressure loss at nominal flow [bar]	0.1	0.1	0.2	0.3
Order no. (RG-A)	**126 400**	**126 405**	**126 410**	**126 415**

Accessories	**Order no. (RG-A)**
Power supply plug	**126 802**
Water sensor with 2 m cable	**126 805**
Water sensor with 10 m cable	**126 815**

Safety devices

		Liquid category				
	Safety device	**1**	**2**	**3**	**4**	**5**
AA	Unobstructed free outlet	✓	✓	✓	✓	✓
AB	Free outlet with non-circular overflow (without restrictions), e.g. system separation device GENO-G5	✓	✓	✓	✓	✓
BA	System separators with controllable intermediate pressure zone, e.g. Euro system separator GENO-DK 2, filling section thermaliQ:FB2	✓	✓	✓	✓	
HD	Pipe aerator for hose connections, combined with non-return valve (safety combination)	✓	✓	✓		
EA	Controllable non-return valve	✓	✓			

Safety devices prevent the drinking water from being polluted due to back-flow. They must not be mixed up with safety fittings such as safety valves.

Backflow may occur for the following reasons:

a) Back siphonage due to low pressure
(pressure loss in the public water supply network)

b) Back pressure: due to counter-pressure
(higher pressure than in the public water supply network)

Modified drinking water or liquids coming into contact with drinking water are classified into five categories. The higher the category, the higher the hazard and the stricter the measures that must be taken against backflow (safety devices).

Category 1: Cold drinking water

Category 2: Modified drinking water without any health risks, e.g. warm drinking water

Category 3: Health risks caused by toxic substances, e.g. heating water without additives

Category 4: Health risks caused by highly toxic, radioactive or carcinogenic substances, e.g. heating water with additives

Category 5: Health risks caused by microbiology, e.g. water originating from body care



Euro system separator GENO-DK 2-Mini



Euro system separator GENO-DK 2

System separators according to BA design of DIN EN 12729. They can protect facilities and systems which endanger the drinking water according to DIN EN 1717 and up to danger class 4. They replace pipe separators EA 1 and EA 2.
The units operate on the basis of the 3-chamber principle, using an upstream, intermediate and downstream pressure zone. In case of relief, the intermediate pressure zone is unpressurised and opened to the atmosphere.
System separators of BA design may only be installed in combination with accessory fittings according to DIN EN 1717 in order to represent so-called safety devices. Seen in flow direction, the safety device consists of a shut-off valve, a dirt trap **(we recommend a fine filter – refer to the present catalogue, starting page 6)**, the system separator itself and an additional shut-off valve.

Euro system separator GENO-DK 2

System separator made of brass up to type R 1¼" and of red bronze from type R 1½". Suitable for operating temperatures up to 65 °C at PN 10, with water inlet and outlet connecting pieces, water meter screw connections made of brass with seals, integrated non-return valve and dripping water connection. Includes three connection points for test pressure gauges.

Euro system separator GENO-DK 2-Mini

System separator made of brass, suitable for operating temperatures up to 65 °C at PN 10, with water inlet and outlet connecting pieces, water meter screw connections made of brass, with seals and a prefilter, integrated non-return valve and dripping water connection. Particularly favourable installation dimensions and reductions from ½" female thread to ¾" male thread, three connection points for test pressure gauges for maintenance according to DIN EN 806-5.

GENO-DK 2 [R]	**½"**	**¾"**	**1"**	**1¼"**	**1½"**	**2"**	**DK 2-Mini**
Nominal connection diameter [DN]	15	20	25	32	40	50	15/20
Recommended max. flow [m^3/h]	1.9	3.3	5.2	7.2	13.5	21.0	1.4
K_v value Δp = 1.0 bar [m^3/h]	3.5	4.5	7.6	9.4	22.2	32.5	2.0
Installation length							
without screw connection [mm]	153	153	187	187	274	274	83
with screw connection [mm]	227	227	280	280	387	395	130/150
Min. distance to wall [mm]	60	60	70	70	90	90	35
Overall height with outlet funnel [mm]	263	263	292	292	382	382	127
Operating weight, approx. [kg]	3.4	3.4	5.2	5.2	12.5	13.6	1.2
Order no. (RG-A)	**132 510**	**132 520**	**132 530**	**132 540**	**132 560**	**132 570**	**133 100**



Euro system separator GENO-DK 2-Maxi



Euro system separator GENO-DK-Maxi

Euro system separator GENO-DK 2-Maxi/DK-Maxi

System separator made of red bronze with flange connections (DIN EN 1092-1) for horizontal installation, two non-return valves and dripping water connection, as well as three test connection pieces **(DVGW-certified up to and including DN 100)**.

	GENO-DK 2-Maxi				GENO-DK-Maxi		
Series	**50**	**65**	**80**	**100**	**150**	**200**	**250**
Nominal connection diameter [DN]	50	65	80	100	150	200	250
Housing material	Red bronze	Red bronze	Red bronze	Red bronze	Sphero-cast coated	Sphero-cast coated	Sphero-cast coated
Recommended max. flow [m^3/h]	25	35	50	80	227	363	523
K_v value Δp = 1.0 bar [m^3/h]	42	55	88	122	227	363	523
Max. water temperature [°C]	65	65	65	65	60	60	60
Min. flow pressure [bar]	1	1	1	1	1	1	1
Nominal pressure PN [bar]	10	10	10	10	10	10	10
Installation length without counter-flanges [mm]	302	305	470	470	600	780	930
Min. distance to wall [mm]	140	150	150	160	200	240	270
Overall height with outlet funnel [mm]	382	385	484	484	839	922	922
Empty weight, approx. [kg]	13.2	17.0	26.5	28.0	103	111	142
Operating weight, approx. [kg]	16.0	19.8	33.1	34.2	123	150	201
Order no. (RG-B)	**132 460**	**132 465**	**132 470**	**132 475**	**132 720**	**132 725**	**132 730**

Service kit for Euro system separators

Suitable for all types and for compulsory pressure zone inspection according to DIN EN 12729 and maintenance according to DIN EN 806-5.

	Order no. (RG-B)
Service kit for Euro system separators	**132 095**



Euro system separation device GENO-G5

Euro system separation device GENO-G5

The Euro system separation device **GENO-G5** is a safety device to protect the drinking water network against liquids up to and including liquid category (danger class) 5, according to DIN EN 1717. The system is suited in particular for the dental sector to supply dental treatment units. In addition, we recommend the installation of the optional rinsing device. Furthermore, we suggest installing a **GENODOS DM-B** dosing system downstream of the Euro system separation device for automatic disinfection.

The system separation device is a compact device, ready for connection, mounted on an aluminium profile rack with adjustable feet, completely piped and wired for connection, mainly consisting of:
Free outlet (DIN EN 13077, family A, type B, DN 20), consisting of supply tank including make-up water feed and overflow, pressure booster system, consisting of: pump with frequency-controlled pressure regulation, dry-run protection, fault alarm output, non-return valve, pressure gauge, pressure sensor, flow restrictor, pressurised expansion tank, sampling valve with waste water discharge as well as set-up for optional rinsing device, water inlet and outlet with shut-off fittings, discharge valve at the supply tank, DIN-compatible waste water outlet HT-DN 50 with waterless odour and vermin barrier, for direct connection to drain on site.

Euro system separation device GENO-G5 [R]	**¾"**
Nominal connection diameter [DN]	20
Nominal capacity [m^3/h]	2.0
Pressure control [bar]	4 (adjustable from 2.5 - 4)
Power supply [V/Hz/kW]	230/50/1.1
Order no. (RG-B)	**134 100**

Accessories

Rinsing unit for **GENO-G5** that washes the stagnant water to the drain when power is switched on again (main switch of the dental office is switched on) after periods of standstill such as during the night, weekend or vacation. Optional connection kit, consisting of 2 corrugated stainless steel hoses (800 mm) including seals and connecting pieces.

	Order no. (RG-B)
Rinsing unit for GENO-G5	**134 805**
Connection kit for GENO-G5	**134 810**

Dosing technology

Dosing system
exaliQ:KC6



Exact dosing for the protection of your drinking water pipes

In combination with the **exaliQ mineral solutions**, Grünbeck's new **exaliQ dosing systems** protect your pipe system and maintain the value of your home.

Dosing mineral substances (phosphates and silicates) into your drinking water prevents corrosion damage in the pipes due to the formation of a protective layer on the inside of the pipe. The natural mineral substances can also prevent the precipitation of scale. For the safety you deserve!

Subject to the respective application, the new **exaliQ mineral solutions** were ideally tailored to your requirements. The focus is on installations made of steel, copper and brass, but also on special applications. By means of the proven **GENODOS DME** dosing systems, water pipes in industrial and commercial buildings in which high flow rates and water withdrawals prevail, can be protected as well.

GERMAN DESIGN AWARD WINNER 2020



NEW



Dosing system exaliQ:KC6[1], compact system

Dosing system exaliQ:SC6[1], system with suction lance

exaliQ dosing systems

Volume-based dosing of exaliQ mineral solutions to protect the drinking water pipes in residential buildings from corrosion. Available as compact dosing system exaliQ:KC6 with 3-litre bottle or as system with suction lance exaliQ:SC6 with stackable 15-litre canister. In case of high water consumption, the exaliQ:SC systems with suction lance can also be retrofitted with a 60-litre canister instead of the 15-litre one. To do so, the conversion kit for exaliQ:SC systems, which includes a 60-litre suction lance, is required.

Recording of important dosing data over a period of up to one year and readout via USB interface. Bayonet lock for 3-litre bottle in case of exaliQ:KC6 and 15-litre suction lance for exaliQ:SC dosing systems (dosing canister not included in the scope of supply). Operating panel with status illumination. Illuminated LED ring as visual signal. Indication of the filling level of the dosing agent (low or empty) with dry-run protection including visual and acoustic signal. Also available as softliQ variants with iQ Comfort communication interface (refer to page 29), requiring only little installation effort.

Scope of supply: Basic variant exaliQ:KC/SC with contact water meter for volume-based dosing. Control and pump unit with click bracket for quick installation on the wall or at the water meter. 24 V power supply plug with cable of 1.9 m in length as well as dosing line with dosing valve. (Dosing agent not included in the scope of supply.)

Specifications

- Power supply 230 V, 50 Hz
- Operating voltage 24 V
- Max. water temperature 30 °C at installation site
- Nominal pressure PN 10
- Dosing volume 100 ml/m³

Dosing system exaliQ	KC6	SC6	SC10	SC20	SC30
Nominal connection diameter [R]	1"	1"	1¼"	1½"	2"
Max. operating range max. [m³/h]	6	6	10	20	30
Dosing tank [l]	3	15	15	15	15
Installation length without screw connections [mm]	140	140	140	190	240
with screw connections [mm]	222	222	231	312	356
Order no. (RG-A)	**117 400**	**117 405**	**117 410**	**117 415**	**117 420**

Accessories	Order no. (RG-A)
Conversion kit for exaliQ:SC systems, 60-litre suction lance	**117 490**
Conversion kit exaliQ:KC6 to exaliQ:SC6 (15-litre suction lance + adapter)	**117 495**

Conversion from EXADOS to exaliQ	Order no. (RG-B)
Adapter kit 1" for conversion from EXADOS EK 6/ES 6 to exaliQ:KC6/SC6	**101 865**
Adapter kit 1¼" for conversion from EXADOS ES 12 to exaliQ:SC10	**101 866**

[1] *DVGW certification pending*



NEW



Dosing system exaliQ:KC6-e¹, compact system

Dosing system exaliQ:SC6-e¹, system with suction lance

Dosing systems exaliQ:KC6-e/SC6-e for combination with softener series softliQ:SD/MD

Volume-based dosing of exaliQ mineral solutions in combination with water softeners softliQ:SD/MD to protect the drinking water pipes in residential buildings from corrosion. Available as compact dosing system exaliQ:KC6-e with 3-litre bottle or as system with suction lance exaliQ:SC6-e with stackable 15-litre canister.

Easy wall mounting possible, so that not adaptation of the pipe is required. Reception of dosing signal from water softener. No additional water meter fitting reqired. Communication interface iQ Comfort for information exchange with water softeners softliQ:SD21, SD23, MD32, MD38. Complimentary Grünbeck app myProduct for status checks. Recording of important dosing data over a period of up to one year and readout via USB interface. Bayonet lock for 3-litre bottle in case of exaliQ:KC6-e and 15-litre suction lance for exaliQ:SC6-e (dosing canister not included in the scope of supply). Operating panel with status illumination. Illuminated LED ring as visual signal. Signalling of the level of the dosing agent (low or empty) with dry-run protection including visual and acoustic signal.

Scope of supply: Control and pump unit with click bracket, connecting cable iQ comfort, 14 V power supply plug with cable of 1.9 m in length as well as dosing line with dosing valve. (Dosing agent not included in scope of supply.)

Specifications

- Power supply 230 V, 50 Hz
- Operating voltage 24 V
- Max. water temperature 30 °C at installation site
- Nominal pressure PN 10
- Dosing volume 100 ml/m³

Dosing system exaliQ	KC6-e	SC6-e
Compatible with water softener	softliQ:SD21/23 softliQ:MD32/38	softliQ:SD21/23 softliQ:MD32/38
Nominal connection diameter [R]	1"	1"
Max. operating range [m³/h]	6	6
Dosing canister [l]	3	15
Order no. (RG-A)	**117 460**	**117 465**

Accessories	Order no. (RG-A)
Conversion kit exaliQ:KC6 to exaliQ:SC6 (15-litre suction lance + adapter)	117 495

¹ *DVGW certification pending*



Dosing system GENODOS DME[1]

Dosing systems GENODOS DME

Volume-controlled dosing of exaliQ mineral solutions in commercial and industrial buildings, as all-inclusive dosing system for stackable 15-litre canisters. In case of high water consumption, a 60-litre canister instead of the 15-litre one can be retro-fitted. To do so, the conversion kit for GENODOS DME systems, which includes a 60-litre suction lance, is required.

Dosing pump **GENODOS GP-/40** as self-priming, low-noise and continuously adjustable diaphragm dosing pump, automatically deaerating against pressure (pump head made of chemical-resistant plastic) with synchronous motor, pump preset and under seal, with fixing bracket for wall or floor mounting, with connection options for activation via external pulse, empty signal, including voltage-free fault signal output. Contact water meter with pulse cable to pump electronics, including water meter screw connections or flanges. Dosing line, dosing group as well as suction lance for stackable 15-litre canisters.

Specifications

- Max. suction head 1.5 mWC
- Max. delivery pressure 10 bar for DME 6 & 10, 8 bar for DME 20 & 30, 6 bar for DME 80 & 100
- Dosing volume 100 ml/m³
- Temperature min. 5 °C - max. 30 °C

Dosing system GENODOS DME	6	10	20	30	80	100
Dosing pump type	1/40	2/40	6/40	6/40	10/40	10/40
Nominal connection diameter	R 1"	R 1¼"	R 1½"	R 2"	DN 80	DN 100
Standard capacity [m³/h]	6	10	20	30	80	100
Pressure loss at standard capacity [bar]	0.5	0.8	0.8	0.8	0.6	0.8
Order no. (RG-A)	**163 435**	**163 445**	**163 455**	**163 465**		
Order no. (RG-B)					**163 475**	**163 485**

[1] *The disposable canister is not included in the scope of supply.*

NEW

Accessories	Order no. (RG-A)
Conversion kit GENODOS DME, 60-litre suction lance	**163 765**

[1] *The disposable canister is not included in the scope of supply.*

Selection of exaliQ mineral solutions

- The shelf life of the mineral solutions is 2 years max (if kept cool and protected from light).
- We recommend using up the solution within 6 months after opening the canister.
- We certify that the mineral substances contained in the colourless, liquid concentrates comply with the publication of the list of treatment substances and disinfection processes according to § 11 of the German Drinking Water Ordinance - 19th amendment (Edition: December 2017)
- The mineral solutions are packed hygienically, they are sterile and sealed with a tamper-evident cap.
- The ready-to-use mineral solutions are adapted to the pumping capacity (100 ml/m³) of the dosing systems.
- Chemical resistance group for GENODOS: Standard.

Mineral solution	Effect	Materials	Field of application
exaliQ control	Rehabilitation	Galvanised pipes	For the rehabilitation of corroded zinc pipes (often recognisable by brown-coloured water). After the rehabilitation (approx. 6 months): Change to a different exaliQ dosing agent.
exaliQ safe	Corrosion protection	Galvanised pipes and copper materials/brass	Corrosion protection for water in the hardness range soft to medium (up to 14 °dH (2.5 mmol/l)) as well as downstream of water softeners. For water temperatures up to 60 °C. To reduce the introduction of heavy metals (e.g. lead).
exaliQ safe+	Corrosion protection & Hardness stabilisation	Galvanised pipes and copper materials/brass	Hardness stabilisation and corrosion protection for water up to 21 °dH (3.75 mmol/l) and to reduce the introduction of heavy metals (e.g. lead). For water temperatures up to 60 °C. In case of a water hardness > 21 °dH (3.75 mmol/l), we recommend a water softener to treat the hardness and then to switch to exaliQ safe.
exaliQ pure	Hardness stabilisation **Note:** Copper and brass materials only suitable for warm water.	Galvanised pipes and copper materials/brass	For circulation water in solar systems or the installation of the dosing technology in the cold water inlet to the decentralised water heater. For high temperatures up to 80 °C and/or hard water with a total hardness > 21 °dH (3.75 mmol/l) (total alkalinity > 15 °dH (5.4 mmol/l)). *Consultation with Grünbeck prior to initial application recommended.*
exaliQ neutra	Increase of pH value **Note:** Only use exaliQ neutra in combination with the stand-alone exaliQ dosing systems and not with the combination systems for softening.	Galvanised pipes and copper materials/brass	Corrosion protection for soft water with high carbon dioxide concentrations as well as downstream of water softeners. Corrosion protection due to the binding of free carbon dioxide and an increase of the pH value. *Consultation with Grünbeck prior to initial application recommended.*

· *Also suitable for EXADOS dosing computers EK/ES and dosing systems GENODOS DME. The mineral-based EXADOS agents are discontinued.*

Country-specific availability of the mineral solutions. Please contact your local Grünbeck expert.



NEW



Mineral solution exaliQ safe, 3 l

Mineral solution exaliQ safe, 15 l

3-litre bottle for exaliQ:KC6/KC6-e

- Packaging unit: 1 box containing 2 bottles of 3 litres each
- Recommended for a water consumption/year of up to 150 m³
  (one bottle of exaliQ is sufficient for the treatment of 30 m³ of drinking water)

Mineral solution	Order no. (RG-I)
exaliQ control	114 031
exaliQ safe	114 032
exaliQ safe+	114 033
exaliQ pure	114 034
exaliQ neutra	114 035

Stackable 15- or 60-litre canister for dosing systems exaliQ:SC/SC6-e and GENODOS DME

- Stackable 15-litre canister, recommended for a water consumption/year of > 150 up to 600 m³
  (1 x 15 litres of exaliQ is sufficient for the treatment of 150 m³ of drinking water)
- Stackable 60-litre canister, recommended for a water consumption/year of > 600 m³
  (1 x 60 litres of exaliQ is sufficient for the treatment of 600 m³ of drinking water)

Country-specific availability of the mineral solutions. Please contact your local Grünbeck expert.

Mineral solution	Order no. (RG-I)
15-litre canister	
exaliQ control	114 071
exaliQ safe	114 072
exaliQ safe+	114 073
exaliQ pure	114 074
exaliQ neutra	114 075

Mineral solution	Order no. (RG-I)
60-litre canister	
exaliQ control	114 081
exaliQ safe	114 082
exaliQ safe+	114 083
exaliQ pure	114 084
exaliQ neutra	114 085

· *Also suitable for EXADOS dosing computers EK/ES and dosing systems GENODOS DME. The mineral-based EXADOS agents are discontinued.*

Water softeners for residential applications

1 mm of scale deposits ≙ ***10 % more energy consumption!***

Excerpt from DIN 1988-200:

Calcium carbonate mass concentration[1] [mmol/l]	Category	Measures at Δ ≤ 60 °C	Measures at Δ > 60 °C
≥ 2.5 (corresponds to ≥ 14 °dH)	hard	stabilisation or softening recommended	stabilisation or softening
≥ 1.5 up to < 2.5 (corresponds to ≥ 8.4 °dH up to < 14 °dH)	medium	none or stabilisation or softening	stabilisation or softening recommended
< 1.5 (corresponds to 8.4 °dH)	soft	none	none

Application recommendations acc. to DIN 1988-200, 12.6.2	
1 – 4 people	softliQ:SD18
1 – 9 people	softliQ:SD21
1 – 12 people	softliQ:SD23
1 – 20 people	softliQ:MD32
1 – 30 people	softliQ:MD38
Up to 5 people	softliQ:PA20 (water softening including 99.999 % protection against germs)
Starting from 13 people	Delta-p (triple water softener)

[1] *Refer to § 9, clause 2 of the Law on Detergents and Cleaning Agents*

Single systems

Single systems feature one exchanger tank. The control unit continuously analyses the water consumption on site and starts the regeneration during a time when usually no water is needed. During the regeneration process, hard water is available, however **(softliQ:SD).**

Twin systems

Twin systems ensure a continuous soft water supply. In times of high consumption, both exchanger tanks are flown through in parallel and the system only alternates between the tanks during the regeneration process **(softliQ:MD)**. The **softliQ:PA20** system also features an additional adsorber unit for hygienic water.

Reasons for water softening

DIN EN 806-2, B.6: *"... Water softeners working according to the ion exchange principle are used for the reduction or complete removal of the hardness contained in the water, if the water gives an indication of scaling. ..."* ***DIN 1988-200, 12.6.1:*** *"Water softeners must comply with the standards DIN EN 14743 and DIN 19636-100."*

Regeneration with sodium chloride

Water softeners which work according to the principle of ion exchange are regenerated by means of sodium chloride (salt tablets in 25 kg bags). Systems with DVGW certificate are designed according to DIN EN 14743 and DIN 19636-100 standards, are cost-effective, hygienic and environmentally safe due to the so-called economy salting and the disinfection unit.

Processes for water softening by means of membrane technology

Water softening is not only feasible by means of the conventional ion exchange. With the **ion selector NANO-X** system, partial softening can also be achieved by way of nanofiltration without any need for regeneration agents or chemicals.

Residual hardness

As the water which has passed through the pressure tank filled with ion exchanger resin is completely softened, it must be mixed with hard water if it is to be used as drinking water. The new German Drinking Water Ordinance does not stipulate a limit value; however, we recommend a residual hardness of 3 - 6 °dH (0.5 - 1.1 mmol/l).

Systems for commercial and industrial applications

Usually, softened water of < 0.1 °dH (< 0.02 mmol/) is required for production or industrial water in commercial and industrial applications. The guidelines of DIN 19636-100 do not apply in this case. For safety reasons, system separators must be installed unless the system is considered to be intrinsically safe **(Weichwassermeister GSX 10-I, Delta-p-I).**

GERMAN DESIGN AWARD WINNER 2020

DIN DVGW CERT



	softliQ:SD18	softliQ:SD21	softliQ:SD23
Water softener	✓	✓	✓
Adsorber	–	–	–
Application recommendation from ... to ... people	1 – 4 people	1 – 9 people	1 –12 people
Capacity of brine tank [kg]	35	35	35
Soft-Close function	✓	✓	✓
Colour touch display 4.3"	✓	✓	✓
Wi-Fi	✓	✓	✓
Mobile system control via Grünbeck's myProduct app	✓	✓	✓
Illuminated LED ring	–	✓	✓
Indication of salt supply	–	✓	✓
Water sensor	–	✓	✓
Communication interfaces 2 x iQ Comfort	–	✓	✓
LAN	–	✓	✓
Connection for delivery pump for regeneration water	–	–	✓
Parallel operation thanks to 2-tank water softener	–	–	–
Electronically controlled blending	–	–	–
Drain connection included in scope of supply	–	–	✓
Insulation kit included in scope of supply	–	–	✓
99.999 % protection against germs thanks to adsorber technology	–	–	–



softliQ:MD32	softliQ:MD38	softliQ:PA20
✓	✓	✓
–	–	✓
1 – 20 people	1 – 30 people	up to 5 people
95	95	95
✓	✓	✓
✓	✓	–
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	–
✓	✓	–
✓	✓	✓
✓	✓	–
✓	✓	✓
✓	✓	✓
✓	✓	–
–	–	–
–	–	✓

Softening
Residential



NEW



Specifications

- Dimensions (w x h x d)
  360 x 815 x 430 mm
- Max. water/ambient temperature
  30/40 °C
- Power supply 100 - 250 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar

Water softener softliQ:SD

Water softener softliQ:SD

Compact single water softener with intelligent adaptation of the system capacity and the times of regeneration to the individual consumption pattern of the user. Regenerations automatically take place in a time slot where usually no water is needed. Alternatively, the regeneration times and the capacity can also be set manually. The intelligent control unit and the 4.3" touch display enable the easy, intuitive start-up and operation of the system. The detachable brine tank simplifies hygienically clean maintenance. Via Wi-Fi, the system can easily be connected to Grünbeck's myProduct app.
Furthermore, the system features a lid with Soft-Close function, a disinfection unit, a water test kit for the determination of hardness, an audio signal and flexible connection hoses. The R 1" connection block with water meter screw connections has an installation length of 190 mm without screw connection and 271 mm with screw connection. Included in the connection block are: a non-return valve, an overflow valve, two shut-off valves (bypass), a blending valve as well as a dosing point for an optional connection of dosing systems.

