

ProMinent® Equipment Catalogue

Products for:

- **Storage**
- **Transfer**
- **Dosing**
- **Measurement and Control**

Issued by:

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This product catalogue replaces
all previous catalogues and
price lists.

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Chapter 1 Solenoid-driven metering pumps

Chapter 2 Motor-driven metering pumps

Chapter 3 Process metering pumps

Chapter 4 Dosing systems

Chapter 5 Tanks and transfer pumps

Chapter 6 Panel-mounted measuring/ control stations

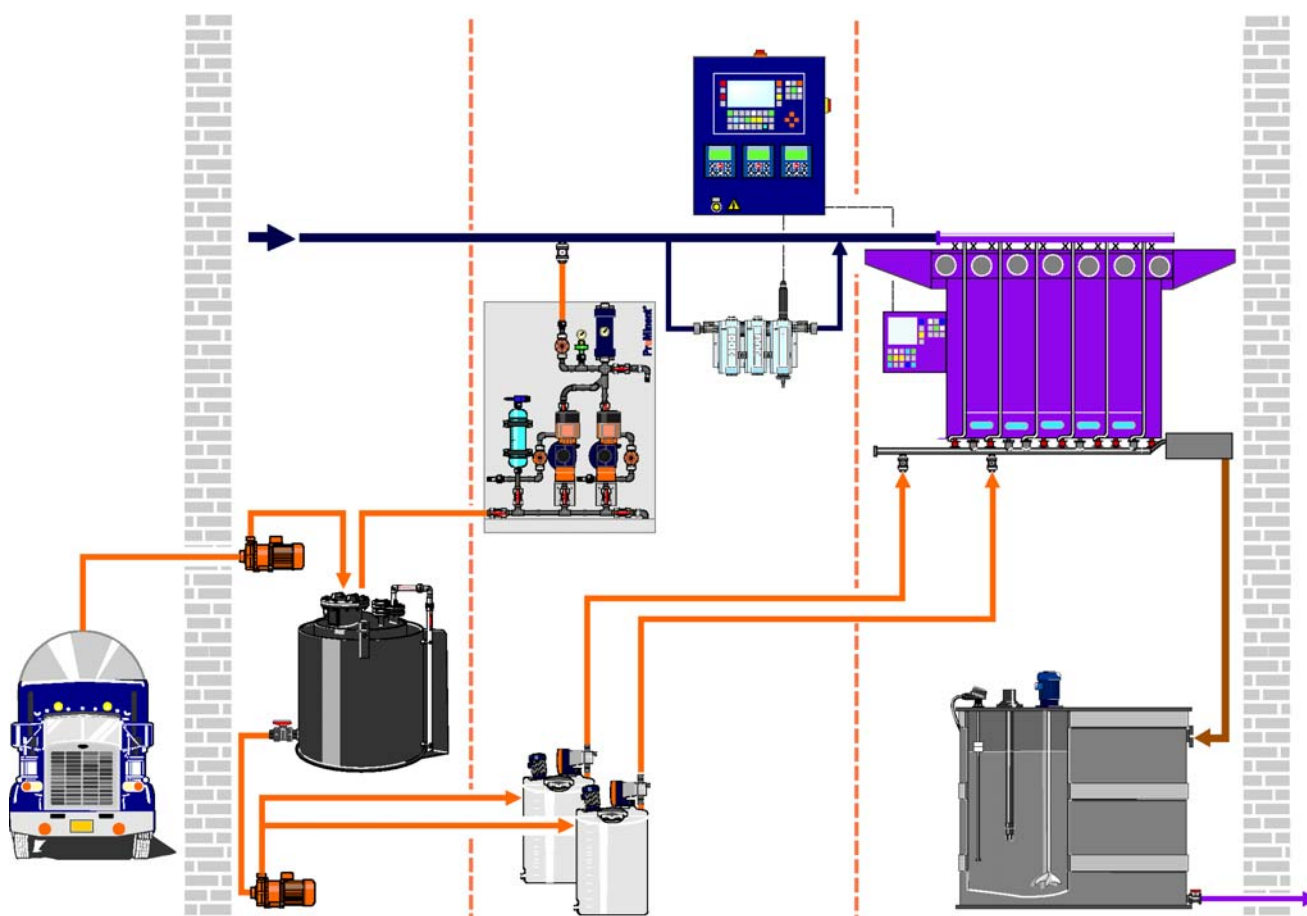
Chapter 7 Sensor technology DULCOTEST®

Chapter 8 Measuring and control technology

Chapter 9 Domestic water plant

Overview Chemical Fluid Handling

Optimum Interaction Of All Components



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ProMinent® solutions store, transfer and meter chemicals – in amounts ranging from 0.1 l/h to 40,000 l/h at pressures of 2 to 3,000 bar. In every industrial environment: whether in a simple control loop or a complex field bus application – solutions from ProMinent are simple and efficient.