Your advantage: Extension of warranty by 12 months when you register your product

Additionally, for softliQ:SD21 and softliQ:SD23:

- Illuminated LED ring as visual signal and illumination of the brine tank's interior
- Indication of salt supply for continuous monitoring and for early notification
- Water sensor to indicate uncontrolled water leakages
- 2 x iQ Comfort connections for easy connection of Grünbeck systems (e.g. exaliQ)
- LAN connection, as alternative connection to Grünbeck's myProduct app

Additionally, for softliQ:SD23:

- Programmable output, e.g. for the connection of the delivery pump for regeneration water
- Fault signal contact (collective fault signal)
- Drain connection and insulation kit included in the scope of supply

Water softener	softliQ:SD18	softliQ:SD21	softliQ:SD23
Nominal flow at a pressure loss of 1.0 bar K_v-value (DIN EN 14743) [m³/h]	1.8	2.1	2.3
at a pressure loss of 1.0 bar, 20 °dH (3.5 mmol/l) to 8 °dH (1.4 mmol/l) [m³/h]	3.0	3.5	3.8
Application recommendation by Grünbeck: up to ... people	1 - 4	1 - 9	1 - 12
Nominal capacity, variable [mol]	1.1 - 2.5	1.4 - 3.6	1.6 - 4.1
Nominal capacity, variable [°dH x m³]	6 - 14	8 - 20	9 - 23
Capacity of brine tank [kg]	35	35	35
Order quantity per pallet, 800 x 1,200 mm [pcs]	4	4	4
Order no. (RG-A)	**189 100**	**189 200**	**189 300**

· For accessories: Please refer to pages 29 and 39.

· The drain connection and the insulation kit are not included in the scope of supply of the softliQ:SD18 and softliQ:SD21 systems.



NEW



Specifications

- Dimensions (w x h x d)
  525 x 912 x 580 mm
- Max. water/ambient temperature
  30/40 °C
- Power supply 100 - 250 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar

Water softener softliQ:MD

Softening
Residential

Water softener softliQ:MD

Compact twin water softener with intelligent adaptation of the system capacity and the times of regeneration to the individual consumption pattern of the user. Alternatively, the regeneration times and the capacity can also be set manually. The electronic blending automatically controls the desired soft water hardness subject to the system flow. The intelligent control unit and the 4.3" touch display enable the easy, intuitive start-up and operation of the system. The detachable brine tank simplifies hygienically clean maintenance. Via LAN and Wi-Fi, the system can easily be connected to Grünbeck's myProduct app.
Furthermore, the system features a lid with Soft-Close function, a disinfection unit, a water test kit for the determination of hardness, an audio signal and flexible connection hoses. The R 1" (and the MD38's R 1¼") connection block with water meter screw connections has an installation length of 190 mm without screw connection and 271 mm with screw connection. Included in the connection block are: a non-return valve, an overflow valve, two shut-off valves (bypass), two sampling valves for untreated and treated water as well as a dosing point for an optional connection of dosing systems.

Your advantage:
Extension of warranty by 12 months when you register your product

All softliQ:MD systems include:

- Illuminated LED ring as visual signal and illumination of the brine tank's interior
- Indication of salt supply for continuous monitoring and for early notification
- Water sensor to indicate uncontrolled water leakages
- 2 x iQ Comfort connections for easy connection of Grünbeck systems (e.g. exaliQ)
- LAN connection, as alternative connection to Grünbeck's myProduct app
- Programmable output, e.g. for the connection of the delivery pump for regeneration water
- Fault signal contact (collective fault signal)
- Drain connection included in the scope of supply

Water softener	softliQ:MD32	softliQ:MD38
Nominal flow at a pressure loss of 1.0 bar K_v-value (DIN EN 14743) [m³/h]	3.2	3.8
at a pressure loss of 1.0 bar, from 20 °dH (3.5 mmol/l) to 8 °dH (1.4 mmol/l) [m³/h]	4.3	5.6
Application recommendation by Grünbeck: up to ... people	1 - 20	1 - 30
Nominal capacity, variable (both exchangers) [°dH x m³/mol]	12 - 28/2.2 - 5.0	16 - 40/2.8 - 7.2
Nominal capacity, variable (per exchanger) [°dH x m³/mol]	6 - 14 /1.1 - 2.5	8 - 20/1.4 - 3.6
Capacity of brine tank [kg]	95	95
Order quantity per pallet, 800 x 1,200 mm [pcs]	2	2
Size of connection block ["]	1	1¼
Order no. (RG-A)	**187 400**	**187 450**

· For accessories: Please refer to pages 29 and 39.

· The insulation kit is not included in the scope of supply.



Water softener softliQ:PA20

Water softener softliQ:PA20 with additional adsorber unit for hygienic water

Twin water softener with additional adsorber unit[1] for hygienic water and small footprint. During the adsorption process, pathogenic germs are retained at the adsorber material, then rendered harmless by means of disinfection and discharged to the drain. It is a physical process without any addition of chemicals to the drinking water. The system automatically regulates the desired soft water hardness subject to the system's flow rate. Developed in particular for households that attach great importance to the hygienic safety of their drinking water. Intelligent control unit with very low power consumption, colour display and guided start-up program. The technical component can be detached for easy, clean and hygienic maintenance. Lid with Soft-Close function for gentle closing of the lid. Wi-Fi interface and control via myGrünbeck app. Voltage-free fault signal output and programmable digital input. Disinfection unit, connection block with water meter screw connections, installation length 190 mm without screw connection, 271 mm with screw connection, non-return valve, two shut-off valves, two flame-sterilisable sampling valves for untreated and treated water, dosing point for optional connection of dosing systems, flexible connection hoses, water test kit to determine the hardness. Indication of salt supply for continuous monitoring and early warning as well as illuminated LED ring as a visual signal and for the illumination of the brine tank's interior. The adsorber elements have to be replaced at regular intervals.

Your advantage:
Extension of warranty by 12 months when you register your product

Specifications

- Dimensions (w x h x d) 525 x 912 x 580 mm
- Max. water/ambient temperature 30/40 °C
- Power supply 85 - 265 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar

Water softener	softliQ:PA20[2]
Nominal flow at a pressure loss of 1 bar K_v-value (DIN EN 14743) [m³/h]	2.0
at a pressure loss of 1 bar, from 3.5 mmol/l to 1.4 mmol/l [m³/h]	2.4
Application recommendation by Grünbeck: up to ... people	5
Recommended interval for replacement of adorber elements:	
after max. ... years at the latest	2
after a max. service of ... [m³]	250
Nominal capacity (both exchangers) [mol]	1.8
Nominal capacity (per exchanger) [mol]	0.9
Capacity of brine tank [kg]	95
Order quantity per pallet 800 x 1,200 mm [pcs]	2
Size of connection block ["]	1
Order no. (RG-A)	**525 450**

[1] *For more information on the process of the adsorber technology for hygienic water, please refer to pages 47/48.*
[2] *Proof of the protection against germ growth verified by TZW: DVGW-Technologiezentrum Wasser (German DVGW Technology Centre for Water)*
· *The drain connection is not included in the scope of supply.*

· ***Accessories: Please refer to page 39.***



Delivery pump for regeneration water



Drain connection DN 50 with siphon acc. to DIN EN 1717

Accessories for water softeners

Accessories	System designation	softliQ:SD18	softliQ:SD21	softliQ:SD23	softliQ:MD32	softliQ:MD38	softliQ:PA20	safeliQ:EA30	WINNI-mat VGX	Weichwassermeister GSX	Order no.	RG-
Connection angle 1 pair for cramped installation positions, connection hoses can be laid much closer alongside the system		–	–	–	•	–	•	•	•	•	**187 865**	A
Double screw connection 1¼" For direct connection of the filter (pureliQ or BOXER X) to the connection block of the water softener		•	•	•	•	–	•	•	•	•	**115 334**	B
Delivery pump for regeneration water For the reliable discharge of the regeneration water volume into discharge pipes located at higher levels (max. 2.5 m), consisting of: delivery pump incl. connection cable to the control electronics of the water softeners		–	–	•	•	•	•	•	•	•	**188 800**	A
Drain connection DN 50 with siphon according to DIN 1717 for small water softeners, backwash filters and system separators[2]		•	•	•[1]	•[1]	•[1]	•	•	•	•	**188 875**	A
Supplementary blending valve To generate a second blending hardness (e.g. for a separate pipe towards the kitchen, for technical applications, etc.)		•	•	•	•	–	–	–	•	•	**187 870**	A
Supplementary soft water outlet To easily branch off a 0 °dH (0 mol/l) pipe		•	•	•	–	–	–	–	•	•	**187 875**	A
Extension kits for connection hoses												
Extension kit for connection hoses DN 22		•	•	•	–	–	–	–	•	•	**187 860e**	B
Extension kit for connection hoses DN 25		–	–	–	•	–	•	•	–	–	**187 660e**	B
Extension kit for connection hoses DN 32		–	–	–	–	•	–	–	–	–	**187 680e**	B
Insulation kit With the insulation kit, the system's connection equipment is insulated properly and professionally												
Insulation kit for softliQ:SD		•	•	•[1]	–	–	–	–	–	–	**188 870**	A

[1] *Already included in the scope of supply.*
[2] *For maximum flow rates and application limits, please refer to the product data sheet and the operation manual.*



Selection Table – Water Softeners

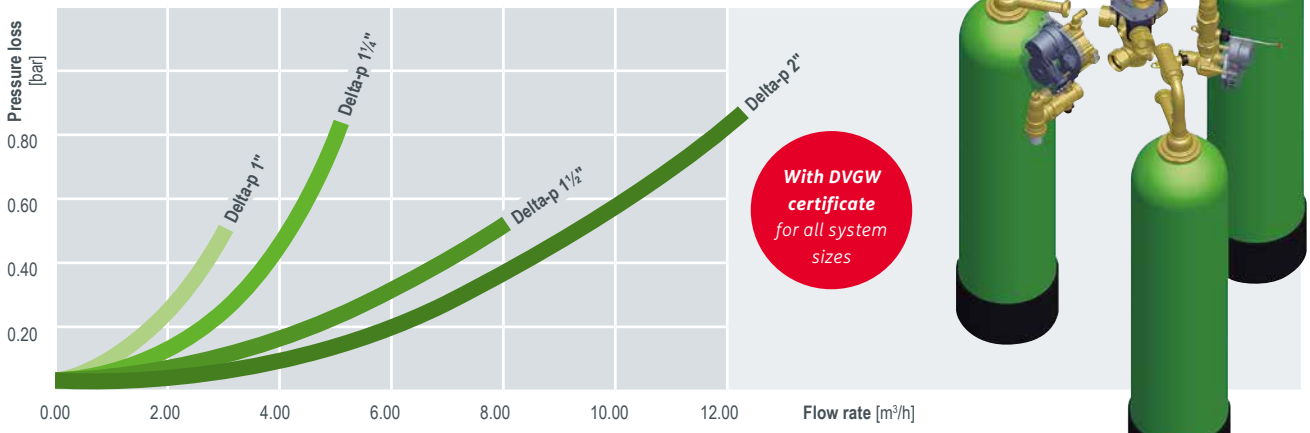
System designation	Connection diameter R [“]	Nominal flow [m³/h] (0 mmol/l) at a pressure loss of max. 1.0 bar	Nominal flow [m³/h] (raw water 3.5 mmol/l, soft water hardness 1.4 mmol/l)	Application recommendation by Grünbeck: up to 4 people	up to 9 people	up to 12 people	up to 20 people	up to 30 people	Order no.	Page
softliQ/Weichwassermeister systems										
softliQ:SD18	1	1.8	3.0	•	–	–	–	–	189 100	36
softliQ:SD21	1	2.1	3.5	•	•	–	–	–	189 200	36
softliQ:SD23	1	2.3	3.8	•	•	•	–	–	189 300	36
softliQ:MD32[1]	1	3.2	4.3	•	•	•	•	–	187 400	37
softliQ:MD38[1]	1¼	3.8	5.6	•	•	•	•	•	187 450	37
softliQ:PA20	1	2.0	2.4	•	–	–	–	–	525 450	38
Weichwassermeister GSX 10-I	1	0.75	–	–	–	–	–	–	187 530	44
GENO-mat systems										
GENO-mat duo WE-X 65/50	1	2.6	3.3	–	–	–	–	–	186 100/186 200	45
GENO-mat duo WE-X 150/130	1	2.9	5.0	–	–	–	–	–	186 110/186 210	45
GENO-mat duo WE-X 300/230	1	3.5	8.3	–	–	–	–	–	186 120/186 220	45
GENO-mat duo WE-X 450/330	1½	4.9	10.0	–	–	–	–	–	186 130/186 230	45
GENO-mat duo WE-X 750/530	1½	6.3	15.8	–	–	–	–	–	186 140/186 240	45
Delta-p systems										
Delta-p 1" + Delta-p-I 1"	1	3.0	5.0	–	–	–	–	•/–	185 100/185 200	42 - 43
Delta-p 1¼" + Delta-p-I 1¼"	1¼	5.0	8.3	–	–	–	–	•/–	185 110/185 210	42 - 43
Delta-p 1½" + Delta-p-I 1½"	1½	8.0	13.3	–	–	–	–	•/–	185 120/185 220	42 - 43
Delta-p 2" + Delta-p-I 2"	2	12.0	20.0	–	–	–	–	•/–	185 130/185 230	42 - 43

[1] *2-tank water softener: parallel operation for short-term peak flows, e.g. raindance shower.*

Grünbeck water softeners for trade and industry – general design information

Fully automatic ion exchangers for softening of drinking water for commercial and industrial applications, according to DIN EN 1717 **GENO-mat** systems must be installed with system separators. Complete systems with plastic exchanger tank, including built-in parts, high-grade ion exchanger filling material, control valve made of brass or red bronze, with electromechanical actuator. Microprocessor controller (types ZF and ZFW with timer control only). Regeneration can be activated fully automatically or manually. Brine tank with lid, integrated brine valve, safety valve and brine buffer technology. Water test kit for the determination of hardness.

Water Softeners for Trade and Industry





Triple water softeners Delta-p

Water softeners based on the ion exchange principle have been regarded as the tried and tested standard for many years now and have essentially been used to date in large residential buildings, building complexes and industrial applications which consume large volumes of water. Pressure losses caused by the softening and the extremely costly and time-consuming installation and dimensioning of the systems, however, always proved to be disadvantageous. With the triple water softener **Delta-p**, Grünbeck Wasseraufbereitung GmbH has developed a completely innovative solution to these problems. The patented control valve of the triple water softener **Delta-p** guarantees the uninterrupted supply of soft water with only a minimum loss of pressure.

Triple softening

Thanks to its significant benefits, the **Delta-p** series convinces trade, craftsmen and builders alike. As a triple system, the unit continuously provides soft water and sets new standards due to its low pressure loss and extra low consumption of operating materials. The fresh water guarantee with its automatic flushing of the bottle content prior to the activation of the exchanger tank in standby mode ensures the hygienic operation of the system. The selection of the system size is based on the dimension of the pipes laid in the building, therefore extensive calculations of capacity and peak volume flows become superfluous. A completely illustrated instruction manual simplifies the installation of the system. Thanks to the electronically controlled blending unit, the setting of the required residual hardness becomes child's play.

The **Delta-p** system is available in sizes 1", 1¼", 1½" and 2" for either drinking water or industrial applications. A pre-alarm salt supply for the timely reminder of a necessary salt refill can also be connected. Apart from the standard brine tanks with a max. capacity of 65 or 180 kg, larger brine tanks can be provided as well. Connection kits with shut-off valves, overflow valve and flexible connection hoses are available for easy connection to the drinking water installation. All connection hoses are suitable for drinking water and have certification according to KTW category A and W270.



Delta-p 1"



Delta-p 2"

Water softeners Delta-p

Fully automatic triple water softeners working according to the ion exchange principle, for the generation of fully/partially softened water with volume-controlled regeneration.

3 exchanger tanks made of pressure-resistant plastics with a filling of ion exchanger material, distribution system and adjustable height adapters, central control valve made of brass for hard, soft and regeneration water, microprocessor controller with simple 3-key operation and voltage-free signal contact and additional fault signal contact, 5 contact water meters (the industrial version only has 4) to transmit the water flow rates to the controller, electronically controlled blending valve, disinfection unit for automatic disinfection according to the electrolysis principle, PE brine tank with lid, sieve bottom and special brine valve, including operation manual.

Water softeners Delta-p-I “industrial version”

As above, however without blending unit, for the generation of fully softened water < 0.02 mmol/l, intrinsically safe system (direct connection to the drinking water installation is admissible).

Specifications

- Max. water temperature 30 °C
- Power supply 230 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 10 bar
- Operating voltage 24 V

Delta-p/Delta-p-I	1"	1¼"	1½"	2"
Nominal connection diameter [DN]	25	32	40	50
Nominal flow [m³/h]	3	5	8	12
Nominal flow of blending water [m³/h][1]	5.0	8.3	13.3	20.0
Pressure loss at nominal flow [bar]	0.5	0.8	0.5	0.8
Capacity per kg of regeneration salt [mol/kg]	5.7	5.7	5.7	5.7
Max. capacity of brine tank [kg][2]	65	65	180	180
Salt consumption per regeneration, approx. [kg]	1.5	2.5	5.2	7.2
Salt consumption per m³ [kg][1]	0.36	0.36	0.36	0.36
Order no. Delta-p (RG-B)	**185 100**	**185 110**	**185 120**	**185 130**
Order no. Delta-p-I (RG-B)	**185 200**	**185 210**	**185 220**	**185 230**

[1] In case of a raw water hardness of 3.5 mmol/l and a soft water hardness of 1.4 mmol/l (not Delta-p-I).

[2] For larger brine tanks, please inquire.

· The drain connection is NOT included in the scope of supply. Please refer to page 43.



Delta-p 2" on pedestal



Connection kit Delta-p 1½ - 2", installation length 260 mm

Water softeners Delta-p/Delta-p-I

Mounted on pedestal, ready for connection

Triple water softeners as described on pages 41 and 42 – mounted on pedestal, including connection kit.

Delta-p/Delta-p-I	1"	1¼"	1½"	2"
Dimensions (w x d) [mm]	770 x 770	770 x 770	960 x 880	960 x 880
System height [mm]	1,500	1,500	1,840	1,960
Brine tank diameter [mm][1]	410	410	570	570
Brine tank height [mm][1]	670	670	860	860
Order no. Delta-p (RG-B)	**185 105**	**185 115**	**185 125**	**185 135**
Order no. Delta-p-I (RG-B)	**185 205**	**185 215**	**185 225**	**185 235**

[1] *Brine tank not mounted on pedestal.*

Accessories Delta-p	Order no. (RG-B)
Connection kit Delta-p 1" - 1¼", installation length 190 mm[2]	**185 807**
Connection kit Delta-p 1½" - 2", installation length 260 mm[2]	**185 823**
Connection kit Delta-p-I 1" - 1¼", installation length 190 mm[2]	**185 808**
Connection kit Delta-p-I 1½" - 2", installation length 260 mm[2]	**185 824**
Pedestal for Delta-p 1" - 1¼" (also for Delta-p-I)	**185 820**
Pedestal for Delta-p 1½" - 2" (also for Delta-p-I)	**185 825**
Communication module DE200 Profibus	**185 890**
NEW Drain connection DN 50 acc. to DIN EN 1717, including siphon for Delta-p[3]	**185 775**

[2] *Screw connection not included.*
[3] *Can be used for all sizes.*

Pre-alarm salt supply	Order no. (RG-B)
To monitor the salt supply by means of a light sensor on the brine tank lid	**185 335**

Screw connections[4]	Order no. (RG-B)
Screw connection for connection block Delta-p 1"	**185 846**
Screw connection for connection block Delta-p 1¼"	**185 847**
Screw connection for connection block Delta-p 1½"	**185 848**
Screw connection for connection block Delta-p 2"	**185 849**

[4] *Screw connections are included in the Delta-p's scope of supply; the drain connection is NOT included in the scope of supply.*



Weichwassermeister GSX 10-I[1]

Weichwassermeister GSX 10-I “industrial version”

Water softener in compact design and modular technology, with full salting.

As pre-stage for reverse osmosis systems, for soft water < 0.02 mmol/l (system separator required).
PE housing consisting of two parts (technical component and brine tank which can be detached for maintenance purposes), transparent lid, two pressure tanks, one control valve, electronics component with controller, operating keys and backlit LCD display, voltage-free fault signal output, simplified indication of the system functions via LEDs (red, yellow, green), disinfection unit, connection block R 1" with water meter screw connections, installation length 190 mm without screw connection, 271 mm with screw connection, non-return valve, two shut-off valves (bypass) as well as flexible connection hoses to the system, water test kit for the determination of hardness.

Specifications

- Dimensions (w x h x d) 485 x 730 x 535 mm
- Max. water/ambient temperature 30/40 °C
- Power supply 85 - 265 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar
- Pressure at nominal flow 0.8 bar

Weichwassermeister	**GSX 10-I**
Max. continuous flow [m^3/h]	0.75
Salt consumption/reg. approx. [kg]	0.7
Order no. (RG-B)	**187 530**

[1] The drain connection is not included in the scope of supply.

Specifications

- Full salting for residual hardness of < 0.02 mmol/l (GENO-mat duo WE-X 65, 150, 300, 450, 750)
- Economy salting for residual hardness ≥ 0.35 mmol/l (GENO-mat duo WE-X 50, 130, 230, 330, 530)
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar
- Water temperature 30 °C
- Power supply 85 - 250 V, 50 - 60 Hz
- Operating voltage 24 V DC



Water softener GENO-mat duo WE-X

Water softeners GENO-mat duo WE-X

Fully automatic twin water softener working according to the principle of ion exchange for the generation of fully softened water with volume-controlled regeneration.

Consisting of:

PE brine tank with lid and sieve bottom, special brine valve with connecting line (enables maximum continuous flow), exchanger tank made of pressure-resistant plastic with filling of ion exchanger resin and distribution system, central control valve made of red bronze, microprocessor controller with simple 3-key operation and voltage-free signal/fault signal contact as well as programmable input. Control unit with LCD graphic display (backlit), integrated SD card to record operating data. Contact water meter with water meter screw connections.

GENO-mat duo WE-X (full salting)	**65**	**150**	**300**	**450**	**750**
Nominal connection diameter [DN]	25 fem	25 fem	25 fem	40 fem	40 fem
Max. continuous flow [m^3/h]	2.0	3.0	5.0	6.0	9.5
K_v value Δp = 1.0 bar [m^3/h]	2.6	2.7	3.1	4.5	5.6
Nominal capacity [mol]	12.0	26.6	53.9	80.2	133.2
Max. capacity of brine tank [kg]	130	190	285	485	760
Salt consumption/reg. [kg]	3.6	8.0	16.2	25.3	40.0
Order no. (RG-B)	**186 100**	**186 110**	**186 120**	**186 130**	**186 140**

Fully automatic twin water softener working according to the principle of ion exchange, with volume-controlled regeneration, particularly suitable for the generation of partially softened water, with integrated blending valve up to type 230, starting from type 330 available as an option, economy salting for residual hardness ≥ 0.35 mmol/l.