Automated systems improve the quality of your processes thanks to reliable metering. This increases the quality of your products, saves chemicals, improves environmental compatibility and lowers the costs of wastewater disposal. You also need fewer operating personnel.

Three criteria determine the design of a chemical fluid handling solution: The chemical being handled, the required level of reproducibility and the system control requirements.

- **Storage and transfer**

ProMinent® storage and metering tanks make chemicals available wherever they are required. Matching transfer pumps ensure problem-free transference.

- **Metering/Measuring/Controlling**

ProMinent offers dosing systems with maximum levels of resistance against practically all types and concentrations of chemicals. The accuracy of the metering is determined not just by the pump but also by their interaction with selected accessories. Whether the pump is calibrated once and then meters continuously or whether simple measured variable-dependant metering or integration into a field bus environment is required: thanks to its broad product range ProMinent offers the right pumps, the optimum measurement and control systems and perfectly interacting accessories for all industry requirements.

- **Wastewater treatment**

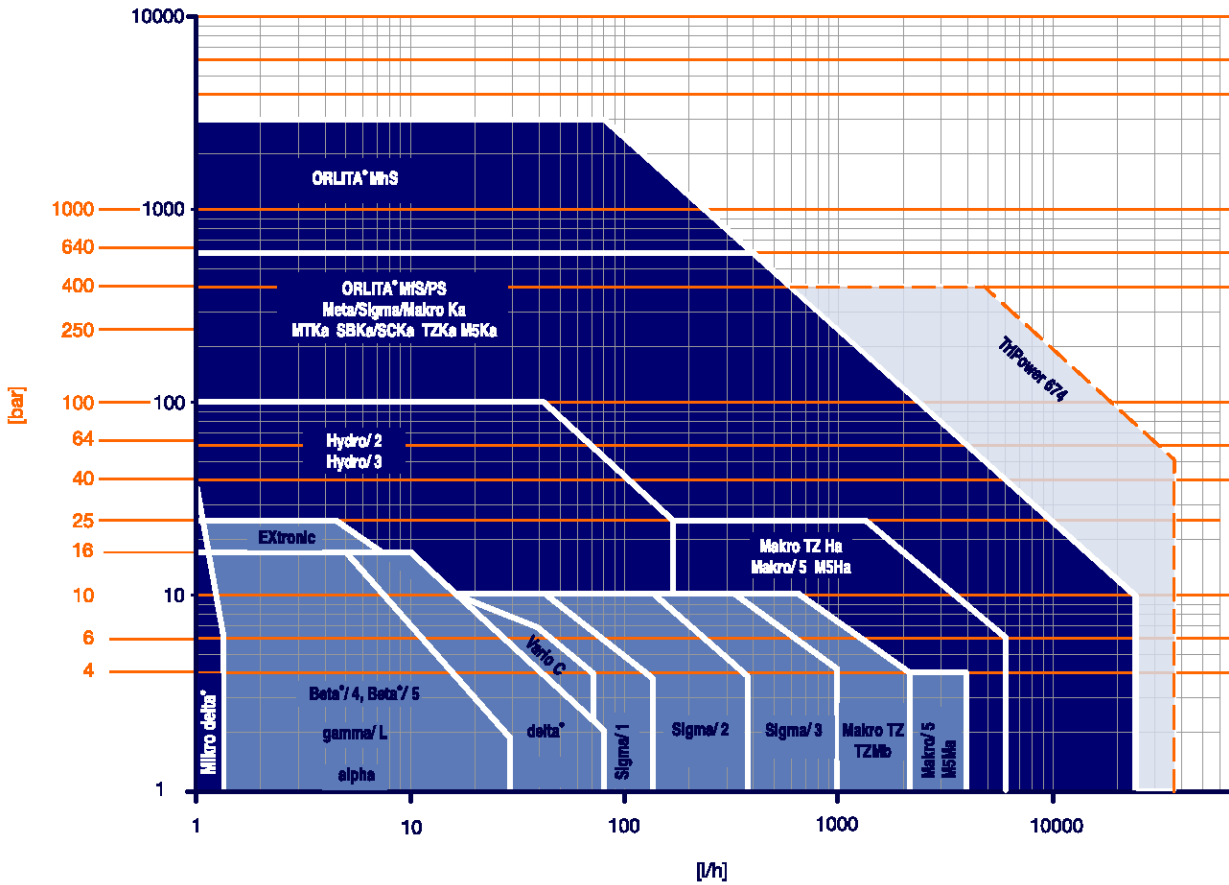
pH-correction or specialist detoxification ensures that wastewater can be safely disposed of via the public drainage system.