GENO-mat duo WE-X (economy salting)	**50**	**130**	**230**	**330**	**530**
Nominal connection diameter [DN]	25 fem	25 fem	25 fem	40 fem	40 fem
Max. continuous flow [m^3/h]	3.3	5.0	8.3	10.0	15.8
K_v value Δp = 1.0 bar [m^3/h]	4.3	4.5	5.2	7.5	9.3
Nominal capacity [mol]	9.5	20.9	42.3	60.0	95.2
Max. capacity of brine tank [kg]	65	130	190	285	285
Salt consumption/reg. [kg]	1.8	4.0	8.1	11.5	16.0
Order no. (RG-B)	**186 200**	**186 210**	**186 220**	**186 230**	**186 240**



Connection kit 1¼"



Mechanical blending valve 1¼"

Connection kits for water softeners 1", 1¼" and 1½"

Connection kits 1", 1¼" and 1½"

Consisting of:

- Connection fitting 1", 1¼" and 1½" with sampling valves
- Installation length 190 mm without screw connection
- Inlet strainer and non-return valve in water inlet
- Shut-off valves system inlet/system outlet
- Integrated overflow valve for emergency operation/peak withdrawal
- Water meter screw connections incl. seals
- Flexible connection hoses with transition fitting

Connection kits 1"-I, 1¼"-I and 1½"-I

Consisting of:

- Connection fitting 1"-I, 1¼"-I and 1½"-I with sampling valves
- Otherwise identical to connection kits 1", 1¼" and 1½", without overflow valve, however

System capacity	50	130	230	330	530	65	150	300	450	750	
Connection kits											**Order no. (RG-B)**
Connection kit 1"	•	–	–	–	–	–	–	–	–	–	**185 515**
Connection kit 1¼"	–	•	•	–	–	–	–	–	–	–	**185 530**
Connection kit 1½"	–	–	–	•	•	–	–	–	–	–	**185 545**
Connection kit 1"-I	–	–	–	–	–	•	•	–	–	–	**185 505**
Connection kit 1¼"-I	–	–	–	–	–	–	–	•	•	–	**185 520**
Connection kit 1½"-I	–	–	–	–	–	–	–	–	–	•	**185 540**

Mounting kit 1 for GENO-mat 1"	**Order no. (RG-B)**
Compact valve block with R 1" female thread, shut-off valves, bypass valve, hard water outlet, flexible connection hoses 600 mm	**125 845**

Accessories

Mechanical blending valves for the addition of raw water to generate any residual soft water hardness	**Order no. (RG-B)**
Mechanical blending valve R 1"	**126 010**
Mechanical blending valve R 1¼"	**126 015**

Pre-alarm salt supply	**Order no. (RG-B)**
To monitor the salt supply by means of a light sensor on the brine tank lid	**185 335**

Hygiene and disinfection

Reasons for disinfection

The disinfection of the water aims at the elimination of pathogens such as viruses or bacteria that might be contained in the water – a goal which can either be achieved by dosing disinfectants (e.g. chlorine or chlorine dioxide), by UV-C light treatment or by using an adsorption system. Disinfection procedures are installed downstream of the water treatment systems and represent the last step in the process. Limit and reference values for microbiological substances that may be contained in the water are indicated in legal stipulations (e.g. the German Drinking Water Ordinance or the European standard EN 806) and technical rules (e.g. the German VDI 6022) subject to the respective specifications and fields of application.

Adsorption

Adsorption is a physical process where the adsorber material removes pathogenic germs such as legionella bacteria and pseudomonads from the drinking water without adding any chemicals to the drinking water. The germs retained by the adsorber are killed at regular intervals by means of disinfection and are then washed out into the drain.
(For an illustration of the process, please refer to page 48.)

UV light

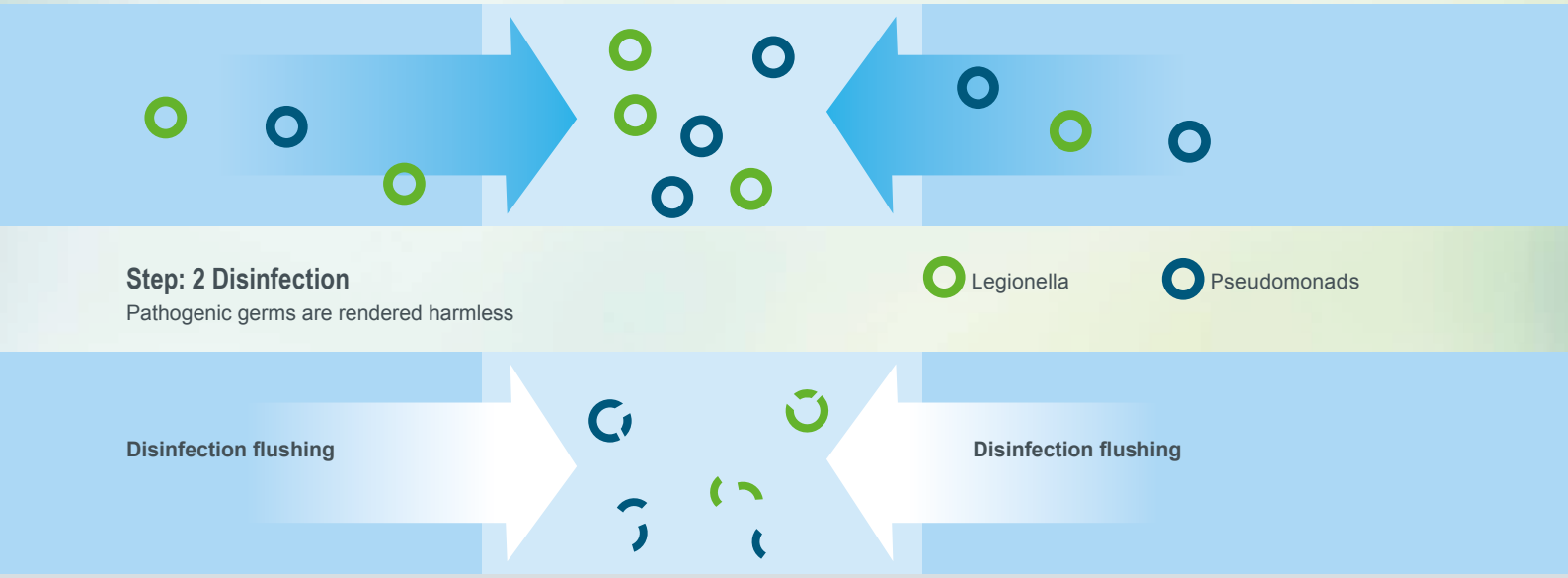
The devitalising effect of the UV light (**GENO-UV systems**) is due to the application of a special kind of lamp whose light – similar to sunlight – destroys organic cells.

- **GENO-UV systems** (for residential and industrial applications)
- Elimination of legionellae
- Combined process of air washer and disinfection (**GENO-LUWADES$_2$**)

Dosing of disinfectants

In order to eliminate pathogens, liquid disinfectants are dosed by means of volume-controlled dosing pumps. There is the option of adding a ready-made dosing solution (**GENO-Chlor A**), a dosing solution prepared on site (**GENO-Baktox**) or a continuously generated disinfection solution (chlorine dioxide).

- Dosing of **GENO-Chlor A (GENODOS DM-T)**
- Dosing of **GENO-Baktox (GENODOS DM-B/BO)**
- Generation and dosing of chlorine dioxide **(GENO-Baktox MRX/RX/X)**



Principle of adsorber technology for hygienic water



Working principle of adsorber technology for hygienic water

The adsorption system **safeliQ:EA30** works according to the principle of physical adsorption. The special surface of the adsorption material causes germs, such as legionella bacteria or pseudomonads, to stick to it. Following their fixation on the adsorber surface, they are rendered harmless at regular intervals by means of disinfection with chlorine and then are washed out of the system. Contrary to common systems, micro-biological impurities are thus effectively removed from the drinking water system, even in case of high demands of cold and hot water. This process works regardless of the flow direction and also ensures the bacteria's adhesion if the flow direction of the water is reversed.

Reasons for the installation of an adsorption system

Due to a germ reduction of 99.999 %, the adsorption process stands for water hygiene and safety. The **safeliQ** system offers this kind of protection even in cases where the water supplier's multi-barrier system no longer can influence the hygienic safety of the drinking water, for instance in the event of accidents or emergencies.

The adsorption technology can be applied in the most diverse fields of application. It is particularly suited for sensitive environments such as hospitals, nursing homes or public facilities but also for the private water supply, in order to ensure a reliable protection against germs.

Combined to a multi-barrier system, the adsorber technology for hygienic water can be effective at the water inlet but also in the circulation or at the withdrawal points. In this case, the **safeliQ:EA30** component is to be installed at the water's point of entry to the house. For the special requirements that sensitive environments might call for, Grünbeck develops individual solutions throughout all the various project phases – from analysis and problem definition up to completion – and while doing so, takes into consideration the specifics about hygiene.



Sales only after consultation with Grünbeck. ***Water analysis required!***

Adsorption system safeliQ:EA30

Adsorption system safeliQ:EA30

Adsorption system to reduce germs in drinking water according to the applicable German Drinking Water Ordinance. Twin system with two adsorber elements and requiring little floor space. Intelligent control unit with very low power consumption, colour display and guided start-up program. Technical component can be detached for easy, clean and hygienic maintenance. Lid with Soft-Close function for gentle closing. Wi-Fi interface and control via myGrünbeck app. Voltage-free fault signal output and programmable digital input. Disinfection unit, connection block with water meter screw connections, non-return valve, two shut-off valves, two flame-sterilisable sampling valves for untreated and treated water, flexible connection hoses. Indication of salt supply for continuous monitoring and early warning as well as illuminated LED ring as a visual signal and for the illumination of the brine tank's interior. The adsorber elements have to be replaced at regular intervals.

Specifications

- Dimensions (w x h x d) 525 x 912 x 580 mm
- Max. water/ambient temperature 30/40 °C
- Power supply 85 - 265 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar

Adsorption system	safeliQ:EA30[1]
Nominal flow at a pressure loss of 1.0 bar [m³/h]	3.0
Recommended interval for replacement of adorber elements:	
after max. ... years at the latest	2
after a max. service of ... [m³]	250
Capacity of brine tank [kg]	95
Order quantity per pallet 800 x 1,200 mm [pcs]	2
Size of connection block ["]	1
Installation length without screw connection [mm]	190
Installation length with screw connection [mm]	271
Order no. (RG-A)	**525 400**

[1] Proof of the protection against germ growth verified by TZW: DVGW-Technologiezentrum Wasser (German DVGW Technology Centre for Water)
· The drain connection is not included in the scope of supply.

· For accessories, please refer to pages 29 and 39.

Hygiene and Disinfection Private Water Supply

Your advantage: Extension of warranty by 12 months when you register your product

Sales only after consultation with Grünbeck. ***Water analysis required!***



GENO-UV-60 S

GENO-UV systems “Drinking water version”

For disinfection of clear drinking water which is free of turbidities, iron and manganese and that only carries a slight micro-biological load, for application in households and private water supply systems. The systems are certified according to DVGW worksheet W 294-2.

Scope of supply: stainless steel reactor with high-intensity UV lamp, 2 flushing/discharge valves, 2 water meter screw connections, flow restrictor, calibrated UV-C system sensor as per DVGW W 294-3. Protective quartz pipe, control unit **GENO-Multi BS** with operating hour meter and switch-on counter, indication of the irradiation intensity in W/m², power output for connection of an optional safety valve (required for a DVGW-compliant operation of the UV system) as well as an optional temperature-controlled flushing device.

Specifications

- Max. service life of lamp 16,000 h
- SAC_{254} max. 2.7 m^{-1}
- Max. operating pressure 10 bar
- Power supply 230 V, 50 Hz

GENO-UV-	60 S	120 S	200 S
Nominal connection diameter [R]	1"	1½"	2"
Installation position	horizontal, outlet at the top, self-deaerating		
Max. flow at 5 - 30 °C [m³/h]	3.3	8.0	12.0
Max. flow at 30 - 70 °C [m³/h]	–	–	8.0
Inlet water temperature [°C]	5 - 30	5 - 30	5 - 70
Ambient temperature [°C]	5 - 40	5 - 40	5 - 40
VA rating [VA]	75	145	215
Total length incl. screw connection [mm]	795	1,185	1,430
Order no. (RG-B)	**523 110**	**523 120**	**523 130**

Please inquire about ***additional GENO-UV systems*** *for special applications –* ***ex works and ready for connection!***

Accessories	Order no. (RG-B)
Safety device for GENO-UV-60 S	**523 870**
Safety device for GENO-UV-120 S	**523 875**
Safety device for GENO-UV-200 S	**523 880**
Temperature-controlled flushing for GENO-UV-S	**523 825**
Stainless steel connection kit 1" for GENO-UV-60 S	**520 070**
Stainless steel connection kit 2" for GENO-UV-120 S / 200 S	**520 075**
Wall bracket for UV systems GENO-UV-60 S up to 200 S	**523 800**
Floor rack for UV system 60	**523 815**
Floor rack for UV system 120	**523 805**
Floor rack for UV system 200	**523 810**
USB data logger for UV systems GENO-UV-60 S up to 200 S	**523 830**
Flushing kit to clean the UV system by means of GENO-clean CP	**520 020**
Cleaning agent GENO-clean CP (10 x 1 litre)	**170 022**



GENODOS DM-T 6



Sales only after consultation with Grünbeck. **Water analysis required!**

GENODOS DM-T 20

Dosing systems GENODOS DM-T

For flow-dependent dosing of GENO-Chlor A from transportation canisters or dosing tanks for the disinfection of drinking water and industrial water.

Low-noise dosing pump as self-priming and continuously adjustable diaphragm pump automatically deaerating against pressure, with pump head made of chemical-resistant plastic, synchronous motor, with fixing bracket for wall or floor mounting, with connection options for control via external pulse, empty signal with pre-alarm, function control including voltage-free fault signal output. Contact water meter with pulse cable to the pump electronics, including water meter screw connections or flanges, dosing group with non-return valve, pressure maintaining valve, dosing line made of PTFE.

- PVC suction lance for transportation canisters (DM-T 6 and DM-T 10)
- Dosing tank 60 litres (black) with suction lance (DM-T 20 and DM-T 30)
- Dosing tank 200 litres (black) with suction lance (DM-T 80 and DM-T 100)

Specifications

- Nominal pressure PN 10
- Temperature min. 5 °C - max. 30 °C
- Power supply 230 V, 50/60 Hz, 18/21 W
- Factory setting of pressure maintaining valve: 4 bar

Dosing system GENODOS	DM-T 6	DM-T 10	DM-T 20	DM-T 30	DM-T 80	DM-T 100
Water meter[1]	R 1"	R 1¼"	R 1½"	R 2"	DN 80	DN 100
Max. operating range [m³/h]	6	10	20	30	80	100
Pressure loss at max. flow [bar]	0.5	0.5	0.8	0.8	0.6	0.8
Tank volume [litres]	20	20	60	60	200	200
Order no. (RG-B)	**163 140**	**163 150**	**163 160**	**163 170**	**163 180**	**163 190**

[1] *With contactor as submerged type.*

Disinfectant	Order no. (RG-B)
GENO-Chlor A (20 litres) for all pipes, except for stainless steel[2]	**210 012**

Accessories	Order no. (RG-B)
PVC dosing group 2.72 with non-return valve and ball valve	**163 220**
Water test kit for chlorine and pH value 0.1 - 2.0 mg/l, 6.9 - 8.2	**170 128**
Chemicals collecting tray for 20 l canisters	**210 560**
Chemicals collecting tray for 60/100 l dosing tanks	**163 805**

[2] *Sufficient for the treatment of approx. 3,000 m³ of water (dosing volume 1.0 mg/l)*

Sales only after consultation with Grünbeck. ***Water analysis required!***



GENODOS DM-B 6[1]



GENODOS DM-B 10[1]

Dosing systems GENO-Baktox

For temporary continuous disinfection of drinking and industrial water by means of chlorine dioxide.

Self-priming diaphragm dosing pump, automatically deaerating against pressure, continuously adjustable, with synchronous motor; with connection options for empty signal, external control and voltage-free fault signal output; pump factory-set and under seal; contact water meter with pulse cable and pulse division for **GENODOS-pump** and dosing valve; gas-tight suction lance with integrated pre-alarm and empty signal, pressure maintaining valve.

Calculation of the estimated coverage of the disinfectant

1 litre of **GENO-Baktox** is sufficient for

- a water volume of 10 m³ in case of standard dosing (DM-B, DM-BO)
- a water volume of 1 m³ in case of sanitising dosing (MOBIdos)

Dosing systems GENODOS DM-B

Dosing system DM-B 6 pre-assembled on mounting plate, dosing systems DM-B 10 - 30 consisting of indiviual components.

Specifications

- Power supply 230 V, 50/60 Hz
- Water temperature 5 - 30 °C
- Ambient temperature 5 - 20 °C
  (in case of ambient temperatures of > 20 °C, the service life of the disinfectant is considerably shorter)
- Nominal pressure PN 8
- Factory setting of pressure maintaining valve: 4 bar

Dosing system	GENODOS DM-B			
	6	10	20	30
Nominal connection diameter [R]	1"	1¼"	1½"	2"
Nominal flow Q_N [m³/h]	3	5	10	15
Flow Q_{max} [m³/h]	6	10	20	30
Pressure loss at Q_{max} [bar]	0.5	0.5	0.7	0.8
Order no. (RG-B)[1]	**163 820**	**163 825**	**163 830**	**163 835**

Accessories	Order no. (RG-B)
Chlorine dioxide test 0.02 - 0.55 mg/l	**170 430**
Chemicals collecting tray for 20 l canisters	**210 560**
M-Bus measuring transducer D-DAM, complete	**115 850**

[1] *GENO-Baktox as well as water test kit not included in scope of supply.*

- *For disinfectants, please refer to page 53.*
- *For dosing systems with order no. 163 820, only 3-litre canisters are suitable.*



Dosing system MOBIdos



Disinfectants

Dosing system MOBIdos

Independent, compact system for mobile drinking water disinfection by means of hydrogen peroxide, chlorine dioxide or chlorine.

The mobile disinfection system MOBIdos is suitable for the disinfection of drinking water installations as per DIN EN 806-4 and DVGW worksheet W 557.

Due to its compact dimensions and low weight, the system is easy to transport and can be applied quickly and flexibly. Thanks to the system separator BA and the contact water meter included in the scope of supply, the dosing system is completely ready for connection. Volume-proportional dosing of the desired disinfectants and the integrated monitoring of the filling level ensure safe and reliable system operation. The dosing system is suitable for the disinfectants GENO-perox, GENO-Baktox and GENO-Chlor A and thus is suitable for all applications.

Dosing system MOBIdos	
Nominal flow Q_N [m^3/h]	5
Power supply [V/Hz]	230/50
Nominal connection diameter [G]	1"
Dimensions (w x h x d) [mm]	600 x 340 x 400
Order no. (RG-B)	**160 150**

Disinfectants and accessories	**Order no. (RG-B)**
GENO-Baktox (3 litres)	**170 450**
GENO-Baktox (10 kg)	**170 460**
GENO-Baktox (20 kg)	**170 470**
GENO-Chlor A (25 kg)	**210 012**
GENO-perox (1 litre)	**170 320**
GENO-perox (11 kg)	**170 335**
Hydrogen peroxide spray	**156 868**
Chlorine dioxide test 0.02 - 0.55 mg/l (300 analyses)	**170 430**
Digital test device Scuba II	**211 235**
Indicator for Scuba II, DPD1 (100 tablets)	**211 213**
Sodium metabisulphite (5 kg)	**170 306**
Water test kit for chlorine and pH value 0.1 - 2.0 mg/l, 6.9 - 8.2	**170 128**
Water test kit for chlorine, 10 - 160 mg/l (20 analyses)	**170 138**
Water test kit for peroxide, 100 - 1,000 mg/l (100 determinations)	**170 167**
Water test kit for peroxide 0.5 - 25 mg/l (100 test strips)	**170 136**
Hose extension kit for flushing compressor/MOBIdos	**151 820**

· *For systems for continuous disinfection in drinking water systems by means of GENO-UV systems, please refer to page 50.*

Note: For an effective disinfection performance, the **GENO-Baktox** solution prepared should be used up within 2 months.

Water treatment for private water supply

Nowadays, water treatment is gaining more and more importance. Large water supply companies are installing expensive measuring and control technology. In the comparatively small systems for a private water supply, other processes must be used in order to make the water treatment cost-effective.

Reduction of nitrate

By nature, the nitrate concentration in ground water is not very high. However, in territories with intensive agricultural manuring, nitrate values of > 50 mg/l can be found. In order to reduce the nitrate concentration of well or ground water to the drinking water limit value, ion exchange systems are commonly used. In this process, nitrate is replaced by chloride (similar to the softening process where calcium and magnesium are replaced by sodium). As soon as the ion exchange material is exhausted, a fully automatic regeneration process takes place. Thereby the nitrate ions are washed out and flow into the drain, and the resin is re-loaded with chloride ions. The systems are regenerated by means of sodium chloride.

Deacidification

Depending on the soil the water flows through, ground or well water can have a very low pH value (which can even be lower than the limit value for drinking water of 6.5) and therefore it reacts acidic. These low pH values are caused by an excess of carbon dioxide. From the hygienic point of view and with regard to health, such acid water can be consumed without objections. For technical applications, however, the water must be deacified. The corrosion behavior of acid water, in particular, is considerable and this kind of water will damage any metal installation in the long run. Deacidification in small systems can mainly be achieved using two methods: dosing of lye or reaction filtration with calcium carbonate. A combination of both methods would also be possible.

Deferrisation/Demanganisation

Ground water containing iron and manganese has a brown, unappetising colour. It leaves brown, hardly removable stains on the sanitary installations and discolours clothes. In ground water, iron and manganese mostly occur in bivalent, soluble form. During treatment they must be oxidised to trivalent iron and tetravalent manganese in order to be able to filtrate them as iron-III-hydroxide and as manganese dioxide. Optimum pH values and sufficient oxidants must be available so that this reaction can take place.

A frequently used process for deferrisation and demanganisation – mainly in small systems – is the utilisation of potassium permanganate for oxidation. However, the required pH value which should be > 7.4 for the reaction to take place must be taken into consideration.



Sales only after consultation with Grünbeck. ***Water analysis required!***



Nitrate filter WINNI-mat VGX-N 50[1]

Nitrate filter WINNI-mat VGX-N 400[1]

Nitrate filter WINNI-mat VGX-N

Compact, volume-controlled single system for nitrate reduction in cold drinking water.

Compact PE housing with filling opening, safety overflow, brine tank and brine valve, pressure vessel with ion exchanger material and distribution system, control valve with ceramic discs and integrated contact water meter, electronics with microprocessor controller, operating keys, digital display and voltage-free fault signal output. In case of **VGX-N 400** and **VGX-N 650**, the brine tank may be detached from the exchanger tank and controller for maintenance work.

Furthermore, a connection block R1" with water meter screw connections, non-return valve, overflow valve, blending valve, two shut-off valves (bypass), as well as two flexible connection hoses to the system and a water test kit for the determination of nitrate are included in the scope of supply.

Specifications

- Connection block – installation length without water meter screw connections 190 mm
- Max. water/ambient temperature 30/40 °C
- Power supply 230 V, 50/60 Hz
- Nominal pressure PN 10
- Operating pressure min. 2 bar/max. 8 bar
- Max. pressure loss 0.8 bar at nominal flow

Nitrate filter WINNI-mat VGX-N	50	400	650
Nominal connection diameter [R]	1"	1"	1"
Nominal flow [m^3/h]	1.3	1.3	1.5
Nominal capacity nitrate [mol]	0.8	6.5	10.5
Nominal capacity nitrate [g x m^3]	50	400	650
Max. capacity of brine tank [kg]	38	90	90
Order no. (RG-B)	**188 140**	**188 450**	**188 460**

Accessories	Order no. (RG-A)
Drain connection DN 50 with siphon acc. to DIN EN 1717	**188 875**

[1] *The drain connection is not included in the scope of supply.*

Specifications

- Power supply 230 V, 50 Hz
- Operating pressure min. 2.5 bar/max. 6 bar
- Nominal pressure PN 10
- Nominal connection diameter
  Type 20/10 - 30/14: R 1" male thread;
  Type 40/17 - 60/20: R 1½" female thread



Sales only after consultation with Grünbeck. ***Water analysis required!***

GENO-mat KF-Z

Filter systems GENO-mat KF-Z/MS-Z/AK-Z

GENO-mat filter systems are used if filtration by means of a cartridge filter or a backwash filter is impossible due to a particularly high degree of pollution.