Capacity Data

Capacity Data Metering Pumps

The following summary of the capacity data for the comprehensive ProMinent® metering pump range facilitates pump selection based on a given back pressure (bar) and feed rate (l/h).

When selecting a pump type, please specify the co-ordinate of the back pressure (bar) and feed rate (l/h).



pk_0_001_4_4c

pressure [bar] over Feed quantity [l/h]

Data Required For Specification Of Dosing Pump And Accessories

Pump Specification Data

Min./max. required feed rate l/h _____
 Available power supply _____ V, _____ Hz
 Min./max. operating temperature °C _____
 Properties of process chemical _____
 Name, concentration % _____
 Solids content % _____
 Dynamic viscosity mPa (= cP) _____
 Vapour pressure at operating temperature bar _____
 Remarks, e.g. abrasive, _____
 gaseous, flammable, _____
 corrosive towards _____

Suction conditions:

Min./max. suction lift m _____
 Min./max. positive suction head m _____
 Pressure in chemical tank bar _____
 Suction line length m _____
 Suction line diameter mm _____

Discharge conditions:

Min./max. back pressure bar _____
 Min./max. discharge head m _____
 Min./max. negative discharge head m _____
 Discharge line length m _____
 Discharge line diameter mm _____
 Number of valves and fittings in suction and discharge line _____

Data required for proportional dosing:

Water flow Q min./max. m³/h _____
 Required final concentration g/m³, ppm _____

Example:

A required dose in mg/l = g/m³ = ppm

(Water flow Q max. 50 m³/h)

Pulse spacing (flow volume per pulse) of water meter 5 l.

Process fluid = sodium hypochlorite solution Na OCl with 12 % chlorine (by weight) = 120 g/kg = 150 g/l = 150 mg/ml

Selected dosing pump GALa 1005 NPB2 with 0.41 ml/per stroke volume, at max. 10800 strokes/h.

Variables: pump type, pulse spacing and concentration. The stroke rate (max. throughput l/h: pulse spacing l/pulse = 50,000 l/h : 5 l/pulse = 10000 pulses/h) must not exceed the max. stroke frequency (10800 strokes/h) of the dosing pump.

$$\text{Feed quantity} = \frac{\text{water throughput Q max. (l/h)} \times \text{stroke volume (l)}}{\text{pulse spacing (l)}} = \frac{50,000 \text{ l} \times 0.00041 \text{ l}}{\text{h} \times 5 \text{ l}} = 4.1 \text{ l/h}$$

$$\begin{aligned} \text{Final dose} &= \frac{\text{concentration (mg/ml)} \times \text{stroke volume (l)}}{\text{pulse spacing (l)}} = \frac{150 \text{ mg} \times 0.41 \text{ ml}}{\text{ml} \times 5 \text{ l}} = 12.3 \text{ mg/l} \\ &= 12.3 \text{ g/m}^3 \\ &= 12.3 \text{ ppm chlorine Cl}_2 \end{aligned}$$

ProMinent® Chemical Resistance List

Resistance of Materials Used in Liquid Ends to the Chemicals Most Frequently Used

The data apply to standard conditions (20 °C, 1,013 mbar).

s	= saturated solution in water
+	= resistant
+/o	= largely resistant
o	= conditionally resistant
-	= not resistant
n	= resistance not known
=>	= see
*	= For bonded connections, the resistance of the adhesive (e.g. Tangit) is to be considered. (Materials of the types 'o' and 'L' are not recommended !)
**	= does not apply to glass fibre reinforced material

Concentration data are stated in weight percent, referred to aqueous solutions. If percentages are stated for the level of resistance, this level of resistance is only valid up to this concentration.

NOTE:

The elastomers **CSM (Hypalon®)** and **IIR (butyl rubber)** used as diaphragm materials in pulsation dampers have properties similar to **EPDM**.

PTFE is resistant to all chemicals in this list.

PTFE filled with carbon, however, is attacked by strong oxidants such as bromine (anhydrous) or concentrated acids (phosphoric acid, sulphuric acid, chromic acid).

The resistance of PVC-U adhesive joints with Tangit deviates from the list below with regard to the following chemicals:

Medium	Concentration range
Sulfochromic acid	≥ 70 % H ₂ SO ₄ + 5 % K ₂ Cr ₂ O ₇ /Na ₂ Cr ₂ O ₇
Chromic acid	≥ 10 % CrO ₃
Hydrochloric acid	≥ 25 % HCl
Hydrogen peroxide	≥ 5 % H ₂ O ₂
Hydrofluoric acid	≥ 0 % HF

Explanation of abbreviations used as column headings:

Acrylic:	Acrylic resistance
PVC:	PVC, rigid, (PVC-U) resistance
PP:	Polypropylene resistance
PVDF:	PVDF resistance
1.4404:	Stainless steel 1.4404 & 1.4571 resistance
FPM:	Fluorine Rubber (e.g. Viton® A & B) resistance
EPDM:	Ethylene-Propylene-Dien-rubber resistance
Tygon:	Tygon® R-3603 resistance
Pharmed:	Pharmed® resistance
PE:	Polyethylene resistance
2.4819:	Hastelloy C-276 resistance
WGK:	Wassergefährdungsklasse

Viton® is a registered trademark of DuPont Dow Elastomers

Water pollution classes (WPC):

1	= slightly hazardous to water
2	= hazardous to water
3	= severely hazardous to water
(X)	= No classification. Classification according to conclusion by analogy. To be used under reserve.

Safety data sheets

We anticipate providing you with safety data sheets on our products in a number of different languages from the second quarter of 2010.

www.prominent.com/MSDS

NEW

ProMinent® Chemical Resistance List

The data has been taken from relevant manufacturer's documentation and our own tests. Resistance of materials is also dependant on other factors, e.g. operating conditions, conditions of surfaces etc., and so this list must be treated as an initial guide only. It cannot claim to offer any guarantees. It should be taken into consideration in particular that usual dosing media are compounds for the most part, and their corrosiveness cannot be deducted simply by adding the corrosiveness of each single component. In such cases the chemical producers' data of the material compatibility are to be considered as a matter of prime importance for the material choice. A safety data sheet does not give these data and therefore cannot take the place of the technical documentation on the application.