Range of application

- Gravel filter (quartz gravel) in case of mechanical impurities (KF-Z)
- Multi-layer filtration for increased efficiency (MS-Z)
- Dechlorination, odour and taste improvement by means of activated carbon (AK-Z)

System description

- Plastic filter tank with internal distribution system
- Filter filling: quartz gravel in various grain sizes (KF-Z), quartz gravel and hydroanthrasite (MS-Z), quartz gravel and activated carbon (AK-Z)
- Central control valve with operation and backwash function, including timer control and power supply cable

GENO-mat KF-Z	**20/10**	**25/13**	**30/14**	**40/17**	**40/18**	**50/19**	**60/20**
Max. nominal flow [m³/h]	1.5	2.0	3.0	4.0	5.0	6.0	8.0
Quartz gravel [kg][1]	33	75	108	148	200	311	390
Order no. (RG-B)	**129 500**	**129 505**	**129 510**	**129 515**	**129 520**	**129 525**	**129 530**

GENO-mat MS-Z	**20/10**	**25/13**	**30/14**	**40/17**	**40/18**	**50/19**	**60/20**
Max. nominal flow [m³/h]	1.5	2.0	3.0	4.0	5.0	6.0	8.0
Quartz gravel [kg][1]	17	40	70	112	110	247	367
Hydroanthrasite [l]	8	18	26	24	64	50	78
Order no. (RG-B)	**129 550**	**129 555**	**129 560**	**129 565**	**129 570**	**129 575**	**129 580**

GENO-mat AK-Z	**20/10**	**25/13**	**30/14**	**40/17**	**40/18**	**50/19**	**60/20**
Max. nominal flow [m³/h]	0.25	0.5	1.0	1.2	1.5	2.0	3.0
Quartz gravel [kg][1]	9	15	20	20	20	30	30
Activated carbon [kg]	10	16	25	40	50	90	140
Order no. (RG-B)	**129 800**	**129 805**	**129 810**	**129 815**	**129 820**	**129 825**	**129 830**

[1] *In various grain sizes.*

· *Regarding consumables for filter systems, please refer to page 57.*

Sales only after consultation with Grünbeck. **Water analysis required!**



Specifications

- Power supply 230 V, 50 Hz
- Operating pressure min. 2.5 bar/max. 6 bar
- Nominal pressure PN 10
- Nominal connection diameter
  Type 20/10 - 30/14: R 1" male thread;
  Type 40/17 - 60/20: R 1½" female thread

GENO-mat TE-Z

Deacidification systems GENO-mat TE-Z

Filter systems **GENO-mat TE-Z** are used for partial deacidification and to increase the total alkalinity in case of soft and acid water. Binding free carbon dioxide increases the pH value. The filter systems can be used up to a total alkalinity of ≤ 1.0 mol/m³ and a carbon dioxide concentration of ≤ 35 mg/l.

System description

- Plastic filter tank with internal distribution system
- Filter filling: Hydrolit-Ca with support layer
- Central control valve with operation and backwash function, including timer control and power supply cable

GENO-mat TE-Z	20/10	25/13	30/14	40/17	40/18	50/19	60/20
Nominal con. diameter [R]	1"	1"	1"	1½"	1½"	1½"	1½"
Max. nominal flow [m³/h]	0.5	1.0	1.5	2.0	2.5	3.0	4.0
Tank diameter [mm]	210	260	340	370	420	550	620
Total height of system [mm]	1,360	1,620	1,620	1,900	1,900	1,870	2,100
Quartz gravel [kg]	9	15	20	20	20	30	30
Hydrolit-Ca [kg]	20	25	70	90	120	220	320
Order no. (RG-B)	**129 850**	**129 855**	**129 860**	**129 865**	**129 870**	**129 875**	**129 880**

· *For the respective mounting kit, please refer to page 58.*

Consumables for filter systems	Order no. (RG-B)
Quartz gravel 3.15 - 5.6 (all filter systems) | 25 kg bag	**170 208**
Quartz sand 1.0 - 2.2 (KF-Z / MS-Z) | 25 kg bag	**170 207**
Filter sand 0.4 - 0.8 (KF-Z) | 25 kg bag	**170 205**
Hydroanthrasite (MS-Z) | 50 litre container (approx. 25 kg)	**170 220**
Activated carbon (AK-Z) | 25 kg bag	**170 255**
Hydrolit-Ca (TE-Z) | 25 kg bag	**170 230**

Specifications

- Operating pressure min. 2.5 bar/max. 6 bar
- Nominal pressure PN 10
- Max. water temperature 30 °C
- Power supply 230 V, 50 Hz

In case of high ammonium values, it is possible to install an additional oxidation step that provides extra air, including a compressor and control system.



Sales only after consultation with Grünbeck. *Water analysis required for the technical process design. If operation conforms to specification, iron values of max. 3 mg/l can be reduced to less than 0.1 mg/l at pH values of > 7.4*

GENO-mat FE-Z with regeneration tank as accessory

Deferrisation systems

Fully automatic filter system to reduce dissolved and undissolved iron in private water supply systems. Complete system with plastic ion exchanger tank including built-in components, filling of high-grade, special filter material. Control head made of red bronze with electromechanical actuator and timer control, water test kit for iron.

Deferrisation systems GENO-mat FE-Z

- Special filter material GENO-Ferrocat

FE-Z	20/10	25/13	30/14	40/17	40/18	50/19	60/20
Nominal con. diameter [R]	1"	1"	1"	1½"	1½"	1½"	1½"
Nominal flow [m³/h][1]	1.5	2.0	3.0	4.0	5.0	6.0	8.0
Max. daily capacity [m³][1]	3.0	4.0	6.0	8.0	10.0	12.0	16.0
Regeneration agent required (quantity to be prepared) [l/reg.]	30	50	60	100	100	200	300
Backwash capacity [m³/h]	1.6	1.6	1.6	3.4	3.4	5.7	5.7
GENO-Ferrocat [l]	28	52	72	100	112	224	308
Support gravel [kg]	–	–	25	25	25	50	50
Order no. (RG-B)	**153 210**	**153 220**	**153 230**	**153 240**	**153 250**	**153 260**	**153 270**

Accessories/Consumables	Order no. (RG-B)
Mounting kit for GENO-mat 1" (up to type 30/14)	**125 845**
NEW Connection kit 1½"-I (starting from type 40/17)	**185 540**
Regeneration tank 100 l[2]	**153 094**
Regeneration tank 300 l[2]	**153 095**
Water test kit for iron 0 - 0.8 mg/l and 1 - 10 mg/l (30 determinations)	**170 150**
Water test kit for manganese 0.03 - 0.5 mg/l (100 determinations)	**170 097**
Refill pack of reagents for water test kit for manganese (100 determinations)	**170 193**
GENO-oxi plus 20 kg (standard)	**170 029**
GENO-special granulate 1 kg[3]	**170 016**
GENO-special granulate 5 kg[3]	**170 017**
Potassium permanganate 5 kg (standard)[3]	**170 041**
Filter material GENO-Ferrocat 28 litres (approx. 18 kg)	**170 170**

[1] *Depending on the iron concentration.*
[2] *For the regeneration of deferrisation systems/demanganisation systems*
[3] *Has to be registered with the Federal Opium Authorities acc. to the law on the monitoring of basic elements (for consumption amounts of more than 100 kg/year).*

Sales only after consultation with Grünbeck. *Water analysis required for the technical process design. If operation conforms to specification, iron values of max. 3 mg/l can be reduced to less than 0.1 mg/l and manganese values of max. 1 mg/l can be reduced to less than 0.05 mg/l at pH values of > 7.4.*



Specifications

- Operating pressure min. 2.5 bar/max. 6 bar
- Nominal pressure PN 10
- Max. water temperature 30 °C
- Power supply 230 V, 50 Hz

GENO-mat MN-Z with regeneration tank as accessory

Demanganisation systems

Fully automatic filter system to reduce dissolved and undissolved iron/manganese in private water supply systems. Complete system with plastic ion exchanger tank including built-in components, filling of high-grade, special filter material, control head made of red bronze with electromechanical actuator and timer control, water test kit for manganese.

Demanganisation systems GENO-mat MN-Z

- Special filter material GENO-Fermanit
- Dosing an oxidant is obligatory for demanganisation

MN-Z type	20/10	25/13	30/14	40/17	40/18	50/19	60/20
Nominal con. diameter [R]	1"	1"	1"	1½"	1½"	1½"	1½"
Nominal flow [m^3/h][1]	1.5	2.0	3.0	4.0	5.0	6.0	8.0
Max. daily capacity [m^3][1]	1.5	2.0	3.0	4.0	5.0	6.0	8.0
Regeneration agent required (quantity to be prepared) [l/reg.]	30	50	60	100	100	200	300
Backwash capacity [m^3/h]	1.6	2.3	2.3	3.4	3.4	5.7	5.7
Tank diameter [mm]	210	260	340	370	420	550	620
Total height of system [mm]	1,360	1,620	1,620	1,900	1,900	1,870	2,100
Order no. (RG-B)	**153 410**	**153 420**	**153 430**	**153 440**	**153 450**	**153 460**	**153 470**

Replacement filter fillings MN-Z

Order no. (RG-B)	153 020	153 022	153 024	153 026	153 028	153 030	153 032

[1] *Depending on the iron and manganese concentration.*

· *For accessories/consumables, please refer to page 58.*



GENODOS DM-oxi 1"

Dosing systems GENODOS DM-oxi

For dosing **GENO-oxi plus.**

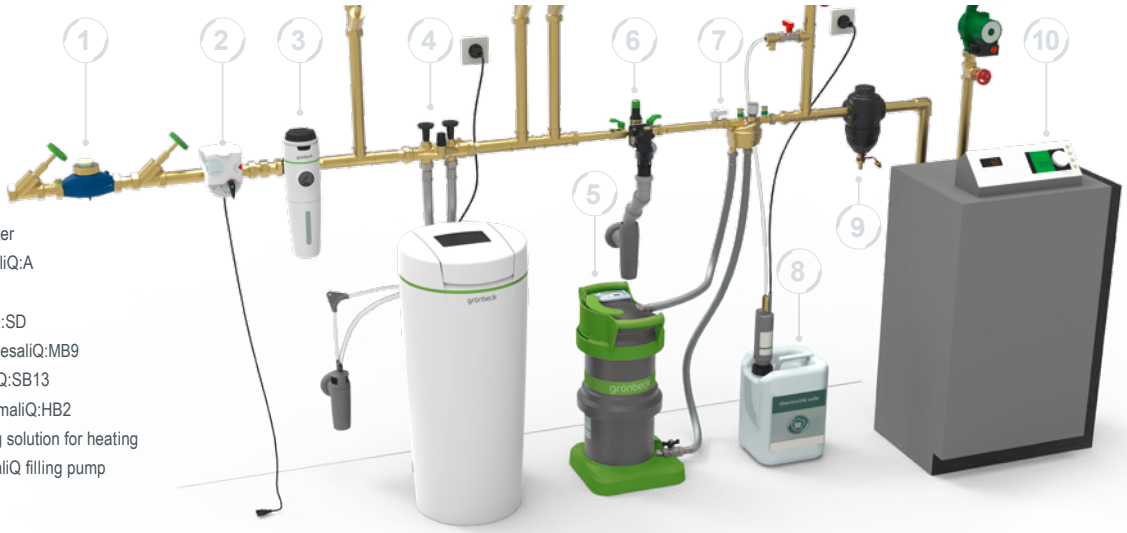
Consisting of: dosing pump GP-/40, contact water meter, suction lance for 20 kg transportation dosing container, dosing valve 4/6 and 4 m dosing line.

Dosing system GENODOS	**DM-oxi 1"**	**DM-oxi 1½"**
Dosing pump GP type	2/40	6/40
Flow Q_{max} [m^3/h]	6.0	20.0
Pulse sequence [l/pulse]	0.33	0.25
Delivery rate (2 bar counter-pressure) [l/h]	2.3	7.1
Delivery rate (6 bar counter-pressure) [l/h]	2.2	6.4
Max. water pressure [bar]	10	8
Max. water temperature [°C]	30	30
Power supply [V/Hz]	230/50	230/50
Order no. (RG-B)	**163 420**	**163 430**

Dosing agent	**Order no. (RG-B)**
GENO-oxi plus 20 kg (standard)	**170 029**

Acccessories	**Order no. (RG-B)**
Overflow valve GENODOS DM-oxi 1", 1½"	**163 790**
Dosing point for filter systems up to type 30/14	**163 860**
Dosing point for filter systems starting from type 40/17	**163 880**
Chemicals collecting tray for 20 l canisters	**210 560**

Heating water



1. Residential water meter
2. Savety device protectliQ:A
3. Fine filter pureliQ:KD
4. Water softener softliQ:SD
5. Mixed bed cartridge desaliQ:MB9
6. Filling group thermaliQ:SB13
7. Treatment group thermaliQ:HB2
8. thermaliQ safe dosing solution for heating protection and thermaliQ filling pump
9. Sludge separator
10. Boiler

Heating water

Varying technical rules and regulations have made a mystery of the topic “heating water treatment” and the considerable demands, the boiler manufacturers are placing on the executing craftsmen, represent an additional challenge. Modern materials, complex components and a compact design with small pipe cross-sections extremely increase the demands on the filling water. Heating systems – no matter whether oil, gas or pellets – can only work effectively if their efficiency is not reduced by deposits.

The solution is quite simple: **The 2-component system by Grünbeck** ensures the easy and efficient protection of the heating system.

For an optimum protection against corrosion and a reliable setting of the pH value without an additional check after 8 - 12 weeks, Grünbeck recommends using fully demineralised water – generated by means of the mixed bed cartridge **desaliQ:MB** for initial fillings and make-up water feed – in combination with Grünbeck’s **thermaliQ safe** dosing solution for heating protection.

With Grünbeck’s practice-oriented 2-component system, filling and protecting the heating system go hand in hand with each other – easily and reliably.

Grünbeck’s products for heating protection – easy and reliable

desaliQ consistently focuses on fully demineralised water (demi water/ low-salt operation). All demands stipulated in VDI 2035, sheet 1 and sheet 2 as well as in the joint worksheet by the BDH (Federal Industrial Association of Germany – House, Energy and Environmental Technology) and the ZVSHK (Central Association of the German HVAC Trade) are being fulfilled.

thermaliQ offers the ideal products for efficiently cleaning and optimally protecting the heating system, ensuring easy application and safety for the craftsman.

Grünbeck's product range includes the filling group **thermaliQ** to secure the drinking water according to DIN EN 1717 and offers additional options for professionally filling the heating system by using a **desaliQ** filling or mixed bed cartridge as well as a mobile reverse osmosis system.

All Grünbeck products are perfectly harmonised with each other and bring clarity to heating water treatment.

Overview on the easy and practical filling and make-up water feed of heating systems

Step 1: Installation of a heating system – laying the groundwork for optimum heating water

- Installation of boiler and piping of the heating system as well as installation of Grünbeck's products:
  Filling group thermaliQ:SB13 and treatment group thermaliQ:HB2
  by the installer

Step 2: Initial filling of the heating system with optimum demi water

- Connection of the mixed bed cartridge **desaliQ:MB9** to the **treatment group thermaliQ:HB2**. To do so, the **desaliQ hose kit** is connected to the **desaliQ connection adapter**. Afterwards, the system is filled with demineralised water. Later on, the filling cartridge is used to carry out the make-up water feed.
- Along with the initial filling, Grünbeck recommends adding **therrmaliQ safe** for corrosion protection and for stabilising the pH value.

→ **No follow-up check required after 8 – 12 weeks. Annual measurement and check is sufficient.**

Step 3: Easy and practical make-up water feed with demi water

- The installer hands over the **filling cartridge desaliQ:HB2** to the end customer. The filling cartridge may be connected directly (without the need for an additional adapter) to the treatment group.
- Alternative option: make-up water feed by means of **filling cartridge desaliQ:HB4**: In order to replenish a larger amount of demineralised water (e.g. in case of large heating systems), **filling cartridge desaliQ:HB4** may be used. For connection to the treatment group, the **desaliQ bottle adapte**r – which is available directly in combination with the cartridge – as well as the **desaliQ connection adapter** are required.



Filling section thermaliQ:FB2



Filling cartridge desaliQ:HB2 + cylinder



desaliQ connection adapter



Filling cartridge desaliQ:HB4 with bottle adapter



Mixed bed cartridge desaliQ:MB9



Mixed bed cartridge desaliQ:BA6

· *Accessories: For new drain connection DN 50 with siphon according to DIN 1717, please refer to page 39.*



NEW



Filling group thermaliQ:SB13

Filling section thermaliQ:FB2
consisting of filling group and treatment group

Filling group thermaliQ:SB13

To secure the drinking water as per DIN EN 1717 during the initial filling or make-up water feed of closed heating systems by preventing the water from flowing back from the heating system.

Consisting of: system separator BA with connected pressure reducer unit including pressure gauge (setting options for filling pressure: 0.5 – 4 bar; factory setting: 1.5 bar). The 360 degree rotatable system separator unit allows for horizontal or vertical installation in the pipe. Thanks to the rotatable flange, the system separator cartridge can be replaced quickly and easily, rendering maintenance convenient. A dirt trap on the inlet side as well as shut-off valves on the filling group's inlet and outlet side complete it. The filling group is fully pre-assembled and comes in a cardboard box.

Treatment group thermaliQ:HB2

To fully demineralise water of drinking water quality for easy and quick initial filling and make-up water feed of closed heating systems.

Consisting of: shut-off valve, vent valves as well as a conductivity measuring cell to monitor the water quality. In case of a conductivity of less than 10 µS/cm, the green light-emitting diode is flashing, between 10 – 50 µS/cm, the yellow diode is flashing and starting from 50 µS/cm, the red light-emitting diode indicates the required replacement of the full demineralisation unit. The filling cartridge desaliQ:HB2 is already included in the scope of supply. By way of the desaliQ connection adapter (see below), other Grünbeck mixed bed cartridges can easily be connected as well. The treatment group also is a retrofitting option for existing filling groups.

Filling section thermaliQ:FB2 – consisting of filling group and treatment group

To fully demineralise water of drinking water quality for easy and quick initial filling and make-up water feed of closed heating systems.

Consisting of: filling group thermaliQ:SB13 and treatment group thermaliQ:HB2. Particularly convenient handling since the filling group not only features a conductivity measuring cell but a filling cartridge desaliQ:HB2 as well.

Filling section thermaliQ:FB13i – heating water treatment for the industrial sector

For the treatment of heating water in the industrial sector, mostly in combination with conductivity meter GENO-Multi-LF. Combined with a desaliQ filling/mixed bed cartridge, it is used for the full demineralisation of water of drinking water quality for the easy and quick initial filling and make-up water feed of closed heating systems. **Consisting of:** filling group thermaliQ:SB13 and housing of treatment group, incl. deasliQ connection adapter as well as a water meter.

Technical specifications	Filling group thermaliQ:SB13	Treatment group thermaliQ:HB2	Filling section thermaliQ:FB2	Filling section thermaliQ:FB13i
Nominal connection diameter [DN]	15	15	15	15
Operating pressure [bar]	10	6	6	10
Nominal flow at 1.5 bar [m³/h]	1.3	–	–	–
Nominal flow (with cartridge) [m³/h]	–	0.2	0.2	–
Nominal flow (with adapter) [m³/h] [1]	–	2.5	1.3	1.3
Max. water temperature [°C]	30	30	30	30
Installation length with screw connections [mm]	210	265	375	510
without screw connections [mm]	150	160	315	454
Order no. (RG-B)	**707 750**	**707 755**	**707 760**	**707 770**

[1] *Depending on the filling cartridge or mixed bed cartridge used.*

NEW



Filling cartridge desaliQ:HB2

Cardboard box for support



Filling cartridge desaliQ:HB4 with bottle adapter

Filling cartridge desaliQ:HB

Cartridge for full demineralisation by means of mixed bed resin for connection to **treatment group thermaliQ:HB2** (refer to page 63), designed for the full demineralisation of water of drinking water quality or the residual demineralisation of partially demineralised water, e.g. for the initial filling of smaller heating systems or the make-up water feed in heating systems. For vertical installation only. The adapter is made of high-grade, dezincification-resistant brass.

Filling cartridge desaliQ:HB2

Filling cartridge (including flow stabiliser) for the make-up water feed of smaller up to medium-sized heating systems with fully demineralised water. This filling cartridge can be directly connected to the **treatment group thermaliQ:HB2**.

Filling cartridge desaliQ:HB4

Filling cartridge (including non-return valve and flow stabiliser) with **desaliQ bottle adapter** for direct connection to the **GENO-therm filling devices** and connection blocks. In case of connection to the **treatment goup thermaliQ:HB2**, the **desaliQ connection adapter** is required in addition.

Filling cartridge desaliQ:HB	**2**	**4 with bottle adapter**	**4 without bottle adapter**
Nominal connection diameter of adapter	–	¾"	–
Capacity < 10 [µS/cm x m³]	25	80	80
Capacity < 50 [µS/cm x m³]	40	110	110
Nominal flow [m³/h]	0.2	0.4	0.4
Nominal pressure [PN]	6	6	6
Max. water temperature [°C]	30	30	30
Weight, resin included [kg]	0.9	4.5	4.5
Order no. (RG-B)	**707 745**	**707 150**	**707 155**

desaliQ connection adapter[1]	**Order no. (RG-B)**
To connect the filling cartridge desaliQ:HB4 (with bottle adapter) as well as the desaliQ mixed bed cartridges to the treatment group or the filling section. The ¾" male thread at the connection adapter allows for convenient connection via the desaliQ hose kit.	**707 276**

Accessories	**Order no. (RG-B)**
Mixed bed resin for filling cartridge desaliQ:HB4	**707 680**
desaliQ:HB4 bottle adapter	**707 127**
desaliQ hose kit	**707 850**

Sample calculation

- Conductivity of the raw water: 500 µS/cm
- Filling cartridge used: desaliQ:HB4
- 110/500 = 0.22 m³ (equals 220 litres at 50 µS/cm) → 220 litres of fully demineralised water at switch-off point 50 µS/cm

[1] *For an illustration of the desaliQ connection adapter, please refer to page 62.*

Available only while stock lasts



desaliQ:MA13

NEW



desaliQ:MB9



desaliQ resin bag

desaliQ mixed bed cartridge

Hot-water-resistant desaliQ:MB9 cartridge for new filling, make-up water feed and treatment of circulation water during operation.

Mixed bed ion exchanger system for full demineralisation of water of drinking water quality or residual demineralisation of partially demineralised water. Suited in particular for the initial filling or make-up water feed of heating systems as well as for full demineralisation of the heating circuit during ongoing heating operation. Thus, the desaliQ:MB9 is also suited for the rehabilitation of heating circuits in combination with the GENO-VARIO mini. The cartridge is suitable for use with **desaliQ resin bags** for easy and quick replacement of the resin on site. Cartridge made of plastic with little dead weight, including carrying handles and easy cliQ lock. Furthermore, a flow stabiliser as well as a measuring device to determine the conductivity are installed in the outlet.

desaliQ[1]	MB9	MA13
Nominal connection diameter	¾"	¾"
Resin bags of 6 litres each	2	4
Capacity < 10 [µS/cm x m³]	320	800
Capacity < 50 [µS/cm x m³]	510	1,320
Nominal flow [m³/h]	0.9	1.3
Weight on delivery [kg]	17	42
Max. water temperature [°C]	65	30
Order no. (RG-A)	**707 455**	**707 440**

[1] *For desaliQ hose kit (order no. 707 850) for connection to treatment group or filling section in combination with the desaliQ connection adapter, please refer to page 64.*

Accessories	Order no. (RG-A)
desaliQ resin bag (2 bags of 6 litres each)	**707 435**

Sample calculation

- Conductivity of the raw water: 500 µS/cm
- Cartridge used: desaliQ:MB9
- • 320/500 = 0.64 m³ (equals 640 litres at 10 µS/cm)
- • 510/500 = 1.02 m³ (equals 1,020 litres at 50 µS/cm)



thermaliQ safe, 5 l; thermaliQ clean, 5 l



thermaliQ filling pump

thermaliQ dosing solution for heating protection

thermaliQ safe ensures the heating system's protection against corrosion and when used with fully demineralised water, stabilises the pH value in the area of 8.5.