Chemical	Formula	Conc	Acryl	PVC	PP	PVDF	1.4404	FPM	EPDM	Tygon	Pharmed	PE	HastelloyC	WPC
Acetaldehyde	CH ₃ CHO	100%	-	-	o	-	+	-	+/-	-	-	+	+	2
Acetamide	CH ₃ CONH ₂	s	+	+	+	+	+	o	+	-	+/-	+	+	1
Acetic Acid	CH ₃ COOH	100%	-	50%	+	+	+	-	o	60%	60%	70%	+	1
Acetic Anhydride	(CH ₃ CO) ₂ O	100%	-	-	o	-	+	-	+/-	-	+	o	+	1
Acetic Ether => Ethyl Acetate														
Acetone	CH ₃ COCH ₃	100%	-	-	+	-	+	-	+	-	-	+	+	1
Acetophenone	C ₆ H ₅ COCH ₃	100%	-	n	+	-	+	-	+	n	n	+	+	1
Acetyl Chloride	CH ₃ COCl	100%	-	+	n	-	o	+	-	-	o	n	+	1
Acetylacetone	CH ₃ COCH ₂ COCH ₃	100%	-	-	+	-	+	-	+	n	n	+	+	1
Acetylene Dichloride => Dichloro Ethylene														
Acetylene Tetrachloride => Tetrachloro Ethane														
Acrylonitril	CH ₂ =CH-CN	100%	-	-	+	+	+	-	-	-	-	+	+	3
Adipic Acid	HOOC(CH ₂) ₄ COOH	s	+	+	+	+	+	+	+	-	+/-	+	+	1
Allyl Alcohol	CH ₂ CHCH ₂ OH	96%	-	o	+	+	+	-	+	-	o	+	+/-	2
Aluminium Acetate	Al(CH ₃ COO) ₃	s	+	+	+	+	+	+	+	+	+	+	+/-	1
Aluminium Bromide	AlBr ₃	s	+	+	+	+	n	+	+	+	+	+	+	2
Aluminium Chloride	AlCl ₃	s	+	+	+	+	-	+	+	+	+	+	+	1
Aluminium Fluoride	AlF ₃	10%	+	+	+	+	-	+	+	+	+	+	+/-	1
Aluminium Hydroxide	Al(OH) ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Aluminium Nitrate	Al(NO ₃) ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Aluminium Phosphate	AlPO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Aluminium Sulphate	Al ₂ (SO ₄) ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Ammonium Acetate	CH ₃ COONH ₄	s	+	+/-	+	+	+	+	+	+	+	+	+	1
Ammonium Bicarbonate	NH ₄ HCO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Ammonium Carbonate	(NH ₄) ₂ CO ₃	40%	+	+	+	+	+	+	+	+	+	+	+	1
Ammonium Chloride	NH ₄ Cl	s	+	+	+	+	-	+	+	+	+	+	+/-	1
Ammonium Fluoride	NH ₄ F	s	+	o	+	+	o	+	+	+	+	+	+	1
Ammonium Hydroxide	"NH ₄ OH"	s	+	+	+	o	+	-	+	+	+	+	+	2
Ammonium Nitrate	NH ₄ NO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Ammonium Oxalate	(COONH ₄) ₂ * H ₂ O	s	+	+	+	+	+	+	+	+	+	+	+	1
Ammonium Perchlorate	NH ₄ ClO ₄	10%	+	+	+	+	+	+	+	+	+	+	+	1
Ammonium Peroxodisulphate	(NH ₄) ₂ S ₂ O ₈	s	+	+	+	+	5%	+	+	+	+	+	5%	2
Ammonium Phosphate	(NH ₄) ₃ PO ₄	s	+	+	+	+	10%	+	+	+	+	+	10%	1
Ammonium Sulphate	(NH ₄) ₂ SO ₄	s	+	+	+	+	10%	+	+	+	+	+	10%	1
Ammonium Sulphide	(NH ₄) ₂ S	s	+	+	+	+	n	+	+	n	n	+	n	2
Ammoniumaluminium Sulphate	NH ₄ Al(SO ₄) ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Amyl Alcohol	C ₅ H ₁₁ OH	100%	+	+	+	+	+	-	+	-	-	+	+	1
Aniline	C ₆ H ₅ NH ₂	100%	-	-	+	+	+	-	+/-	-	o	+	+	2
Aniline Hydrochloride	C ₆ H ₅ NH ₂ * HCl	s	n	+	+	+	-	+/-	+/-	-	o	+	+	2
Antimony Trichloride	SbCl ₃	s	+	+	+	+	-	+	+	+	+	+	n	2
Aqua Regia	3 HCl + HNO ₃	100%	-	+	-	+	-	-	o	-	-	-	-	2
Arsenic Acid	H ₃ AsO ₄	s	+	+	+	+	+	+	+	20%	o	+	+	3
Barium Carbonate	BaCO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Barium Chloride	BaCl ₂	s	+	+	+	+	-	+	+	+	+	+	+	1
Barium Hydroxide	Ba(OH) ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Barium Nitrate	Ba(NO ₃) ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Barium Sulphate	BaSO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Barium Sulphide	BaS	s	+	+	+	+	+	+	+	+	+	+	+	(1)
Benzaldehyde	C ₆ H ₅ CHO	100%	-	-	+	-	+	+	+	-	-	o	+	1
Benzene	C ₆ H ₆	100%	-	-	o	+	+	o	-	-	-	o	+	3
Benzene Sulphonic Acid	C ₆ H ₅ SO ₃ H	10%	n	n	+	+	+	+	-	-	-	n	+	2
Benzoic Acid	C ₆ H ₅ COOH	s	+	+	+	+	+	+	+	-	+/-	+	+	1
Benzoyl Chloride	C ₆ H ₅ COCl	100%	-	n	o	n	o	+	+	n	n	o	+	2
Benzyl Alcohol	C ₆ H ₅ CH ₂ OH	100%	-	-	+	+	+	+	-	-	+	+	+	1
Benzyl Benzoate	C ₆ H ₅ COOC ₇ H ₇	100%	-	-	+	o	+	+	-	-	-	+	+	2
Benzyl Chloride	C ₆ H ₅ CH ₂ Cl	90%	-	n	o	+	+	+	-	-	-	o	+	2
Bitter Salt => Magnesium Sulphate														
Bleach => Sodium Hypochlorite														
Blue Vitriol => Copper Sulphate														
Borax => Sodium Tetraborate														