If applied in rehabilitation processes, **thermaliQ clean** dissolves and detaches impurities and rust in the system. Thanks to its inhibitor component, **thermaliQ clean** ensures corrosion protection even during cleaning. We recommend filtering the circulation water during cleaning in order to immediately remove the dissolved impurities from the system. Both dosing solutions can be dosed into the system by means of the **thermaliQ filling pump**. The actual concentration of **thermaliQ safe** can be determined with the **thermaliQ safe test kit**.

thermaliQ	**safe**			**clean**		
Dosing [% by volume]	0.5			0.2 - 0.4		
pH value	8.5			8.5		
Optimum application temperature [°C]	10 - 100			10 - 100		
Canister [l]	1	5	10	1	5	10
Order no. (RG-A)	**170 076**	**170 077**	**170 078**	**170 057**	**170 058**	**170 059**

thermaliQ filling pump

The **thermaliQ filling pump** is designed for the easy and quick feed of **thermaliQ safe** und **thermaliQ clean** into the heating circuit. The **thermaliQ filling pump** can directly be screwed onto the 5 or 10 litre canisters. Connection to the heating system is made by a boiler fill and drain fitting. For easy transportation, the **thermaliQ filling pump** including accessories comes in a practical case.

thermaliQ filling pump	
Nominal connection diameter	¾"
Hose connection [mm]	6
Power supply [V/Hz]	230/50
Protection	IP64
Max. delivery capacity [l/h]	100
Dynamic pressure [bar]	8.8
Order no. (RG-A)	**150 110**

thermaliQ safe test kit

By means of the **thermaliQ safe test kit**, the concentration of the heating protection inhibitor **thermaliQ safe** can be determined in the heating water. The case includes the required reagents, pipettes and measuing vessels.

thermaliQ safe test kit	**Order no. (RG-A)**
	170 504



Mixed bed cartridge desaliQ:BA6

Mixed bed cartridge desaliQ:BA

Compact mixed bed ion exchanger system for the full demineralisation of water of drinking water quality or residual demineralisation of partially demineralised water, e.g. for the initial filling or make-up water feed of heating systems. Stainless steel cartridge with high-grade mixed bed resin, internal distribution system, plastic ring with carrying handles, plastic foot, with oval, clip-lock-type lid for easy replacement of the resin, flow stabiliser, vent valve, nominal connection diameter ¾", nominal pressure PN 10, max. water temperature 80 °C.

desaliQ:BA[1]	**6**	**12**	**13**	**16**	**20**
Nominal connection diameter	¾"	¾"	¾"	¾"	¾"
Capacity < 10 [µS/cm x m³]	215	460	1,040	1,560	2,080
Capacity < 50 [µS/cm x m³]	340	800	1,650	2,475	3,300
Nominal flow [m³/h]	0.6	1.2	1.3	1.6	2.0
Weight on delivery [kg]	12	23	48	68	89
Order no. (RG-B)	**707 450**	**707 460**	**707 470**	**707 480**	**707 490**

[1] *For connection to the treatment group or filling group by means of desaliQ connection apater, the desaliQ hose kit is required. Please refer to page 64.*

Sample calculation

- Conductivity of the raw water: 500 µS/cm
- Cartridge used: desaliQ:BA6
- 215/500 = 0.43 m³ (equals 430 litres at 10 µS/cm)
- 340/500 = 0.68 m³ (equals 680 litres at 50 µS/cm)

Cartridge version VARIO mini to soften or fully demineralise heating water

In the circulation water treatment of heating water, the resin cannot be regenerated.

Cartridge version VARIO mini	**Temperature resistance**	**Capacity**	**Order no. (RG-B)**
Softening cartridge version VARIO mini			
decaliQ:BA12 VARIO mini	max. 80 °C	16 m³ x mmol/l at < 0,02 mmol/l	**707 765**
decaliQ:BA16 VARIO mini[2]	max. 80 °C	32 m³ x mmol/l at < 0,02 mmol/l	**707 785**
Mixed bed cartridge version VARIO mini			
desaliQ:BA12 VARIO mini	max. 80 °C	460 [µS/cm x m³] < 10 µS/cm or 800 [µS/cm x m³] < 50 µS/cm	**707 465**
desaliQ:BA16 VARIO mini[2]	max. 80 °C	1,250 [µS/cm x m³] < 10 µS/cm or 1,615 [µS/cm x m³] < 50 µS/cm	**707 485**

[2] ***Without*** *oval clip-lock-type lid (threaded lid with removable riser pipe).*



GENO-therm case Premium



GENO-therm analysis case including test kit for molybdenum

GENO-therm cases Basic and Premium as well as analysis case

The **GENO-therm cases** have been thoroughly tried and tested and perfectly fit into the Sortimo in-vehicle equipment. They are, of course, compatible with all other products for heating protection included in Grünbeck's product range.

GENO-therm case Basic

The **GENO-therm case Basic** includes a **thermaliQ conductivity measuring cell** by which the water's conductivity can be checked manually. Starting from a conductivity of 50 µS/cm, a red diode lights up and indicates that the full demineralisation unit has to be replaced. The corresponding measuring cell adapter is battery-operated. Furthermore, the filling water volume may be documented by means of the analogue water meter which is included.

GENO-therm case Premium

Apart from the equipment of the Basic version, the **GENO-therm case Premium** features, amongst others, the conductivity meter **GENO-Multi-LF**. It measures the water's conductivity (with temperature compensation), detects when the cartridge is exhausted and starting from a conductivity of e.g. 10 µS/cm, activates the solenoid valve also included in the **GENO-therm case Premium**. Thus, filling is automatically prevented and therefore, the manual monitoring of the remaining residual capacities is no longer required.

GENO-therm analysis case

By means of the **GENO-therm analysis case**, the parameters for heating and feed water can be determined properly. The case contains test kits for total hardness, conductivity and pH value. For calibration and sampling purposes, the case also provides three test cups. Two versions (with and without test kit for molybdenum) of the analysis case are available. The test kit for molybdenum is designed to determine the efficiency of **GENO-safe A**.

GENO-therm cases	Order no. (RG-B)
Basic case	**707 160**
Premium case	**707 170**
Analysis case (pH value + conductivity, total hardness, molybdenum)	**707 190**
Analysis case (pH value + conductivity, total hardness)	**707 192**
thermaliQ conductivity measuring cell with adapter	**707 015**



- Suitable for closed heating and cooling circuits
- No loss in the circuit as the water is treated within the system
- To fill new installations or to rehabilitate existing systems
- For filtration and demineralisation of partial flows or softening of partial flows
- Option: separate dosing system to set a specific pH value



Mobile heating water treatment system GENO-VARIO mini

Stationary heating water treatment system GENO-VARIO mini

Mobile or stationary heating water treatment system GENO-VARIO mini

For closed heating and cooling circuits, to fill new systems, to rehabilitate existing systems and to demineralise partial flows or soften partial flows in existing systems. Compact mobile system, pre-assembled and ready for connection, or stationary version with supporting feet for permanent installation, consisting of:

- Water circulation with circulation pump, non-return valve, deaeration, fine filter with depth filter element, pressure gauge and discharge or sampling valve, water meter with reset function and flow indicator, connection block with bypass and sampling valve, 2 shut-off valves for connection to heating and cooling circuits, temperature monitoring of water circulation with pre-selection of the temperature 60/80 °C for shut-off of the circulation pump as well as the integrated mains socket for the connection of external circulation pump(s).
- Drinking water make-up feed with system separator to secure the drinking water network as well as pressure reducer and pressure gauge to protect the heating and cooling circuits
- System rack made of anodised aluminium profile with fastening brackets to receive the optional softening or demineralisation cartridges of various sizes. The resin is a consumable that has to be replaced after every application.
- Version with GENO-Multi-LF featuring a conductivity sensor and solenoid valve to monitor the conductivity during the automatic salt reduction
- 2 flexible hoses for connection to the heating circuit, 2 flexible hoses to connect the exchanger tank

Mobile/stationary GENO-VARIO mini	without GENO-Multi-LF	incl. GENO-Multi-LF
Nominal connection diameter [DN (G)]	20 (¾ male)	20 (¾ male)
Nominal pressure (drinking water inlet) [PN]	10	10
Nominal pressure (circuit) [PN]	6	6
Water temperature (circuit) [°C]	5 - 80	5 - 80
Ambient temperature min./max. [°C]	5 - 40	5 - 40
Order no. Mobile/stationary GENO-VARIO mini (RG-B)	**707 550/707 560**	**707 550.01/707 560.01**

Accessories	Order no. (RG-B)
Hose kits DN 20, union nut ¾", 1,5 m, 2 hoses, 2 double nipples, incl. seals	
straight/straight	**707 840**
straight/90°	**707 845**
Depth filter elements, 2 pcs in cardboard box	
25 µm	**707 570**
50 µm	**707 575**
100 µm	**707 580**
150 µm	**707 585**

· For mixed bed cartridges desaliQ:BA VARIO mini and softening cartridges decaliQ:BA VARIO mini, please refer to page 70.
· For spare resins for GENO-VARIO mini, please inquire.



Patented process



Mobile reverse osmosis system AVRO-flex 400

GENO-therm sludge separator DN 20

Mobile reverse osmosis system AVRO-flex 400

The mobile reverse osmosis system AVRO-flex 400 is designed for the direct filling of heating systems, district heating networks and other systems with low-salt water. Thanks to the patented AVRO-technology, a pretreatment by means of a water softener or an anti-scaling dosing is not required while the membranes used nevertheless have a long service life and a high recovery due to the innovative operating process. By means of a selector switch, the system can be put into two simple operating modes. In the filling mode, the system automatically switches off as soon as a certain counter-pressure is reached. In the unique “shop” mode, no extensive preservation efforts have to be made during periods of standstill thanks to regular rinsing procedures.

Specifications

- Salt rejection rate 95 - 99 %
- Max. counter-pressure of the system to be filled: 3.5 bar
- Feed water temperature min. 10 °C, max. 30 °C
- Power supply 230 V, 50 Hz

Mobile reverse osmosis system AVRO-flex 400	
Nominal connection diameter	¾" and GEKA coupling
Permeate capacity at 10/15 °C [l/h]	340/400
Connected load [kW]	1.8
Operating weight, approx. [kg]	80
Order no. (RG-B)	**752 250**

GENO-therm sludge separator with magnet and insulating shell

To effectively separate particles and corrosion products from the heating water and thus reduce the system’s wear and tear and the risk of clogging in system components such as valves and heat exchangers.

Thanks to the removable solenoid ring, the cut-off of ferrous impurities in particular is improved. By opening the ball valve, the deposited impurities can be discharged to the drain while the heating system is running. The use of a system separator improves the efficiency of the heating system.

GENO-therm sludge separator with magnet	**DN 20**	**DN 25**	**DN 32**	**DN 40**	**DN 50**
Connection diameter [female thread]	R ¾"	R 1"	R 1¼"	R 1½"	R 2"
Nominal pressure [PN]	10	10	10	10	10
Max. water temperature [°C]	110	110	110	110	110
Installation length [mm]	110	110	124	124	127
Total height [mm]	248	248	268	268	268
Order no. (RG-B)	**707 705**	**707 710**	**707 715**	**707 720**	**707 725**



Manual digital measuring device for pH, conductivity and temperarture



thermaliQ conductivity measuring cell with adapter

Accessories	Order no.	(RG-)
Analogue water meter with connection material	**702 845**	B
System log for hot water heating systems	**825 52 110**	B
Double nipple ¾"	**707 124**	B
Double screw connection ¾"	**855 01 851**	B
desaliQ:HB4 bottle adapter	**707 127**	B
thermaliQ conductivity measuring cell with adapter	**707 015**	B
thermaliQ conductivity measuring cell	**707 025**	B
desaliQ hose kit	**707 850**	B
GENO-dosing unit H 5	**150 100**	B
Conductivity meter GENO-Multi-LF (measuring range 0 - 99.9 µS/cm, incl. temp.)	**702 842**	B
Calibration solution for conductivity	**203 624**	B
Calibration solution pH 4	**203 627**	B
Calibration solution pH 7	**203 628**	B
Potassium chloride solution [3 mol/l]	**203 631**	B
Combined measuring device for pH and conductivity, complete	**170 181**	B
Spare electrode for combined measuring device	**170 605e**	B
Stainless steel solenoid valve (24 V/50 Hz)	**707 055**	B
Hose adapter to convert from a ¾" male thread connection to quick-acting coupling	**707 059e**	B
Blending housing (for GENO-therm filling device Basic)	**707 056**	B
Water test kit for pH value 7 - 14[1] (100 test strips)	**170 147**	B
Water test kit for sulphite 10 - 1,000 mg/l[1] (100 test strips)	**170 535**	B
Water test kit for total hardness mol/m³ and °f	**170 187**	B
Water test kit for molybdenum 5 - 250 mg/l[1] (100 determinations)	**170 140**	B
Manual digital measuring device for pH, conductivity and temperature	**170 185**	B
Refill kit of reagents for thermaliQ safe test kit	**170 655e**	A

[1] *Measuring range*

Dosing agents

Recommended by Grünbeck: *The 2-component system* ***thermaliQ safe/clean*** *+ fully demineralised water (refer to pages 65/66)*

Product	Applications	Characteristics
GENO-safe A full heating protection	Warm water heating systems as per VDI 2035	Full heating protection for one-family and multi-family homes as well as industrial buildings. Combination product for hardness stabilisation and corrosion protection, suitable for all types of heating systems and materials. The required quantity is 1 litre for every 200 l of filling volume.
GENO-heating protection FSK	All heating system as well as cooling circuits, heat pumps and solar systems	Corrosion and anti-freeze protection as combined agent. Full corrosion and scaling protection is guaranteed if at least a minimum of 20 % of the system volume is added: • Minimum quantity to be added: 10 % of the system volume • Starting from 20 % of the system volume up to -10 °C • Starting from 30 % of the system volume up to -18 °C In case of aluminium and aluminium components, a pH value of 8.2 - 8.5 has to be observed.
GENO-phos Nr. 1	Steam boiler systems and warm water heating systems as per VDI 2035 with metal pipes and radiators	Trisodium phosphate (granulate), precipitation of residual hardness, alkalinisation by means of pH increase, preparation with soft water. In case of aluminium and aluminium components, a pH value of 8.2 - 8.5 has to be observed.
GENO-phos Nr. 2	Steam boiler systems where alkalinity is too high	Sodium dihydrogen phosphate (granulate), to reduce high alkalinity, pH reduction, precipitation of residual hardness.
Sodium sulphite	Steam boiler systems, warm water and hot water circuits	Oxygen binding agent (granulate), activated, for chemical oxygen binding in water, not steam-volatile, approved for steam boilers in food applications.

Full heating protection	Order no. (RG-I)
GENO-safe A, 1 litre	**180 530**
GENO-safe A, box 10 x 1 litre	**180 540**
GENO-safe A, canister 11 kg	**180 550**

Full heating protection with anti-freeze protection	Order no. (RG-I)
GENO-heating protection FSK (20 kg)	**180 230**

Dosing agents to increase the pH value	Order no. (RG-B)
GENO-phos Nr. 1 (granulate) [500 g]	**170 001**
GENO-phos Nr. 1 (granulate) [3.5 kg]	**170 002**
GENO-phos Nr. 1 (granulate) [25 kg]	**170 052**
GENO-SW 2010 (liquid) [20 kg]	**180 415**
GENO-SW 2010 (liquid) [100 kg]	**180 420**

Dosing agents to decrease the pH value	Order no. (RG-B)
GENO-phos Nr. 2 (granulate) [3.5 kg]	**170 003**
GENO-phos Nr. 2 (granulate) [25 kg]	**170 053**

Dosing agents to bind oxygen	Order no. (RG-B)
Sodium sulphite (granulate) [6 kg]	**170 004**
Sodium sulphite (granulate) [25 kg]	**170 054**
GENO-SW 2000 (liquid) [20 kg]	**180 405**

Combined product to increase the pH value and to bind oxygen	Order no. (RG-B)
GENO-SW 2040 (liquid) [25 kg]	**180 440**



Water softener HEH 9



Mobile water softener MEH

Water softener HEH 9

Water softener to generate softened filling and make-up water for heating systems

Consisting of: flexible connection hoses, softening cartridge with exchanger resin, sampling valve, dosing point to add **GENO-safe A** and water test kit for total hardness, connection ¾", nominal flow 0.3 m³/h, max. operating pressure 10 bar, operating temperature 30 °C, nominal capacity 3.2 mol, soft water capacity at a raw water hardness of 3.5 mmol/l x 900 litres.

	Order no. (RG-B)
Water softener HEH 9[1]	**190 570**
Refill exchanger resin (4 litres)	**190 575**

Water softener WINNI-mat VGX 14-H

Volume-controlled single water softener in compact design, including integrated water meter as well as full salting with pulse generator, connection hoses, nominal capacity 2.4 mol, capacity of brine tank 38 kg, salt consumption/regeneration approx. 0.85 kg, nominal flow (at 0 mmol/l) 0.5 m³/h.

Water softener WINNI-mat VGX 14-H[1]	Order no. (RG-B)
	188 250

Accessories	Order no. (RG-A)
Drain connection DN 50 with siphon acc. to DIN EN 1717	**188 875**

Mobile water softener MEH

Mobile water softener with wheels for filling and make-up water, with water meter to monitor the capacity of the water softener. The regeneration of the MEH is carried out by means of a regeneration station, nominal connection diameter MEH 1" GK coupling (regeneration station ½"), nominal flow 3.0 m³/h, nominal capacity 26.8 mol, soft water capacity at a raw water hardness of 3.5 mmol/l x 7.5 m³, nominal pressure PN 10, flow pressure min. 2.0/max. 8.0 bar, capacity of brine tank 190 kg.

Mobile water softener[1]	MEH	Regeneration station
Order no. (RG-B)	**707 250**	**707 240**

[1] Connection to treatment group thermaliQ:HB2 possible by means of desaliQ connection adapter (refer to page 64).

Note: In case of heating systems with aluminium components, we recommend full demineralisation and dosing **thermaliQ safe**.



Patented process

GENO-Neutra FNH-420-R[1]

Condensate neutralisation for gas and oil condensing boilers

according to DWA-A 251, DIN 4716-1, DVGW VP 114

The **GENO-Neutra FNH-420-R** system is designed for the neutralisation (increase of pH value to more than 6.5) of condensate from gas and oil condensing heat generators (condensing boilers) and/or flue gas systems made of aluminium, stainless steel, plastic, graphite, glass and ceramics. Via the condensate inlet filter, the condensate flows into the neutralisation box where it is circulated and where the pH value is increased by dosing neutralisation agents and monitored. When the admissible pH value (> 6.5) is reached, the condensate is pumped to the drain. The control unit **GENO-Neutra-matic** controls and monitors all major functions of the system. Amongst others, the pH value of the condensate, the levels and the current states of the outputs are indicated in the display of the **GENO-Neutra-matic**.

GENO-Neutra	**FNH-420-R**
Max. neutralisation capacity [l/h]	420
≙ Nominal capacity for condensing boilers with gas burning (at 0.14 l/kWh) max. [kW]	3,000
with oil burning (at 0.08 l/kWh) max. [kW]	5,250
Condensate temperature [°C]	5 - 40
Inlet/overflow/outlet hose [DN]	25/25/12
Height inlet/overflow connection [mm]	105
Delivery head of pump at 420 l/h [m]	3
Power supply [V/Hz]	2 x power cable 230/50
Neutralisation agent	GENO-Neutrox[1]
Order no. (RG-B)	**410 540**

Accessories	**Order no. (RG-B)**
Voltage-free level signal “pre-alarm” for GENODOS pump	**163 870**
Safety package for caustic substances: gloves, protective goggles, eye rinsing bottle, symbolic signs (warning against caustic substances, use gloves, use eye protection)	**180 810**
Condensate pre-filtration box with activated carbon filling w x h x l = 300 x 340 x 400 mm, hose connection DN 25	**410 135**
Oil binding mats (20 pcs), oil absorption 100 ml/mat, water-repellent	**410 585**
GENO-Neutrox, 25 kg	**180 350**
GENO-Neutrox, 75 kg[2]	**180 355**
GENODOS suction lance, 750 mm	**118 505**

[1] The neutralisation agent GENO-Neutrox is not included in the scope of supply.

[2] The GENODOS suction lance 750 mm (order no. 118 505) is required here.

NEW



GENO-Neutra KW65



GENO-Neutra NO-5

Condensate neutralisation for gas and oil condensing boilers

according to DWA-A 251, DVGW VP 114 (subject to type)

These neutralisation systems are designed for the neutralisation (increase of pH value to more than 6.5) of condensate from gas or oil condensing heat generators and/or flue gas systems made of stainless steel, plastic, graphite, glass and ceramics. They each consist of: a plastic neutralisation box with integrated sedimentation zone for impurities, pH indicator strips, connection hose and connecting material.

GENO-Neutra N-14, N-70, N-210

For flow-through neutralisation of condensate originating from gas condensing boilers (DVGW VP 114), initial filling of neutralisation granulate **GENO-Neutralit Hz**, N-210 in addition with variable adaption of filling volume to boiler capacity.

GENO-Neutra NO-5, NO-12, NO-24

For flow-through neutralisation of condensate originating from oil condensing boilers. With additional regeneration system for neutralisation granulate, initial filling of activated carbon and neutralisation granulate **GENO-Neutralit Hz** (NO-5 with built-in siphon at the inlet connection). If direct draining of the waste water via a natural gradient is not feasible, the waste water lifting system AH-300 may be installed downstream of all systems.

NEW

GENO-Neutra KW35, KW65

For flow-through neutralisation of condensate originating from gas-condensing boilers (DVGW VP 114). Initial filling of neutralisation granulate **GENO-Neutralit Hz**.

GENO-Neutra	KW35	KW65	N-14	N-70	N-210	NO-5	NO-12	NO-24
Gas condensate up to max. [l/h]	4.9	9.1	14	70	210	–	–	–
≙ boiler capacity at 0.14 l/kW max. [kW]	35	65	100	500	1,500	–	–	–
Oil condensate up to max. [l/h]	–	–	–	–	–	4.4	12.8	25.6
≙ boiler capacity at 0.08 l/kW max. [kW]	–	–	–	–	–	55	160	320
Power supply [V/Hz]	–	–	–	–	–	230/50	230/50	2 x 230/50
Condensate temperature [°C]	5 - 60	5 - 60	5 - 60	5 - 60	5 - 60	5 - 60	5 - 60	5 - 60
Inlet/outlet hose [DN]	20	20	20	20	25[1]	20	20	20
Height of inlet/outlet [mm]	61	61	110	110	80	110	110	110
Condensate backwater level [mm]	90	90	120	120	90	120	120	120
Filling volume of GENO-Neutralit Hz [kg]	2.5	3.3	3	8	24	3	8	16
Order no. (RG-B)	**410 335**	**410 345**	**410 440**	**410 450**	**410 320**	**410 230**	**410 240**	**410 250**

[1] *In addition, an inlet hose connection (DN 20) is included in the scope of supply.*



GENO-Neutra NO-24



Waste water lifting system AH-300

Accessories for condensate neutralisation

Waste water lifting system AH-300

To convey neutralised condensate and condensate of gas condensing boilers with a pH value of > 3, clear water or slightly polluted industrial water. Not suitable for salt water (e.g. from water softeners) or water containing chlorine. Collecting container with inlet connection for hoses DN 20 and DN 25, level-controlled pump with filter basket, non-return valve and 6 m outlet hose DN 12, level switch with voltage-free change-over contact for fault signal (overflow warning).