ProMinent® Chemical Resistance List

Chemical	Formula	Conc	Acryl	PVC	PP	PVDF	1.4404	FPM	EPDM	Tygon	Pharmed	PE	HastelloyC	WPC
Boric Acid	H ₃ BO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Brine		s	+	+/o	+	+	+/o	+	+	+	+	+	+	1
Bromine (dry)	Br ₂	100%	-	-	-	+	-	-	-	-	-	-	+	2
Bromine Water	Br ₂ + H ₂ O	s	-	+	-	+	-	-	-	n	n	-	n	(2)
Bromo Benzene	C ₆ H ₅ Br	100%	n	n	o	+	+	o	-	-	-	o	+	2
Bromochloro Methane	CH ₂ BrCl	100%	-	-	-	+	+	n	+/o	-	-	o	+	2
Bromochlorotrifluoro Ethane	HCClBrCF ₃	100%	-	-	o	+	+	+	-	+	+	o	+	(3)
Butanediol	HOC ₄ H ₈ OH	10%	n	+	+	+	+	o	+	+	+	+	+	1
Butanetriol	C ₄ H ₁₀ O ₃	s	+	+	+	+	+	o	+	+	+	+	+	1
Butanol	C ₄ H ₉ OH	100%	-	+	+	+	+	o	+/o	-	-	+	+	1
Butyl Acetate	C ₇ H ₁₃ O ₂	100%	-	-	+	+	+	-	-	-	+/o	+	+	1
Butyl Acetate	CH ₃ COOC ₄ H ₉	100%	-	-	o	+	+	-	+/o	-	+/o	-	+	1
Butyl Alcohol => Butanol														
Butyl Amine	C ₄ H ₉ NH ₂	100%	n	n	n	-	+	-	-	n	n	+	+	1
Butyl Benzoate	C ₆ H ₅ COOC ₄ H ₉	100%	-	-	o	n	+	+	+	-	-	o	+	2
Butyl Mercaptane	C ₄ H ₉ SH	100%	n	n	n	+	n	+	-	n	n	n	n	3
Butyl Oleate	C ₂₂ H ₄₂ O ₂	100%	n	n	n	+	+	+	+/o	n	n	n	+	1
Butyl Stearate	C ₂₂ H ₄₄ O ₂	100%	o	n	n	+	+	+	-	n	n	n	+	1
Butyraldehyde	C ₃ H ₇ CHO	100%	-	n	+	n	+	-	+/o	-	-	+	+	1
Butyric Acid	C ₃ H ₇ COOH	100%	5%	20%	+	+	+	+	+	-	+/o	+	+	1
Calcium Acetate	(CH ₃ COO) ₂ Ca	s	+	+	+	+	+	+	+	+	+	+	+	1
Calcium Bisulphite	Ca(HSO ₃) ₂	s	+	+	+	+	+	+	+	+	+	+	+	(1)
Calcium Carbonate	CaCO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Calcium Chloride	CaCl ₂	s	+	+	+	+	-	+	+	+	+	+	+	1
Calcium Cyanide	Ca(CN) ₂	s	+	+	+	+	n	+	+	+	+	+	n	3
Calcium Hydroxide	Ca(OH) ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Calcium Hypochlorite	Ca(OCl) ₂	s	+	+	o	+	-	o	+	+	+	+	+	2
Calcium Nitrate	Ca(NO ₃) ₂	s	+	50%	50%	+	+	+	+	+	+	+	+	1
Calcium Phosphate	Ca ₃ (PO ₄) ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Calcium Sulphate	CaSO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Calcium Sulphide	CaS	s	+	+	+	+	n	+	+	+	+	+	+	(2)
Calcium Sulphite	CaSO ₃	s	+	+	+	+	+	+	+	+	+	+	+	(1)
Calcium Thiosulphate	CaS ₂ O ₃	s	+	+	+	+	-	+	+	+	+	+	+	1