Specifications

- Delivery head 4 m at 300 l/h
- Operating mode S1 (suitable for continuous operation)
- Power supply 230 V, 50 Hz, 0.33 A
- Height of inlet connection 50 mm
- Height of pump switch-on point approx. 80 mm
- Dimensions without hose connection (w x h x d) 300 x 270 x 400 mm

	Order no. (RG-B)
Waste water lifting system AH-300	**420 150**

Accessories for condensate neutralisation	for type	Order no. (RG-B)
Activated carbon filter GENO AF-5[1]		**410 435**
Overflow alarm switch	N-14, N-70, N-210, NO-5, NO-12, NO-24[3], AF-5	**410 680**
Alarm delay[2]	N-14, N-70, N-210, NO-5, NO-12, NO-24[3], AF-5, AH-300	**410 285**
Maintenance kit (incl. GENO-Neutralit Hz)	N-14	**410 801**
Maintenance kit (incl. GENO-Neutralit Hz)	N-70	**410 802**
Maintenance kit (incl. GENO-Neutralit Hz)	N-210	**410 803**
Maintenance kit (incl. GENO-Neutralit Hz)	NO-5	**410 805**
Maintenance kit (incl. GENO-Neutralit Hz)	NO-12	**410 806**
Maintenance kit (incl. GENO-Neutralit Hz)	NO-24	**410 807**
NEW Maintenance kit (incl. GENO-Neutralit Hz)	KW35	**410 810**
NEW Maintenance kit (incl. GENO-Neutralit Hz)	KW65	**410 830**
Maintenance kit for activated carbon filter	AF-5	**410 824**
GENO-Neutralit Hz, 3 kg	Neutrabox GENO G-25, N-14, NO-5	**410 770**
GENO-Neutralit Hz, 8 kg	N-70, N-210, NH-140, NO-12, NO-24	**410 011**
GENO-Neutralit Hz, 25 kg	NH-140 and N-210	**170 249**
Neutralisation agent FNK, 20 kg (liquid)	FN 400 M	**180 300**
pH indicator strips 4.5 - 10 (3 pcs)	all types	**170 173**

[1] The activated carbon filter GENO AF-5 is suitable for the filtration of condensate originating from oil and gas burning heat generators (oil and gas condensing boilers and/or their flue gas systems and may be used if there is no obligation to neutralise. It may also be used as a prefilter upstream of a neutralisation system.

[2] Only in combination with overflow alarm switch.

[3] For NO-24, two units are required.



Water test kit for total hardness mol/m³ and °f



pH test strips

Water test kits

Drinking water	Order no. (RG-B)
Water test kit for chlorine and pH value 0.1 - 2.0 mg/l, 6.9 - 8.2[1]	**170 128**
Water test kit for total hardness mol/m³ and °f	**170 187**
Water test kit for total alkalinity	**170 169**
Combined measuring device for pH and conductivity, complete	**170 181**
Water test kit for manganese 0.03 - 0.5 mg/l[1] (100 determinations)	**170 097**
Refill pack of reagents for water test kit for manganese (100 determinations)	**170 193**
Water test kit for iron 0 - 0.8 and 1 - 10 mg/l[1] (30 determinations)	**170 150**
Water test kit for nitrate 0 - 500 mg/l[1] (100 test strips)	**170 131**
Water test kit for peroxide 0.5 - 25 mg/l[1] (100 test strips)	**170 136**
Water test kit for pH value 4.5 - 10[1] (100 test strips)	**170 148**

Heating water, boiler feed water	Order no. (RG-B)
Water test kit for total hardness, p and m value	**170 110**
Water test kit for total hardness type B (100 determinations)	**170 149**
Water test kit for total hardness GENO-plex B	**170 121**
Water test kit for ortho-phosphate 2 - 15 mg/l[1] (250 determinations)	**170 103**
Water test kit for ortho-phosphate 1 - 20 mg/l[1] (75 determinations)	**170 554**
Water test kit for pH value 4.5 - 10[1] (100 test strips)	**170 148**
Water test kit for pH value 7 - 14[1] (100 test strips)	**170 147**
Water test kit for pH value 0 - 6 / 4.5 - 10 / 7 - 14[1] (3 boxes of 100 test strips each)	**170 106**
Water test kit for residual oxygen 0 - 100 ppb[1] (30 determinations)	**170 144**
Water test kit for sulphite 10 - 1000 mg/l[1] (100 test strips)	**170 535**
Water test kit for sulphite drip test 0.5 - 20 mg/l[1] (80 determinations)	**170 107**
Water test kit for GENO-heating protection FSK 1.00 - 1.10 g/cm³ [1]	**170 141**
Water test kit for molybdenum 5 - 250 mg/l[1] (100 determinations)	**170 140**

Replacement reagents for phosphate and sulphite test kits	Order no. (RG-B)
Phosphate reagent I (250 ml)	**170 501**
Phosphate reagent II (250 ml)	**170 502**
Sulphite reagent 1/2/3 (large package 100/100/250 ml)	**170 525**
Sulphite reagent 1/2/3 (small package 15/15/50 ml)	**170 520**

[1] *Measuring range*



GENO-clean M, 12 kg

Agents to remove scale and rust

For removal of tenacious scale and rust deposits, in particular in devices and components of drinking water installations (e.g. drinking water heaters) but also in pipes and built-in parts in cooling and industrial water circuits.

The cleaning agents produced on an acid base contain inhibitors harmonised with the field of application which ensure metal or material friendly cleaning. The selection of the respective product depends on the type of deposits to be removed and the materials contained in the water-carrying systems.

When carrying out the cleaning, we recommend circulating the cleaning agent in the system by means of an acid-proof pump. In case of **GENO-clean M** or **GENO-clean CP**, common flushing devices can be used as well.

Note: In dinking water pipes made of galvanised steel, flushing with acid-containing cleaning agents is not allowed as per the generally acknowledged rules of technlogy! (DVGW leaflets W 557 and W 558 (draft)).

*GENO-clean M and GENO-clean CP are **tested** based on the stipulations of DVGW worksheet W 319*

Material of the components to be cleaned	Aluminium	Stainless steel	Grey cast iron	Copper or copper alloys	Steel	Acid-resistant plastic	Acid-resistant enamel	Zinc and zinc-coated materials	Applicability with GENO-flushing device	Max. operating temperature [°C]		
Agents to remove scale and rust											**Order no.**	**RG-**
GENO-clean M, 12 kg[1]	•	•	•	•	•	•	•	–	•	40	**170 045**	B
GENO-clean M, 1 litre[1]	•	•	•	•	•	•	•	–	•	40	**170 047**	B
GENO-clean CP, 10 x 1 litre	–	•	–	•	–	•	•	–	•	40	**170 022**	B
GENO-clean CP, 22 kg (18.3 litres)	–	•	–	•	–	•	•	–	•	40	**170 028**	B
GENO-Passivierungspulver (passivation powder), 3.5 kg	–	•	•	•	•	•	•	•	•	40	**170 015**	I
Neutralisation agent FNK, 20 kg									•		**180 300**	B
Water test kit for pH value 4.5 - 10 (100 test strips)									•		**170 148**	B

[1] *Strong and odourless acid, readily biodegradable, good compatibility of materials.*

Commissioning and maintenance when performed by Grünbeck's technical service

Grünbeck products are made of high-quality materials in order to ensure long, trouble-free operation. In order to guarantee the maximum process performance for many years after the installation, maintenance of the systems is required at regular intervals. With regard to residential applications, this is regulated by the DIN standard EN 806-5. A maintenance contract ensures the functionality of your system for many years beyond the warranty period. Maintenance work and supply of consumables, chemicals, etc. should be performed by authorised experts. Please inquire about commissioning and maintenance prices.

Devices, systems, services Designation	Commissioning Order no.	Maintenance Order no.
Travel expenses	**943 905**	**943 905**
Filters		
Cartridge filters up to 2"	**943 101**	**942 101**
Backwash filters BOXER, KICKER, pureliQ	**943 103**	**942 103**
Backwash filters up to 2"	**943 105**	**942 105**
Cartridge filters FME, FM DN 50 - DN 200	**943 107**	**942 107**
Backwash filters DN 65 - DN 100	**943 108**	**942 108**
Automatic backwash filters 1" - DN 100	**943 109**	**942 109**
Dosing		
Dosing computer EXADOS, exaliQ dosing system	**943 114**	**942 114**
Dosing with supply tank	**943 115**	**942 115**
Dosing systems GENODOS DM, DME, DM-T, DM-oxi	**943 161**	**942 161**
Dosing systems GENODOS DM-B, MOBIdos	**943 162**	**942 162**
Dosing systems GENODOS DM-BO	**943 163**	**942 163**
Alternative anti-scaling		
GENO-K4	**943 157**	**942 803**
Water softeners with DVGW certification		
softliQ:SC/SD	**943 188**	**942 188**
Single systems		**942 120**
softliQ:MC/MD	**943 387**	**942 387**
softliQ:PA	**943 625**	**942 625**
		(plus adsorber cost per adsorber element, RG-B)
Twin systems GSX 5, 10, 10-I	**943 187**	**942 187**
Twin system GSX plus		**942 287**
Delta-p 1" - 1¼"	**943 085**	**942 085**
Delta-p 1½" - 2"	**943 185**	**942 185**
Disinfection Delta-p 1" - 1¼"	**944 085**	
Disinfection Delta-p 1½" - 2"	**944 185**	
Extended start-up Delta-p 1" - 1¼"	**943 285**	
Extended start-up Delta-p 1½" - 2"	**943 385**	
Water softeners without DVGW certification (incl. system separators)		
Single systems R 1"	**943 122**	**942 122**
Twin systems R 1"	**943 125**	**942 125**
Twin systems R 1½"	**943 126**	**942 126**
Filter systems		
GENO-mat KF-Z	**943 110**	**942 110**
GENO-mat MS-Z	**943 111**	**942 111**
GENO-mat AK-Z	**943 112**	**942 112**
GENO-mat TE-Z	**943 113**	**942 113**
Deferrisation, demanganisation		
without regeneration tank	**943 154**	**942 154**
with regeneration tank	**943 153**	**942 153**

· ***Note:*** *Required consumables, chemicals and regeneration salt will be charged separately.*

Commissioning and Maintenance, Index, Standard Terms of Sale and Delivery

Devices, systems, services Designation	Commissioning Order no.	Maintenance Order no.
Reduction of nitrate		
Single systems	**943 129**	**942 129**
GENO-therm		
Reusable GENO-therm cartridge, mixed bed cartridge desaliQ:BA/MA/MB	**943 702**	**942 702**
		(regeneration costs not included)
AVRO-flex	**943 820**	**942 820**
GENO-VARIO mini mobile/stationary	**943 807**	
Safety devices		
System separators DK 2-Mini, DK 2½" - 2"	**943 132**	**942 132**
System separators DN 50 - DN 250	**943 133**	**942 133**
GENO-G5	**943 134**	**942 134**
protectliQ, GENO-STOP	**943 226**	**942 226**
Adsorption		
safeliQ:EA	**943 525**	**942 525**
		(plus adsorber cost per adsorber element, RG-B)
UV disinfection		
Types 60 S, 120 S, 200 S	**943 521**	**942 521**
Heating technology		
GENO-Neutra N-14 up to N-210, NO-5 up to NO-12	**943 414**	**942 414**
GENO-Neutra FNH-420-R	**943 413**	**942 413**

· ***Note:*** *Required consumables, chemicals and regeneration salt will be charged separately.*

Analyses packages	
Public water suppply	**943 911**
Well water	**943 912**
Swimming pool water[1]	**943 913**
Dimensioning of osmosis systems	**943 914**
Heating water	**943 915**
Local/district heating, biogas systems	**943 916**
Cooling water[1], open	**943 917**
Cooling water, closed/semi-closed	**943 918**
Evaluation of deposits	**943 920**
Evaluation of pipe sample	**943 922**
Sampling by Grünbeck's subsidiaries and representations	**943 921**

[1] *Swimming pool water and cooling water, open: For a detailled assessment, we recommend an addditional analysis of the filling and make-up water.*
· ***Note:*** *In individual cases, additional cost may occur for increased analysis efforts.*

Regeneration costs[2]	
Reusable GENO-therm cartridge 290	**707 050ak**
Reusable GENO-therm cartridge 570	**707 060ak**
Reusable GENO-therm cartridge 825	**707 070ak**
Reusable GENO-therm cartridge 1160	**707 080ak**
Reusable GENO-therm cartridge 1615	**707 090ak**
Mixed bed cartridge desaliQ:BA6	**707 450ak**
Mixed bed cartridge desaliQ:BA12	**707 460ak**
Mixed bed cartridge desaliQ:BA13	**707 470ak**
Mixed bed cartridge desaliQ:BA16	**707 480ak**
Mixed bed cartridge desaliQ:BA20	**707 490ak**

[2] *Plus costs for roundtrip resp. roundtrip by shipping company*

Ord. no.	Item	RG-	Page
100001	Seal kit for FS 1" + FSD 1"	I	18
100002	Seal kit for FS 1¼" - 2", 3 pcs	I	18
100651	Filter element with O-ring	I	20
100860	Pressure gauge to indicate operating pressure 1"	B	13
100865	Pressure gauge to indicate operating pressure 1¼"	B	13
100870	Pressure gauge to indicate operating pressure 1 ½"	B	13, 14
100875	Pressure gauge to indicate operating pressure 2"	B	13, 14
101080	KICKER 1½", backwash filter	A	14
101085	KICKER 2", backwash filter	A	14
101170	GENO-fine filter FS-B 1"	A	13
101175	GENO-fine filter FS-B 1¼"	A	13
101180	GENO-fine filter FS-B 1½"	A	13
101185	GENO-fine filter FS-B 2"	A	13
101220	Fine filter pureliQ:K20	A	8
101225	Fine filter pureliQ:K25	A	8
101230	Fine filter pureliQ:K32	A	8
101270	Fine filter pureliQ:KD20	A	8
101272e	Filter element, 100 µm, 2-pack	A	20
101275	Fine filter pureliQ:KD25	A	8
101290	Fine filter pureliQ:KD32	A	8
101320	Backwash filter pureliQ:R20	A	9
101325	Backwash filter pureliQ:R25	A	9
101330	Backwash filter pureliQ:R32	A	9
101370	Backwash filter pureliQ:RD20	A	9
101375	Backwash filter pureliQ:RD25	A	9
101380	Backwash filter pureliQ:RD32	A	9
101420	Automatic filter pureliQ:A20	A	10
101425	Automatic filter pureliQ:A25	A	10
101430	Automatic filter pureliQ:A32	A	10
101470	Automatic filter pureliQ:AD20	A	10
101475	Automatic filter pureliQ:AD25	A	10
101480	Automatic filter pureliQ:AD32	A	10
101510	BOXER RX ¾", backwash filter	A	12
101515	BOXER RX 1", backwash filter	A	12
101520	BOXER RX 1¼", backwash filter	A	12
101525	BOXER RDX ¾", backwash filter	A	12
101530	BOXER RDX 1", backwash filter	A	12
101535	BOXER RDX 1¼", backwash filter	A	12
101639e	Seal kit FS-B, 1½", 2", 2 pcs	I	18
101641e	Seal kit pureliQ/BOXER/fine filter FS-B 1", 1¼", 2 pcs	I	18
101646e	Adapter kit KOMBI-pureliQ/BOXER 1"	B	19
101647e	Adapter kit FS 1" to pureliQ/BOXER/fine filter FS-B 1"	B	19
101651e	Adapter kit FS 1½" to FS-B/KICKER 1½"	B	19
101652e	Adapter kit FS 2" to BOXER/FS-B/KICKER 2"	B	19
101815	BOXER KDX ¾", fine filter	A	11
101820	BOXER KDX 1", fine filter	A	11
101825	BOXER KDX 1¼", fine filter	A	11
101830	BOXER KX ¾", fine filter	A	11
101835	BOXER KX 1", fine filter	A	11
101840	BOXER KX 1¼", fine filter	A	11
101852	Adapter kit FS 1¼" pureliQ, BOXER, FS-B 1¼"	B	19
101862	Adapter kit KOMBI, pureliQ, BOXER ¾"	B	19
101864	Adapter kit KOMBI, pureliQ, BOXER 1¼"	B	19
101865	Adapter kit KOMBI (V1), pureliQ, BOXER 1"	B	19, 28
101866	Adapter kit KOMBI (V1), pureliQ, BOXER 1¼"	B	19, 28
102185	GENO-fine filter FME-WW 50 (stainless steel version)	B	17
102190	GENO-fine filter FME 50 (stainless steel version)	B	17
102195	GENO-fine filter FME-KW 50 (stainless steel version)	B	17
102285	GENO-fine filter FME-WW 65 (stainless steel version)	B	17
102290	GENO-fine filter FME 65 (stainless steel version)	B	17
102295	GENO-fine filter FME-KW 65 (stainless steel version)	B	17
102385	GENO-fine filter FME-WW 80 (stainless steel version)	B	17
102390	GENO-fine filter FME 80 (stainless steel version)	B	17
102395	GENO-fine filter FME-KW 80 (stainless steel version)	B	17
102400	GENO-fine filter FM 150	B	17
102401	GENO-fine filter FM-WW 150	B	17
102470	GENO-fine filter FM-KW 150	B	17
102485	GENO-fine filter FME-WW 100 (stainless steel version)	B	17
102490	GENO-fine filter FME 100 (stainless steel version)	B	17
102495	GENO-fine filter FME-KW 100 (stainless steel version)	B	17
102500	GENO-fine filter FM 200	B	17
102501	GENO-fine filter FM-WW 200	B	17
102570	GENO-fine filter FM-KW 200	B	17
102850	Hose extension kit for FM 150-200, 500 mm	B	17
102870	GENO-differential pressure switch type K 0.16 - 1.6	B	17
103001	GENO-RFE 50 µm, 2-pack, size 1 with protective cylinder	I	20
103002	GENO-RFE 50 µm, 2-pack, size 2 with protective cylinder	I	20
103003	GENO-RFE 50 µm, 2-pack, size 3 with protective cylinder	I	20
103007	GENO-RFE 80 µm, 2-pack, size 1 with protective cylinder	I	20
103008	GENO-RFE 80 µm, 2-pack, size 2 with protective cylinder	I	20
103009	GENO-RFE 80 µm, 2-pack, size 3 with protective cylinder	I	20
103044	GENO-RFE 50 µm, 2-pack, size 5 without protective cylinder	I	20
103061	GENO-RFE 5 µm, 2-pack, size 1 with protective cylinder	I	20
103062	GENO-RFE 5 µm, 2-pack, size 2 with protective cylinder	I	20
103063	GENO-RFE 5 µm, 2-pack, size 3 with protective cylinder	I	20
103067	GENO-RFE 20 µm, 2-pack, size 1 with protective cylinder	I	20
103068	GENO-RFE 50 µm, 2-pack, size 1 without protective cylinder	I	20
103069	GENO-RFE 50 µm, 2-pack, size 2 without protective cylinder	I	20
103070	GENO-RFE 50 µm, 2-pack, size 3 without protective cylinder	I	20
103071	GENO-RFE 20 µm, 2-pack, size 1 without protective cylinder	I	20
103075	GENO-RFE 80 µm, 2-pack, size 1 without protective cylinder	I	20
103076	GENO-RFE 80 µm, 2-pack, size 2 without protective cylinder	I	20
103077	GENO-RFE 80 µm, 2-pack, size 3 without protective cylinder	I	20
103081	GENO-RFE 5 µm, 2-pack, size 1 without protective cylinder	I	20
103082	GENO-RFE 5 µm, 2-pack, size 2 without protective cylinder	I	20
103083	GENO-RFE 5 µm, 2-pack, size 3 without protective cylinder	I	20
103100	GENO-RFE 50 µm, 2-pack, size 6 without protective cylinder	I	20
103110	GENO-RFE 100 µm, 2-pack, without protective cylinder	I	20
103111	GENO-RFE 500 µm, 2-pack, without protective cylinder, VA	I	20
103150	GENO-RFE 100 µm, 14-pack, size 4	I	20
103151	GENO-RFE 500 µm, 14-pack, size 4, VA	I	20
103153	GENO-RFE 50 µm, 28-pack, size 4	I	20
104805	Spigot wrench for pressure reducer	B	18
105805	Belt wrench for diameters up to 170 mm	B	18
106804e	Adapter kit from MS to MX/MXA (A) DN 80	B	19
106805e	Adapter kit from MS to MX/MXA (A) DN 100	B	19
107400	GENO-backwash filter MX 1"/standard	A	15
107405	GENO-backwash filter MX 1¼"/standard	A	15
107410	GENO-backwash filter MX 1½"/standard	A	15
107415	GENO-backwash filter MX 2"/standard	A	15
107420	GENO-backwash filter MX DN 65/standard	B	16
107425	GENO-backwash filter MX DN 80/standard	B	16
107430	GENO-backwash filter MX DN 100/standard	B	16
107450	GENO-backwash filter MXA 1"/standard	A	15
107455	GENO-backwash filter MXA 1¼"/standard	A	15
107460	GENO-backwash filter MXA 1½"/standard	A	15
107465	GENO-backwash filter MXA 2"/standard	A	15
107470	GENO-backwash filter MXA DN 65/standard	B	16
107475	GENO-backwash filter MXA DN 80/standard	B	16
107480	GENO-backwash filter MXA DN 100/standard	B	16
107660	Seal kit for GENO-fine filter FSV, 2 pcs	I	18
108601	Seal kit for KOMBI-filter GENO-pur	I	18
108614	Seal kit for KOMBI-backwash filter	I	18
114031	Mineral solution exaliQ control, 2 x 3-litre bottle	I	32
114032	Mineral solution exaliQ safe, 2 x 3-litre bottle	I	32
114033	Mineral solution exaliQ safe+, 2 x 3-litre bottle	I	32
114034	Mineral solution exaliQ pure, 2 x 3-litre bottle	I	32
114035	Mineral solution exaliQ neutra, 2 x 3-litre bottle	I	32
114071	Mineral solution exaliQ control, 15-litre canister	I	32
114072	Mineral solution exaliQ safe, 15-litre canister	I	32
114073	Mineral solution exaliQ safe+, 15-litre canister	I	32
114074	Mineral solution exaliQ pure, 15-litre canister	I	32
114075	Mineral solution exaliQ neutra, 15-litre canister	I	32
114081	Mineral solution exaliQ control, 60-litre canister	I	32
114082	Mineral solution exaliQ safe, 60-litre canister	I	32
114083	Mineral solution exaliQ safe+, 60-litre canister	I	32

Ord. no.	Item	RG-	Page
114084	Mineral solution exaliQ pure, 60-litre canister	I	32
114085	Mineral solution exaliQ neutra, 60-litre canister	I	32
115334	Double screw connection 1¼"	B	39
115850	M-Bus measuring transducer D-DAM, complete	B	52
117400	Dosing system exaliQ:KC6 - 1"	A	28
117405	Dosing system exaliQ:SC6 - 1"	A	28
117410	Dosing system exaliQ:SC10 - 1 ¼"	A	28
117415	Dosing system exaliQ:SC20 - 1 ½"	A	28
117420	Dosing system exaliQ:SC30 - 2"	A	28
117460	Dosing system exaliQ:KC6-e - 1"	A	29
117465	Dosing system exaliQ:SC6-e - 1"	A	29
117490	Conversion kit for exaliQ:SC systems, 60-litre suction lance	A	28
117495	Conversion kit exaliQ:KC6 to exaliQ:SC6	A	29
118505	GENODOS suction lance B 10/20, l = 750 mm/PE	B	74
125845	Mounting kit 1 for GENO-mat 1"	B	46, 58
126010	Mechanical blending valve 1"	B	46
126015	Mechanical blending valve 1¼"	B	46
126400	Safety device protectliQ:A20	A	22
126405	Safety device protectliQ:A25	A	22
126410	Safety device protectliQ:A32	A	22
126415	Safety device protectliQ:A40	A	22
126802	Power supply plug GENO-STOP, protectliQ	A	22
126805	Water sensor with 2 m cable GENO-STOP, protectliQ	A	22
126815	Water sensor with 10 m cable GENO-STOP, protectliQ	A	22
128001	Adjusting piece l = 190 mm, connection 1"	B	19
128401	Adjusting piece l = 190 mm, connection 1¼"	B	19
129500	Gravel filter GENO-mat KF-Z 20/10	B	56
129505	Gravel filter GENO-mat KF-Z 25/13	B	56
129510	Gravel filter GENO-mat KF-Z 30/14	B	56
129515	Gravel filter GENO-mat KF-Z 40/17	B	56
129520	Gravel filter GENO-mat KF-Z 40/18	B	56
129525	Gravel filter GENO-mat KF-Z 50/19	B	56
129530	Gravel filter GENO-mat KF-Z 60/20	B	56
129550	Multi-layer filter GENO-mat MS-Z 20/10	B	56
129555	Multi-layer filter GENO-mat MS-Z 25/13	B	56
129560	Multi-layer filter GENO-mat MS-Z 30/14	B	56
129565	Multi-layer filter GENO-mat MS-Z 40/17	B	56
129570	Multi-layer filter GENO-mat MS-Z 40/18	B	56
129575	Multi-layer filter GENO-mat MS-Z 50/19	B	56
129580	Multi-layer filter GENO-mat MS-Z 60/20	B	56
129800	Activated carbon filter GENO-mat AK-Z 20/10	B	56
129805	Activated carbon filter GENO-mat AK-Z 25/13	B	56
129810	Activated carbon filter GENO-mat AK-Z 30/14	B	56
129815	Activated carbon filter GENO-mat AK-Z 40/17	B	56
129820	Activated carbon filter GENO-mat AK-Z 40/18	B	56
129825	Activated carbon filter GENO-mat AK-Z 50/19	B	56
129830	Activated carbon filter GENO-mat AK-Z 60/20	B	56
129850	Partial deacidification filter GENO-mat TE-Z 20/10	B	57
129855	Partial deacidification filter GENO-mat TE-Z 25/13	B	57
129860	Partial deacidification filter GENO-mat TE-Z 30/14	B	57
129865	Partial deacidification filter GENO-mat TE-Z 40/17	B	57
129870	Partial deacidification filter GENO-mat TE-Z 40/18	B	57
129875	Partial deacidification filter GENO-mat TE-Z 50/19	B	57
129880	Partial deacidification filter GENO-mat TE-Z 60/20	B	57
132095	Service kit for DK Mini/Standard/Maxi	B	25
132460	Euro system separator GENO-DK 2-Maxi DN 50	B	25
132465	Euro system separator GENO-DK 2-Maxi DN 65	B	25
132470	Euro system separator GENO-DK 2-Maxi DN 80	B	25
132475	Euro system separator GENO-DK 2-Maxi DN 100	B	25
132510	Euro system separator GENO-DK 2, ½"	A	24
132520	Euro system separator GENO-DK 2, ¾"	A	24
132530	Euro system separator GENO-DK 2, 1"	A	24
132540	Euro system separator GENO-DK 2, 1¼"	A	24
132560	Euro system separator GENO-DK 2, 1½"	A	24
132570	Euro system separator GENO-DK 2, 2"	A	24
132720	Euro system separator GENO-DK-Maxi DN 150	B	25
132725	Euro system separator GENO-DK-Maxi DN 200	B	25
132730	Euro system separator GENO-DK-Maxi DN 250	B	25