Carbolic Acid => Phenole														
Carbon Disulphide	CS ₂	100%	-	-	o	+	+	+	-	-	-	o	+	2
Carbon Tetrachloride	CCl ₄	100%	-	-	-	+	+	+	-	-	-	o	+	3
Carbonic Acid	"H ₂ CO ₃ "	s	+	+	+	+	+	+	+	+	+	+	+	1
Caustic Potash => Potassium Hydroxide														
Caustic Soda => Sodium Hydroxide														
Chloric Acid	HClO ₃	20%	+	+	-	+	-	o	o	+	+	10%	+	2
Chlorinated Lime => Calcium Hypochlorite														
Chlorine Dioxide Solution	ClO ₂ + H ₂ O	0.5%	o	+	o	+	-	o	-	o	-	o	+	
Chlorine Water	Cl ₂ + H ₂ O	s	o	+	o	+	-	+	+	o	-	o	+	
Chloro Benzene	C ₆ H ₅ Cl	100%	-	-	+	+	+	+	-	-	-	o	+	2
Chloro Ethanol	ClCH ₂ CH ₂ OH	100%	-	-	+	o	+	-	o	-	+	+	+	3
Chloro Ethylbenzene	C ₆ H ₄ ClC ₂ H ₅	100%	-	-	o	n	+	o	-	-	-	o	+	(2)
Chloro Phenole	C ₆ H ₄ OHCl	100%	-	n	+	+	+	n	-	-	-	+	+	2
Chloro Toluene	C ₇ H ₈ Cl	100%	-	-	n	+	+	+	-	-	-	n	+	2
Chloroacetone	ClCH ₂ COCH ₃	100%	-	-	n	n	+	-	+	-	-	n	+	3
Chlorobutadiene	C ₄ H ₅ Cl	100%	-	-	n	n	+	+	-	-	-	n	+	1
Chloroform	CHCl ₃	100%	-	-	o	+	+	+	-	-	o	-	+	2
Chlorohydrin	C ₃ H ₅ OCl	100%	-	n	+	-	+	+	o	-	+	+	+	3
Chloroprene => Chlorobutadiene														
Chlorosulphonic Acid	SO ₂ (OH)Cl	100%	-	o	-	+	-	-	-	-	-	-	o	1
Chrome-alum => Potassium Chrome Sulphate														
Chromic Acid	H ₂ CrO ₄	50%	-	+	o	+	10%	+	-	o	o	+	10%	3
Chromic-Sulphuric Acid	K ₂ CrO ₄ + H ₂ SO ₄	s	-	+	-	+	n	n	n	-	-	-	n	3
Chromium Sulphate	Cr ₂ (SO ₄) ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Citric Acid	C ₆ H ₈ O ₇	s	+	+	+	+	+	+	+	+	+	+	+	1
Cobalt Chloride	CoCl ₂	s	+	+	+	+	-	+	+	+	+	+	+	2
Copper-II-Acetate	Cu(CH ₃ COO) ₂	s	+	+	+	+	+	+	+	+	+	+	+	3
Copper-II-Arsenite	Cu ₃ (AsO ₃) ₂	s	+	+	+	+	+	+	+	+	+	+	+	3
Copper-II-Carbonate	CuCO ₃	s	+	+	+	+	+	+	+	+	+	+	+	2
Copper-II-Chloride	CuCl ₂	s	+	+	+	+	1%	+	+	+	+	+	+	2
Copper-II-Cyanide	Cu(CN) ₂	s	+	+	+	+	+	+	+	+	+	+	+	(3)
Copper-II-Fluoride	CuF ₂	s	+	+	+	+	+	+	+	+	+	+	+	(2)
Copper-II-Nitrate	Cu(NO ₃) ₂	s	+	+	+	+	+	+	+	+	+	+	+/o	2
Copper-II-Sulphate	CuSO ₄	s	+	+	+	+	+	+	+	+	+	+	+	2
Cresols	C ₆ H ₄ CH ₃ OH	100%	o	o	+	+	+	+	-	-	-	+	+	2