Ord. no.	Item	RG-	Page
132870	Adapter kit DK-standard ½" to DK 2	B	19
132875	Adapter kit DK-standard ¾" to DK 2	B	19
132880	Adapter kit DK-standard 1" to DK 2	B	19
132885	Adapter kit DK-standard 1¼" to DK 2	B	19
132890	Adapter kit DK-standard 1½" to DK 2	B	19
132895	Adapter kit DK-standard 2" to DK 2	B	19
133100	Euro system separator GENO-DK 2-Mini	A	24
134100	Euro system separation device GENO-G5	B	26
134805	Rinsing unit for GENO-G5	B	26
134810	Connection kit for GENO-G5	B	26
150100	GENO-dosing unit type H 5	B	71
150110	thermaliQ filling pump	A	66
151820	Hose extension kit for flushing compressor/MOBIdos	B	53
153020	Filter filling, complete, MN-Z 20/10	B	59
153022	Filter filling, complete, MN-Z 25/13	B	59
153024	Filter filling, complete, MN-Z 30/14	B	59
153026	Filter filling, complete, MN-Z 40/17	B	59
153028	Filter filling, complete, MN-Z 40/18	B	59
153030	Filter filling, complete, MN-Z 50/19	B	59
153032	Filter filling, complete, MN-Z 60/20	B	59
153094	Regeneration tank FE/MN system, 100 l tank	B	58
153095	Regeneration tank FE/MN system, 300 l tank	B	58
153210	Deferrisation system GENO-mat FE-Z 20/10	B	58
153220	Deferrisation system GENO-mat FE-Z 25/13	B	58
153230	Deferrisation system GENO-mat FE-Z 30/14	B	58
153240	Deferrisation system GENO-mat FE-Z 40/17	B	58
153250	Deferrisation system GENO-mat FE-Z 40/18	B	58
153260	Deferrisation system GENO-mat FE-Z 50/19	B	58
153270	Deferrisation system GENO-mat FE-Z 60/20	B	58
153410	Demanganisation system GENO-mat MN-Z 20/10	B	59
153420	Demanganisation system GENO-mat MN-Z 25/13	B	59
153430	Demanganisation system GENO-mat MN-Z 30/14	B	59
153440	Demanganisation system GENO-mat MN-Z 40/17	B	59
153450	Demanganisation system GENO-mat MN-Z 40/18	B	59
153460	Demanganisation system GENO-mat MN-Z 50/19	B	59
153470	Demanganisation system GENO-mat MN-Z 60/20	B	59
156868	Hydrogen peroxide spray	B	53
160150	Dosing system MOBIdos	B	53
163140	Dosing system GENODOS DM-T 6	B	51
163150	Dosing system GENODOS DM-T 10	B	51
163160	Dosing system GENODOS DM-T 20	B	51
163170	Dosing system GENODOS DM-T 30	B	51
163180	Dosing system GENODOS DM-T 80	B	51
163190	Dosing system GENODOS DM-T 100	B	51
163220	Dosing group 2.72, PVC	B	51
163420	Dosing system GENODOS DM-oxi 1"	B	60
163430	Dosing system GENODOS DM-oxi 1½"	B	60
163435	Dosing system GENODOS DME 6	A	30
163445	Dosing system GENODOS DME 10	A	30
163455	Dosing system GENODOS DME 20	A	30
163465	Dosing system GENODOS DME 30	A	30
163475	Dosing system GENODOS DME 80	B	30
163485	Dosing system GENODOS DME 100	B	30
163765	Conversion kit for GENODOS DME, 60-litre suction lance	A	30
163790	Overflow valve for GENODOS DM-oxi 1",1½"	B	60
163805	Chemicals collecting tray for 60/100 l dosing tanks	B	51
163820	Dosing system GENODOS type DM-B 6	B	52
163825	Dosing system GENODOS type DM-B 10	B	52
163830	Dosing system GENODOS type DM-B 20	B	52
163835	Dosing system GENODOS type DM-B 30	B	52
163860	Dosing point for filter systems up to type 30/14	B	60
163870	Voltage-free level signal GENODOS, complete	B	74
163880	Dosing point for filter systems starting from type 40/17	B	60
170001	GENO-phos Nr. 1, 0.5 kg canister	B	72
170002	GENO-phos Nr. 1, 3.5 kg bucket	B	72
170003	GENO-phos Nr. 2, 3.5 kg bucket	B	72
170004	Sodium sulphite: 6.0 kg	B	72
170015	GENO-Passivierungspulver (passivation powder), 3.5 kg	I	78

Ord. no.	Item	RG-	Page
170016	GENO-special granulate, 1 kg	B	58
170017	GENO-special granulate, 5 kg	B	58
170022	GENO-clean CP, 10 x 1 litre	B	50, 78
170028	GENO-clean CP, 22 kg (18.3 l)	B	78
170029	GENO-oxi plus, 20 kg (19.7 l)	B	58, 60
170041	Potassium permanganate, 5 kg	B	58
170045	GENO-clean M, 12 kg	B	78
170047	GENO-clean M, 1 litre	B	78
170052	GENO-phos Nr. 1, 25 kg bag	B	72
170053	GENO-phos Nr. 2, 25 kg bag	B	72
170054	Sodium sulphite, 25 kg bag	B	72
170057	thermaliQ clean, dosing solution, 1 litre	A	66
170058	thermaliQ clean, dosing solution, 5 litres	A	66
170059	thermaliQ clean, dosing solution, 10 litres	A	66
170076	thermaliQ safe, dosing solution, 1 litre	A	66
170077	thermaliQ safe, dosing solution, 5 litres	A	66
170078	thermaliQ safe, dosing solution, 10 litres	A	66
170097	Water test kit for manganese 0.03 - 0.5 mg/l	B	58, 77
170103	Water test kit for ortho-phosphate 2 - 15 mg/l	B	77
170106	Water test kit for pH value 0 - 6 / 4.5 - 10 / 7 - 14	B	77
170107	Water test kit for sulphite drip test 0.5 - 20 mg/l	B	77
170110	Water test kit for total hardness, p and m value	B	77
170121	Water test kit for total hardness GENO-plex B	B	77
170128	Water test kit for chlorine + pH value	B	51, 53, 77
170131	Water test kit for nitrate	B	77
170136	Water test kit for peroxide 0.5 - 25 mgl/l	B	53, 77
170138	Water test kit for chlorine 10 - 160 mg/l	B	53
170140	Water test kit for molybdenum 5 - 250 mg/l	B	71, 77
170141	Water test kit for GENO-heating protection FSK	B	77
170144	Water test kit for residual oxygen 0 - 100 ppb	B	77
170147	Water test kit for pH value 7 - 14	B	71, 77
170148	Water test kit for pH value 4.5 - 10	B	77, 78
170149	Water test kit for hardness	B	77
170150	Water test kit for iron	B	58, 77
170167	Water test kit for peroxide 100 - 1,000 mg/l	B	53
170169	Water test kit for total alkalinity	B	77
170170	Filter material GENO-Ferrocat (28 litres)	B	58
170173	pH indicator strips pH 4.5 - 10	B	76
170181	Combined measuring device for pH and conductivity, complete	B	71, 77
170185	Manual digital measuring device for pH, conductivity, temp.	B	71
170187	Water test kit for total hardness °dH, mol/m³ and °f	B	71, 77
170193	Refill pack of reagents for water test kit for manganese (100 determinations)	B	58, 77
170205	Filter sand SB 0.4 - 0.8 T EN 12904	B	57
170207	Quartz sand SB 1.0 - 2.0 T EN 12904	B	57
170208	Quartz gravel SB 3.15 - 5.6 T EN 12904	B	57
170220	Hydroanthrasite H, grain size I: 0.6 - 1.6 mm	B	57
170230	Hydrolit-Ca 1.0 - 3.0 mm	B	57
170249	GENO-Neutralit Hz, 25 kg	B	76
170255	Activated carbon Hydraffin CC 8x30, 0.5 - 2.5 mm, 25 kg	B	57
170306	Sodium metabisulphite, 5-kg bucket	B	53
170320	GENO-perox, content: 1 l	B	53
170335	GENO-perox, content: 11 kg	B	53
170430	Chlorine dioxide test, 0.02 - 0.55 ppm	B	52, 53
170450	GENO-Baktox, 3 l	B	53
170460	GENO-Baktox, 10 kg	B	53
170470	GENO-Baktox, 20 kg, complete	B	53
170501	Phosphate reagent I (250 ml)	B	77
170502	Phosphate reagent II (250 ml)	B	77
170504	thermaliQ safe test kit	A	66
170520	Sulphite reagent 1/2/3, small package	B	77
170525	Sulphite reagent 1/2/3, large package	B	77
170535	Water test kit for sulphite, 10 - 1,000 mg/l	B	71, 77
170554	Water test kit for ortho-phosphate, 1 - 20 mg/l	B	77
170605e	Replacement pH electrode for combined measuring device	B	71
170655e	Refill kit of reagents for thermaliQ safe test kit	A	71
180230	GENO-heating protection FSK, 20 kg	I	72
180300	Neutralisation agent FNK, 20 kg	B	76, 78

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180350	GENO-Neutrox, 25 kg canister	B	74
180355	GENO-Neutrox, 75 kg canister	B	74
180405	GENO SW 2000, 20 kg canister	B	72
180415	GENO SW 2010, 20 kg	B	72
180420	GENO SW 2010, 100 l barrel	B	72
180440	GENO SW 2040, 25 kg canister	B	72
180530	GENO-safe A, 1 l	I	72
180540	GENO-safe A, 10 x 1 l	I	72
180550	GENO-safe A, 11 kg (10 l)	I	72
180810	Safety package for caustic substances	B	74
185100	Water softener Delta-p 1"	B	42
185105	Water softener Delta-p 1" with pedestal	B	43
185110	Water softener Delta-p 1¼"	B	42
185115	Water softener Delta-p 1¼" with pedestal	B	43
185120	Water softener Delta-p 1½"	B	42
185125	Water softener Delta-p 1½" with pedestal	B	43
185130	Water softener Delta-p 2"	B	42
185135	Water softener Delta-p 2" with pedestal	B	43
185200	Water softener Delta-p 1" - I	B	42
185205	Water softener Delta-p 1" - I with pedestal	B	43
185210	Water softener Delta-p 1¼" - I	B	42
185215	Water softener Delta-p 1¼" - I with pedestal	B	43
185220	Water softener Delta-p 1½" - I	B	42
185225	Water softener Delta-p 1½" - I with pedestal	B	43
185230	Water softener Delta-p 2" - I	B	42
185235	Water softener Delta-p 2" - I with pedestal	B	43
185335	Pre-alarm salt supply	B	43, 46
185505	Connection kit 1" - I	B	46
185515	Connection kit 1"	B	46
185520	Connection kit 1¼" - I	B	46
185530	Connection kit 1¼"	B	46
185540	Connection kit 1½" - I	B	46, 58
185545	Connection kit 1½"	B	46
185775	Drain connection DN 50 as per DIN EN 1717 for Delta-p	B	43
185807	Connection kit for Delta-p 1" - 1¼", installation length 190 mm	B	43
185808	Connection kit for Delta-p 1" - 1¼"- I	B	43
185820	Pedestal for Delta-p 1" - 1¼"	B	43
185823	Connection kit for Delta-p 1½" - 2", installation length 260 mm	B	43
185824	Connection kit for Delta-p 1½" - 2"- I	B	43
185825	Pedestal for Delta-p 1½" - 2"	B	43
185846	Screw connection for connection block Delta-p 1"	B	43
185847	Screw connection for connection block Delta-p 1¼"	B	43
185848	Screw connection for connection block Delta-p 1½"	B	43
185849	Screw connection for connection block Delta-p 2"	B	43
185890	Communication module DE200 Profibus	B	43
186100	Water softener GENO-mat duo WE-X 65	B	45
186110	Water softener GENO-mat duo WE-X 150	B	45
186120	Water softener GENO-mat duo WE-X 300	B	45
186130	Water softener GENO-mat duo WE-X 450	B	45
186140	Water softener GENO-mat duo WE-X 750	B	45
186200	Water softener GENO-mat duo WE-X 50	B	45
186210	Water softener GENO-mat duo WE-X 130	B	45
186220	Water softener GENO-mat duo WE-X 230	B	45
186230	Water softener GENO-mat duo WE-X 330	B	45
186240	Water softener GENO-mat duo WE-X 530	B	45
187400	Water softener softliQ:MD32	A	37
187450	Water softener softliQ:MD38	A	37
187530	Weichwassermeister GSX 10-I	B	44
187660e	Extension kit for connection hoses DN 25	B	39
187680e	Extension kit for connection hoses DN 32	B	39
187860e	Extension kit for connection hoses DN 22	B	39
187865	Connection angle 90°-1" (content: 2 pcs)	A	39
187870	Supplementary blending valve GSX/VGX	A	39
187875	Supplementary soft water outlet GSX/VGX	A	39
188140	Nitrate filter WINNI-mat VGX-N 50	B	55
188250	Water softener WINNI-mat VGX 14-H	B	73
188450	Nitrate filter WINNI-mat VGX-N 400	B	55
188460	Nitrate filter WINNI-mat VGX-N 650	B	55

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188800	Delivery pump for regeneration water VGX/GSX/softliQ	A	39
188870	Insulation kit softliQ:SD	A	39
188875	Drain connection DN 50 acc. to DIN EN 1717	A	39, 55, 73
189100	Water softener softliQ:SD18	A	36
189200	Water softener softliQ:SD21	A	36
189300	Water softener softliQ:SD23	A	36
190570	Water softener HEH 9	B	73
190575	Exchanger resin, water softener, 4 litres	B	73
203624	Calibration solution, conductivity 1413 µS/cm, 50 ml	B	71
203627	Calibration solution pH 4, 50 ml	B	71
203628	Calibration solution pH 7, 50 ml	B	71
203631	Potassium chloride solution KCL 3 mol/l, 50 ml	B	71
210012	GENO-Chlor A, content of canister: 25 kg	B	51, 53
210560	Chemicals collecting tray for 20 l canisters	B	55, 56, 60
211213	Indicator DPD 1, 100 tablets	B	53
211235	Digital test device Scuba II	B	53
410011	GENO-Neutralit Hz, 8 kg	B	76
410135	Condensate prefiltration box DN 25	B	74
410230	GENO-Neutra NO-5	B	75
410240	GENO-Neutra NO-12	B	75
410250	GENO-Neutra NO-24	B	75
410285	GENO-alarm delay relay	B	76
410320	GENO-Neutra N-210	B	75
410335	Neutralisation system GENO-Neutra KW35	B	75
410345	Neutralisation system GENO-Neutra KW65	B	75
410435	Activated carbon filter GENO AF-5	B	76
410440	GENO-Neutra N-14	B	75
410450	GENO-Neutra N-70	B	75
410540	GENO-Neutra FNH-420-R	B	74
410585	Oil binding mats, 20 pcs, oil absorption	B	74
410680	Overflow alarm switch for GENO-Neutra	B	76
410770	GENO-Neutralit Hz, 3 kg	B	76
410801	Maintenance kit for GENO-Neutra N-14	B	76
410802	Maintenance kit for GENO-Neutra N-70	B	76
410803	Maintenance kit for GENO-Neutra N-210	B	76
410805	Maintenance kit for GENO-Neutra NO-5	B	76
410806	Maintenance kit for GENO-Neutra NO-12	B	76
410807	Maintenance kit for GENO-Neutra NO-24	B	76
410810	Maintenance kit GENO-Neutra KW35	B	76
410824	Maintenance kit activated carbon filter GENO AF-5	B	76
410830	Maintenance kit GENO-Neutra KW65	B	76
420150	Waste water lifting system AH-300	B	76
520020	Flushing kit for UV disinfection system	B	50
520070	Connection kit for UV disinfection UV-60	B	50
520075	Connection kit for UV disinfection UV-120/200	B	50
523110	GENO-UV-60 S, DVGW	B	50
523120	GENO-UV-120 S, DVGW	B	50
523130	GENO-UV-200 S, DVGW	B	50
523800	Wall bracket for UV systems (DVGW & I)	B	50
523805	Floor rack for UV system 120 (DVGW & I)	B	50
523810	Floor rack for UV system 200 (DVGW & I)	B	50
523815	Floor rack for UV system 60	B	50
523825	Temperature-controlled flushing for GENO-UV	B	50
523830	USB data logger for GENO-Multi BS	B	50
523870	Safety device for UV 60 S with Multi BS	B	50
523875	Safety device for UV 120 S with Multi BS	B	50
523880	Safety device for UV 200 S with Multi BS	B	50
525400	Adsorption system safeliQ:EA30	A	49
525450	Water softener softliQ:PA20	A	38
702842	GENO-Multi LF	B	71
702845	Water meter with connection material	B	71
707015	thermaliQ conductivity measuring cell with adapter	B	68, 71
707025	thermaliQ conductivity measuring cell	B	71
707055	GENO-therm solenoid valve, complete	B	71
707056	GENO-therm blending housing, complete	B	71
707059e	Hose adapter from male thread ¾" to quick coupling	B	71
707124	Double nipple for F-NT and OV G ¾ x 28	B	71
707127	desaliQ:HB4 bottle adapter	B	64, 71
707150	Filling cartridge desaliQ:HB4 with adapter	B	64
707155	Filling cartridge desaliQ:HB4 without adapter	B	64
707160	GENO-therm case Basic	B	68
707170	GENO-therm case Premium	B	68
707190	Analysis case (pH value + conduct., total hardness, molyb.)	B	68
707192	Analysis case (pH value + conductivity, total hardness)	B	68
707240	Regeneration station MEH	B	73
707250	Mobile water softener MEH	B	73
707276	desaliQ connection adapter	B	64
707435	desaliQ resin bags 2 x 6 l	A	65
707440	Mixed bed cartridge desaliQ:MA13	A	65
707450	Mixed bed cartridge desaliQ:BA6	B	67
707455	Mixed bed cartridge desaliQ:MB9	A	69
707460	Mixed bed cartridge desaliQ:BA12	B	67
707465	Mixed bed cartridge desaliQ:BA12 VARIO mini	B	67
707470	Mixed bed cartridge desaliQ:BA13	B	67
707480	Mixed bed cartridge desaliQ:BA16	B	67
707485	Mixed bed cartridge desaliQ:BA16 VARIO mini	B	67
707490	Mixed bed cartridge desaliQ:BA20	B	67
707550	Mobile GENO-VARIO mini without GENO-Multi-LF conductivity measuring cell	B	69
707550.01	Mobile GENO-VARIO mini incl. GENO-Multi-LF conductivity measuring cell	B	69
707560	Stationary GENO-VARIO mini without GENO-Multi-LF conductivity measuring cell	B	69
707560.01	Stationary GENO-VARIO mini incl. GENO-Multi-LF conductivity measuring cell	B	69
707570	Depth filter element, 25 µm, 2 pcs in cardboard box	B	69
707575	Depth filter element, 50 µm, 2 pcs in cardboard box	B	69
707580	Depth filter element, 100 µm, 2 pcs in cardboard box	B	69
707585	Depth filter element, 150 µm, 2 pcs in cardboard box	B	69
707680	Mixed bed resin for filling cartridge desaliQ:HB4	B	64
707705	GENO-therm sludge separator DN 20, complete	B	70
707710	GENO-therm sludge separator DN 25, complete	B	70
707715	GENO-therm sludge separator DN 32, complete	B	70
707720	GENO-therm sludge separator DN 40, complete	B	70
707725	GENO-therm sludge separator DN 50, complete	B	70
707745	Filling cartridge desaliQ:HB2	B	64
707750	Filling group thermaliQ:SB13	B	63
707755	Treatment group thermaliQ:HB2	B	63
707760	Filling section thermaliQ:FB2	B	63
707765	Softening cartridge decaliQ:BA12 VARIO mini	B	67
707770	Filling section thermaliQ:FB13i	B	63
707785	Softening cartridge decaliQ:BA16 VARIO mini	B	67
707840	Hose kit DN 20 straight/straight	B	69
707845	Hose kit DN 20 straight/90°	B	69
707850	desaliQ hose kit DN 12, 1.5 m (2 pcs)	B	64, 71
752250	Mobile reverse osmosis system AVRO-flex 400	B	70
82552110	System log for warm water heating system		71
85501851	Double screw connection ¾" x ¾"	B	71

Standard Terms of Sale and Delivery of Grünbeck Wasseraufbereitung GmbH

1 APPLICATION, SUBJECT MATTER OF CONTRACT AND CONCLUSION OF CONTRACT

1.1 These Standard Terms of Sale and Delivery (hereinafter: "STS") apply for the sale of goods ("Delivery") as well as for the provision of services or work contract services ("Service"). Our STS apply for all (including future) business relationships with our customers (hereinafter: "Purchaser") and irrespective of whether we manufacture the object ourselves or obtain it from suppliers or perform the service or work contract service ourselves or through third parties. We do not accept standard business terms of the Purchaser. We object to their application. The STS also apply if we, having knowledge of conflicting standard business terms of the Purchaser, carry out deliveries without reservation.

1.2 As far as not otherwise mentioned in an offer, our offers are subject to change and non-binding. An order of the Purchaser is deemed to be a binding offer of contract. As far as the order does not indicate to the contrary, we are entitled to accept the Purchaser's order within four (4) calendar weeks after receipt. The acceptance shall occur through confirmation or by delivery of the order to the Purchaser.

1.3 Individual terms deviating from these STS are only valid if they are confirmed in writing. Legally binding declarations or notices of the Purchaser after conclusion of the contract (e. g. setting of deadlines, notice of defects, declaration of rescission or reduction of price) must be made in textual form.

1.4 The minimum order value amounts to EUR 100.00 net. In the case of orders under EUR 100.00 we are entitled to apply a reduced quantity charge of EUR 20.00 for the processing costs.

2 SERVICES

2.1 We provide services within the scope of our existing technical and operational possibilities. The services include in particular assembly, start-up operation, customer service and maintenance.

2.2 In the case of services to be provided by us including (but not limited to) development services and/or analysis services, in general no particular result is owed. In connection with the performance of services we do not assume any responsibility for a particular result and are entitled to perform the services through subagents (subcontractors). This shall not apply upon conclusion of a separate contractual agreement.

2.3 If exceptionally an acceptance is stipulated for our services, the Purchaser shall accept the work contract services as provided by us, including partial work contract services, without delay and declare the acceptance or partial acceptance as far as there are no defects in the services which materially impair the suitability or the function.

2.4 If after the making available for acceptance or partial acceptance no objection of substantial defects is made within seven (7) calendar days or if the Purchaser uses the work services or partial work contract services which were made available, the acceptance (partial acceptance) shall be deemed to have occurred as far as the Purchaser is a merchant.

3 SPECIAL PROVISIONS FOR ASSEMBLY, START-UP OPERATION, CUSTOMER SERVICE AND MAINTENANCE

In the event that the order includes assembly, start-up operation, customer service and/or maintenance, the following terms have supplementary application. In the case of contradictions the provisions of this Section 3 have priority over the other provisions of these STS.

3.1 Assembly works

As far as the order includes assembly works, the Purchaser shall ensure at the construction site at his expense that at the start of and during the assembly works

3.1.1 there is freedom to build, i. e. we can perform the contractually owed services without being obstructed by third parties;

3.1.2 suitable access possibilities and openings to bring in items exist in the size specified by us such that the installation can be transported with all necessary vehicles to the site where it is to be set up; the transport path shall not be obstructed;

3.1.3 all terminal points of supply for power supply and signal transmission exist at the agreed location according to the agreed specifications;

3.1.4 the assembly site is protected against weather influences and damaging influences by animals and is secured against unauthorized access;

3.1.5 a power connection of 230/400 V, 50 Hz in accordance with the VDE regulations respectively exists at the assembly site and/or there is an assembly room with such a connected wattage;

3.1.6 appropriate load-bearing points exists on the building and/or ceiling structure to affix hoists;

3.1.7 the interfaces to connect to existing systems, including if applicable necessary isolation valves, are implemented.

3.2 Start-up operation, customer services and maintenance

As far as the order includes the start-up operation, customer service works and/or the maintenance of the installation or individual components, the Purchaser shall at his expense and having regard to the cooperation duty applicable in 3.1 ensure that at the start of and during such works in addition

3.2.1 there is freedom to build; i. e. we can perform the contractual services without being obstructed by third parties;

3.2.2 all necessary operating media with the necessary volume power and flow pressure are available ready for operation;

3.2.3 the water quality (product water, waste water) produced by the installation is accepted with the relevant volume streams;

3.2.4 the air volume streams necessary for the operation of the installation can be and are permitted to be discharged;

3.2.5 all electrical voltages necessary for the operation of the installation are ready for operation together with the necessary connected wattage;

3.2.6 in the case of swimming pools the basin is filled with water;

3.2.7 all signals necessary for the operation of the installation together with third parties and/or agreed signals are available for operation;

3.2.8 suitable climate conditions of the assembly site

3.2.9 location for individual components and/or operating resources are complied with.

3.3 Works abroad

As far as the services are to be performed abroad and our technical personnel requires a residence and/or work permit for that purpose, the Purchaser shall, subject to agreement in a particular case, support us free of charge in the necessary scope in relation to the local authorities in the application for, the extension of or the change of the permit required for the performance of the service.

4 INTELLECTUAL PROPERTY RIGHTS, KNOW-HOW

The Purchaser recognizes our know-how as well as our intellectual property rights. As far as not stipulated otherwise, we reserve our rights of ownership and copyrights to illustrations, drawings and other documents. They may not be made accessible to third parties. This applies in particular for confidential documents. As far as not expressly stipulated elsewhere, e. g. in the order, we do not grant to the Purchaser any rights of use to the know-how or intellectual property rights which arose in connection with our services.

5 DELIVERY, TIME LIMITS, SCOPE OF SERVICE, DEFAULT

5.1 The delivery shall be made EXW "Ex Works" (Incoterms 2010). The place of performance is Höchstädt/Donau. At the request of the Purchaser the goods shall be sent to another destination at his expense. As far as not stipulated otherwise, we are entitled to ourselves to determine the manner of shipment (in particular shipping company, shipping route, packaging). The risk passes to the Purchaser upon delivery to the shipping agent or upon collection at the factory site, as far as the Purchaser is a merchant. If the Purchaser is a consumer, the transfer of risk is governed by the respective statutory provisions. Please note that we are exempted from mandatory freight forwarders' insurance (SLVS-Verzichtskunde).

5.2 Delivery and service deadlines are non-binding unless their binding effect is expressly stipulated.

5.3 We are not responsible for delays which arise through the fact that we do not receive timely or proper supplies from our supplier if we have carefully selected the supplier and have timely placed an order with him such that timely delivery was to be expected. The same applies in the case of delays of services if we have carefully selected the subcontractor and have timely engaged him such that timely service was to be expected.

5.4 The contract fulfilment including compliance with time limits is subject to the condition that there are no conflicting hindrances on the basis of German, US as well as other applicable national, EU or international foreign trade regulations and no embargos or other sanctions.

5.5 Our goods correspond to German safety and quality guidelines. The compliance with foreign guidelines is not ensured as far as not stipulated in a particular case. The purchaser of the goods agrees to inform himself of the regulations under the law to be complied with concerning distribution and the use of our goods in the country of destination and shall comply therewith. If we require information or the participation of the Purchaser in connection with the export or import of the goods in the country of destination, the Purchaser agrees to provide them upon request without delay at his expense.

5.6 The compliance with deadlines for our deliveries or services require the timely receipt of all documents to be provided by the Purchaser, the performance of the cooperation services as well as the compliance with the agreed payment terms and other obligations. If these conditions are not timely fulfilled, the delivery or service time limits shall be reasonably extended.

5.7 If we cannot meet delivery or service deadlines we shall inform the Purchaser thereof without delay and at the same time indicate the probable new deadline or a new date.

5.8 Any rights due to delay, delivery or service can only be asserted by the Purchaser after an unsuccessful warning notice with the setting of a reasonable time limit. A reasonable time limit is considered to be four (4) weeks.

5.9 Partial deliveries and partial services are permissible in a scope which can be reasonably expected and can be brought to account as such. We can provide partial services for acceptance (hereinafter "partial acceptance"). This includes self-contained phases to fulfil the contractually agreed services and self-contained functioning parts.

5.10 In the event that the Purchaser does not timely accept the delivery or service the statutory provisions on delay of acceptance apply. The Purchaser shall in such a case in particular bear the additional costs (e. g. for a second delivery) involved therewith.

5.11 Rules concerning exchange of pallets if the Purchaser is a merchant.

5.11.1 As far as nothing is stipulated otherwise, for the shipping of the goods by a shipping company Euro Pool exchange pallets according to the Cologne Pallet Exchange shall be used.

5.11.2 The Purchaser is obligated upon delivery of the palleted goods to return the same amount of exchangeable pallets of the same type and quality. The UIC standard 435-4 of the International Union of Railways applies for the exchangeability.

5.11.3 The Purchaser must provide a receipt for the number and type of the loaded pallets and note in writing the reservations concerning the quality, provide empty pallets in the same number and type in exchangeable condition, obtain a receipt for the delivery and note reservations concerning the quality, as well as in the event of non-exchange, if no pallets of the same type and quality or not of a sufficient quantity are provided or the acceptance is rejected as not being capable of exchange, to confirm this.

5.11.4 In the case of non-exchange if no pallets of the same type and quality or not of a sufficient quantity are provided or the acceptance is rejected as not being capable of exchange, we will invoice the procurement of replacements for missing or non-exchangeable pallets.

6 PRICES

6.1 As far as not agreed otherwise, our prices are for delivery ex works, including packaging without VAT. The VAT and other costs shall be separately stated in the invoice.

6.2 As far as not agreed otherwise, the provision of the services shall occur Monday to Friday during our usual business hours (max. 8 h/day) and the calculation of the services according to the time spent by us, at the hourly rates respectively currently applied by us plus the respectively applicable material prices and as far as relevant plus travel expenses (in particular, but without limitation, travel to and from the site, accommodation). If at the request of the Purchaser our employees work overtime, the overtime compensation shall be borne by the Purchaser. The same applies for extra pay for Sunday and holiday work. Overtime, Sunday and holiday work shall be charged in accordance with the respectively applicable collective bargaining provisions of the Bavarian metal industry. The Purchaser agrees to verify and countersign working hours certificates which are prepared by our employees. If compensation at a fixed price is agreed, we are entitled to make a down payment for self-contained parts of the service or after completion of a project phase (e. g. contract commencement, initial partial delivery, making available for acceptance, acceptance).

6.3 Costs increases which arise on the basis of requests for change by the Purchaser, in particular delays involved therewith shall be borne by the Purchaser.

6.4 Reasonable price changes in accordance with our price list are reserved if the delivery occurs in accordance with the contract more than four (4) months after conclusion of the contract and as far as the list price increase is attributable to a subsequent increase of the acquisition costs (prices for raw, auxiliary or operating materials, such as material price increases, collective bargaining wage increases or other preliminary services necessary for the subject matter of the contract) on which we have based our price indication upon conclusion of the contract.

7 PAYMENT TERMS

7.1 The agreed compensation shall become due without deduction immediately after performance has been provided and an invoice issued. As far as in a particular case a discount was agreed, no discount can be deducted from wage, packaging and freight costs.

7.2 Upon default of the Purchaser the respectively outstanding residual amount shall bear interest of 5 percentage points above the base interest rate and in the case of legal transactions in which no consumer is involved, 9 percentage points above the base interest rate. In the case of a default by a Purchaser who is a merchant, we are in addition entitled to charge a collection fee of EUR 40.00. The collection fee shall be set off against any damages which are owed as far as the damages are based on costs of the pursuit of legal rights.

7.3 If the Purchaser despite a warning notice does not comply with the payment terms or if the financial circumstances of the Purchaser deteriorate such that there are justified doubts as to his ability to make payments or creditworthiness, we can make further deliveries/services dependant on the Purchaser providing sufficient security. If the Purchaser is not in a position to do so, we are entitled to rescind the contract, if appropriate after setting a time limit.

7.4 The Purchaser is only entitled to apply set-off and to assert a right of retention based on claims which have been finally adjudicated or which are undisputed. Thus does not apply for the reciprocal claims which are characteristic for the exchange of the main performance and counter-performance under the contract. The right of retention is limited to a counterclaim arising from the same contractual relationship.

8 INFORMATION, WARRANTY

8.1 The information in our catalogues, brochures, list of types, data sheets and other advertising writings, in specifications, specification sheets and other technical delivery terms, in certificates and other forms or documents are not guarantees which go beyond the normal warranty.

8.2 In the case of any reliability information (useful life, long-term stability, etc.) statistically determined average values are involved. They are provided according to best knowledge and belief, but in a particular case may be exceeded or not reached.

8.3 For the rights of the Purchaser in the case of physical defects and defects in title (including incorrect and insufficient delivery as well as improper assembly or defective assembly instructions), the statutory provisions apply as far as nothing is stipulated otherwise below. A defect in particular does not exist to the extent that we have performed our services in accordance with the illustrations proved by the Purchaser or data provided by the Purchaser.

8.4 If the Purchaser is a merchant, he shall inspect or cause to be inspected the delivery or service without delay after receipt as to proper delivery or service, completeness and apparent defects.

8.5 If the Purchaser is a merchant, he loses the right to refer to a defect if he does not notify us thereof within seven (7) calendar days after the day on which he determines it or should have determined it, and exactly specifies the manner of non-compliance with the contract. The timely sending of the notice is sufficient to comply with the time limit.

8.6 If the Purchaser objects to a defect, he must provide to us the allegedly defective parts or devices or allow us a review of such parts in his premises during the usual business hours and provide us with the necessary time and opportunity for the replacement performance.

8.7 If the delivery or a work service is defective, we can initially choose whether we provide a replacement performance through elimination of the defect (improvement) or through delivery of a defect-free item (replacement). Depending on a particular case we are entitled to at least three (3) improvement attempts.

8.8 If only an individual part of the facility is to be exchanged, we can request that the Purchaser himself replaces that part of the installation which is provided to him by us if the costs for the sending of the technical personnel are disproportionately high.

8.9 The warranty period is

8.9.1 two years, if the Purchaser is a consumer;

8.9.2 one year, if the Purchaser is a merchant;

8.9.3 two years for all DVGW-certified devices, including for industrial and commercial use, as far as the special stipulation of the SHK liability assumption agreement with the German Sanitation, Heating and Air-Conditioning Association (ZVSHK) applies to the contractual

relationship between us and the Purchaser. All requirements of that agreement must be fulfilled, in particular the compliance with the applicable operation manual as well as the proper assembly, start-up and maintenance;
8.9.4 one year in the case of used goods (consumer and merchant).
8.10 The warranty does not – as far as not stipulated otherwise in this Section 8 – cover wear-and-tear parts such as sealings, ion exchange resins, membranes, etc. and damages which arose through excessive electrical voltage, frost or improper treatment, operation and maintenance, in particular in deviation from the operation manual. Our liability is also excluded for damages which arose through the use of unsuitable dosing solutions and chemicals.
8.11 Services which do not serve to remove defects in connection with the warranty shall be invoiced separately to the Purchaser.
8.12 After an unsuccessful replacement performance, in relation to the defect removal the Purchaser retains the right at his option to rescind the contract or to reduce the agreed compensation. The right to damages instead of performance shall not be affected thereby.
8.13 The place of performance for the replacement performance is in the case of companies the place of the registered office of Grünbeck, unless the defective products or parts thereof cannot be disassembled. In that case the place of performance of the replacement performance is the agreed place of delivery of the affected product/installation.
8.14 In cases of breach of warranty concerning installations which are not installed in Germany, the warranty service shall be undertaken by the local customer service authorized by Grünbeck as far as it exists. If in a particular country no customer service exists, the customer service of Grünbeck ends at the German border in cases in which the Purchaser is a merchant. All other costs arising in this connection, except material, shall be borne by the Purchaser.

9 RETURNS

9.1 The return of new goods with original packaging can only occur after prior agreement and only within twelve (12) months after the delivery date. The return fee amounts to 20 % of the net merchandise value. No credit note can be issued for returns which have a net merchandise value of EUR 50.00 after deduction of the return fee. Any necessary processing costs shall be charged separately. The return must be made free of charge to the address mentioned by us.
9.2 A return of goods with a limited expiry date (e. g. chemicals) will not be accepted by us. The same applies for the return of goods which are manufactured according to the Purchaser's specifications.
9.3 After prior agreement defective goods can also be returned. Repairs shall be made after a cost estimate. If the Purchaser does not respond to our cost estimate within 8 weeks, we are entitled to return the defective goods to the Purchaser at his expense and to charge the expense incurred by us to the Purchaser.
9.4 For the purpose of the return the Purchaser shall receive an RMA number which must be indicated at the time of return.

10 DISPOSAL OF B2B DEVICES ACCORDING TO ELECTROG (ELECTRICAL AND ELECTRONIC EQUIPMENT ACT)

10.1 The buyer assumes the obligation to properly dispose of the delivered goods after the end of use at his own expense in accordance with the statutory provisions.
10.2 The Buyer indemnifies the Supplier from the obligations under § 19 (1) ElektroG (manufacturers' obligation to accept returned devices) and related third-party claims.
10.3 The Purchaser shall contractually obligate commercial third parties to whom he delivers goods to properly dispose of them after the end of use at their expense in accordance with the statutory provisions and to impose a corresponding further obligation in the event of redelivery.
10.4 If the purchaser fails to obligate a third party to whom he delivers the goods to take over the obligation to dispose of the goods and to impose a corresponding further obligation in the event of redelivery, the purchaser is obliged to take back the delivered goods at his own expense after the end of use and to dispose of them properly in accordance with the statutory provisions.
10.5 The manufacturer's entitlement for takeover/exemption by the customer does not expire before a period of two years after the final termination of the use of the device. The two-year limitation period starts at the earliest upon receipt of a written notification from the purchaser to the manufacturer of the end of use.

11 LIMITATION OF LIABILITY

11.1 If nothing is stipulated to the contrary, the following exclusions and limitations of liability apply for our liability, regardless of the legal grounds, subject to the other statutory claim requirements, and which also apply for our employees, agents and other third parties whom we engage for the performance of the contract.

11.2 The following liability limitations however do not apply as far as we have fraudulently concealed a defect, provided a guarantee for the quality of the merchandise, claims of the Purchaser exist under the Product Liability Act or injury to body or health are caused.

11.3 We are liable for damages as far as we are responsible for intentional actions or gross negligence. In the case of simple negligence we are only liable for damages arising from injury to life, limb or health and for damages arising from the breach of a material contractual duty (obligation the fulfilment of which first makes possible the proper performance of the contract and on the fulfilment of which the contractual partner as a rule relies and is entitled to rely). Where there is a breach of substantial contractual obligations, in the case of simple negligence our liability is limited to the indemnification of the foreseeable, typically arising damages.

11.4 If the Purchaser is a merchant, we are liable – except in the case of liability for intentional acts – for any damages which do not result from injury to life, limb or health or under the German Product Liability Act and only up to a maximum amount of EUR 250,000.00 per calendar year. If our insurance company pays a higher amount for the claims asserted by the Purchaser than this maximum amount, this higher paid out amount constitutes the maximum amount.

11.5 The Purchaser may only rescind or terminate the contract due to a breach of duty which does not constitute a defect if we are responsible for the breach of duty. Other rights of termination of the Purchaser are excluded.

12 FORCE MAJEURE

12.1 We are not liable for force majeure events which make the performance of the contractual services substantially more difficult for us, which temporarily obstruct or make impossible the proper implementation of the contract. Force majeure shall be deemed to be all circumstances which cannot be foreseen or influenced by us and the Purchaser and which arise after conclusion of the contract, including but without limitation natural catastrophes, blockades, war and other military conflicts, mobilization, strikes or lock-outs.

12.2 As far as we are prevented from the fulfilment of the contractually agreed obligations through force majeure, this shall not be deemed to be a contractual violation and the contractually agreed deadlines shall be reasonably extended in accordance with the duration of the hindrance. The same applies as far as services are performed by third parties and they provide performance to us with delay due to force majeure. If the force majeure circumstances or circumstances outside the sphere of influence of the contracting party last longer than two (2) months, the contracting parties shall reach an agreement on the continuation of the contract within one (1) week.

13 RESERVATION OF TITLE

13.1 Until the fulfilment of all claims (including all outstanding balance claims based on the current account) to which we are entitled for any legal reasons against the Purchaser now or in the future, the goods remain our property.

13.2 The goods which are subject to the reservation of title may not be pledged to third parties nor transferred by way of assignment until complete payment of the secured claims. The Purchaser shall inform us in writing without delay if and the extent seizures of the goods belonging to us made are made by third parties. In the case of seizures by third parties of the goods which are subject to a reservation of title, the Purchaser shall refer to our ownership and inform us without delay.

13.3 The Purchaser is entitled to resell and/or process in the ordinary course of business the goods which are subject to the reservation of title. In this case the following provisions have supplementary application.

13.3.1 The reservation of title extends to the processing of products created through the processing, mixing or combination of our goods in their full value; we shall be deemed to the manufacturer. If in the case of processing, mixing or combination with the goods of third parties their right of ownership remains in place, we shall acquire coownership in the ratio of the invoice values of the processed, mixed or combined goods. In other respects the same applies for the created product as for the goods delivered subject to the retention of title.

13.3.2 The claims against third parties arising from the resale of the goods or the created product are hereby assigned to us by the Purchaser in full or in the amount of any co-ownership in accordance with Section 13.3.1 above by way of security. We accept the assignment. The obligations of the Purchaser mentioned in Section 13.2. also apply with respect to the assigned claims.

13.3.3 The Purchaser remains entitled to collect the claim in addition to us. We do not agree to collect the claim as long as the Purchaser complies with his payment obligations toward us, does not default on payment, no application for the commencement of an insolvency proceeding has been made and there is no other deficiency in his payment capability. If this is however the case, we can request that the Purchaser disclose the claims assigned and the debtors thereof, provide all information necessary for collection, deliver the associated documents and inform the debtors (third parties) of the assignment.

13.3.4 If the realizable value of the security exceeds our claims by more than 10 %, we shall at the request of the Purchaser release security of our selection.

14 CONFIDENTIALITY

Each contracting party shall keep secret the information received from the respective other party. This also applies after fulfilment of the delivery or services. This obligation does not apply (i) for information which was legitimately known to the receiving party upon receipt without a duty of confidentiality or (ii) thereafter legitimately becomes known without a duty of confidentiality or (iii) which are or become generally known without a breach of contract by one of the parties. The same applies for information which is developed by a contracting party independently of the information received in connection with the delivery or fulfilment of services. Each party reserves ownership and any rights to the documents or data carriers provided. Duplications and the passing on of such documents or data carriers is only permissible with the consent of the providing contracting party.

15 PRIVACY

15.1 For the duration of the business relationship and to maintain legal retention periods, we process contact details (such as name, email address) of the buyer, his employees and his partners ("contact persons"). These have been obtained from the buyer or partner or collected from publicly available sources (e.g., buyer website). We process the data for the purpose of providing our services and, as long as there is no objection, to promote our offers; the latter is based on the interest-weighting clause of the EU General Data Protection Regulation (DSGVO).
15.2 Contact persons may request information and restrict the processing, provision, correction, publication and deletion of the data (for example via info@gruenbeck.com), **object** to the processing and file a complaint with data protection supervisory authorities.
15.3 Buyers are obliged to forward the above information about our data processing to their contact persons or employees; In this way, our own information obligations towards these contacts are fulfilled. If the buyer requires further details, he can retrieve them at
https://www.gruenbeck.de/en/privacy-policy/ or contact our data protection officer (info@gruenbeck.com).

16 DISPUTE RESOLUTION

The European Commission provides a platform for online dispute resolution under *http://ec.europa.eu/consumers/odr/.* We try hard to settle possible dissensions resulting from contracts directly with our contracting partner. However, we are not obliged to participate in the online dispute resolution procedure according to the Consumer Dispute Resolution Act (VSBG) and cannot offer you participation in such procedure. Please contact us with questions and problems directly under *info@gruenbeck.com.*

17 APPLICABLE LAW, PLACE OF JURISDICTION, SEVERABILITY

17.1 The law of the Federal Republic of Germany, with the exception of the UN law on the sale of goods (CISG), has exclusive application.

17.2 The exclusive place of jurisdiction for all disputes arising directly or indirectly in connection with the contractual relationship is Dillingen/Donau. We are however entitled to also raise claims against the Purchaser at the place of the registered office of the Purchaser.

17.3 As far as individual provisions of this agreement are or become invalid in whole or in part, the validity of the remaining contractual provisions shall not be affected thereby. In place of the void or invalid provision the parties shall agree on a valid provision which comes as close as possible to it in a commercial sense as far as a supplementary interpretation of contract does not have priority or is not possible. The same applies accordingly as far as the contract contains a lacuna not intended by both contracting parties.

Status: 11/2018

We understand water.

Product range

- Water filters
- Dosing
- Softening
- Alternative anti-scaling
- Heating water treatment
- System separators
- Automatic flushing systems for initial flushing and sanitation
- UV disinfection
- Chemical disinfection systems to fight legionella
- Partial and full demineralisation systems
- Selective ion exchangers
- Microfiltration
- Ultrafiltration
- Nanofiltration
- Reverse osmosis
- Cooling water treatment
- Condensate cleaning
- Drinking and industrial water treatment
- Deferrisation, demanganisation and deacidification
- Arsenic removal
- Brewing water treatment
- Boiler feed water treatment
- Water treatment for district heating systems
- Swimming pool technology
- Whirlpools
- Waste water and recycling technology
- River water treatment
- Brackish water desalination
- Private water supply

YOUR LOCAL
WATER
EXPERTS!



Company profile

Grünbeck
Wasseraufbereitung GmbH
Josef-Grünbeck-Str. 1
89420 Hoechstaedt
GERMANY

General manager
Dr. Günter Stoll

Staff
Approx. 660

Sales organisation
Subsidiaries and authorised representations in Germany, representations in all EU member countries as well as associated partners world-wide

Certifications
DIN EN ISO 9001, ISO 14001, SCC^{P} by TÜV Management Service, OHRIS

Product certifications
DVGW, SVGW, ACS, EAC

Approvals
for welding, specialised welding company according to DIN EN ISO 3834-3. Manufacturing of pressure equipment according to the Pressure Equipment Directive 97/23/EC as per AD 2000 data sheet HPO and DIN EN 13480. Manufacturer of steel constructions according to DIN EN 1090. WEEE reg. no.: DE 77585882

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