ProMinent® Chemical Resistance List

Chemical	Formula	Conc	Acryl	PVC	PP	PVDF	1.4404	FPM	EPDM	Tygon	Pharmed	PE	HastelloyC	WPC
Crotonaldehyde	CH ₃ C ₂ H ₂ CHO	100%	n	-	+	+	+	-	+	-	-	+	+	3
Cubic Nitre => Sodium Nitrate														
Cumene => Isopropyl Benzene														
Cyclo Hexane	C ₆ H ₁₂	100%	+	-	+	+	+	+	-	-	-	+	o	1
Cyclohexanole	C ₆ H ₁₁ OH	100%	o	+/o	+	+	+	+	-	-	-	+	+	1
Cyclohexanone	C ₆ H ₁₀ O	100%	-	-	+	-	+	-	+/o	-	-	+	+	1
Cyclohexyl Alcohol => Cyclohexanol														
Cyclohexylamine	C ₆ H ₁₁ NH ₂	100%	n	n	n	n	+	-	n	n	n	n	+	2
Decahydronaphthaline	C ₁₀ H ₁₈	100%	-	+/o	o	+	n	o	-	-	-	o	+	2
Decaline => Decahydronaphthalene														
Dextrose => Glucose														
Di-iso-nonyl Phthalate	C ₂₆ H ₄₂ O ₄	100%	-	-	+	+	+	n	n	o	+	+	+	1
Diacetonolcohol	C ₆ H ₁₂ O ₂	100%	-	-	+	o	+	-	+	-	-	+	+	1
Dibromoethane	C ₂ H ₄ Br ₂	100%	-	-	n	+	+	+	-	-	-	-	+	3
Dibutyl Ether	C ₄ H ₉ OC ₄ H ₉	100%	-	-	+	+	+	-	o	-	-	+	+	2
Dibutyl Phthalate	C ₁₆ H ₂₂ O ₄	100%	-	-	+	+	+	+	+/o	o	+	o	+	2
Dibutylamine	(C ₄ H ₉) ₂ NH	100%	n	n	+	+	+	-	-	n	n	+	+	1
Dichloro Acetic Acid	Cl ₂ CHCOOH	100%	-	+	+	+	+	-	+	-	o	+	+	1
Dichloro Benzene	C ₆ H ₄ Cl ₂	100%	-	-	o	+	+	+	-	-	-	o	+	2
Dichloro Butan	C ₄ H ₈ Cl ₂	100%	-	-	o	+	+	+	-	-	-	o	+	3
Dichloro Butene	C ₄ H ₆ Cl ₂	100%	-	-	o	+	+	o	-	-	-	o	+	3
Dichloro Ethane	C ₂ H ₄ Cl ₂	100%	-	-	o	+	+	+	-	-	o	-	+	3
Dichloro Ethylene	C ₂ H ₂ Cl ₂	100%	-	-	o	+	+	o	-	-	o	-	+	2
Dichloro Methane	CH ₂ Cl ₂	100%	-	-	o	o	o	+	-	-	o	-	+	2
Dichloroisopropyl Ether	(C ₃ H ₆ Cl) ₂ O	100%	-	-	o	n	+	o	o	-	-	o	+	(2)
Dicyclohexylamine	(C ₆ H ₁₂) ₂ NH	100%	-	-	o	n	+	-	-	-	-	o	+	2
Diethyleneglycol	C ₄ H ₁₀ O ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Diethyleneglycolethyl Ether	C ₈ H ₁₈ O ₃	100%	n	n	+	+	+	n	+/o	-	o	+	+	1
Diethylether	C ₂ H ₅ OC ₂ H ₅	100%	-	-	o	+	+	+	-	-	o	o	+	1
Diglycolic Acid	C ₄ H ₆ O ₅	30%	+	+	+	+	+	+	n	+	+/o	+	+	3
Dihexyl Phthalate	C ₂₀ H ₂₆ O ₄	100%	-	-	+	+	+	-	n	o	+	+	+	(1)
Diisobutylketone	C ₉ H ₁₈ O	100%	-	-	+	+	+	-	+	-	-	+	+	1
Diisopropylketone	C ₇ H ₁₄ O	100%	-	-	+	+	+	-	+	-	-	+	+	1
Dimethyl Carbonate	(CH ₃ O) ₂ CO	100%	n	n	+	+	+	+	-	n	n	+	+	1
Dimethyl Ketone => Acetone														
Dimethyl Phthalate	C ₁₀ H ₁₀ O ₄	100%	-	-	+	+	+	-	+/o	o	+	+	+	1
Dimethylformamide	HCON(CH ₃) ₂	100%	-	-	+	-	+	-	+	-	+/o	+	+	1
Dimethylhydrazine	H ₂ NN(CH ₃) ₂	100%	n	n	+	n	+	-	+	n	n	+	+	3
Diocetyl Phthalate	C ₄ H ₄ (COOC ₈ H ₁₇) ₂	100%	-	-	+	+	+	-	+/o	o	+	+	+	1
Dioxane	C ₄ H ₈ O ₂	100%	-	-	o	-	+	-	+/o	-	-	+	+	1
Disodium Hydrogenphosphate	Na ₂ HPO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Disulfur Acid -- Oleum														
Disulphur Dichloride	S ₂ Cl ₂	100%	n	n	n	+	n	+	-	-	-	n	n	
DMF => Dimethylformamide														
Engine Oils		100 %	n	+/o	+	+	+	+	-	-	-	+	+	2
Epsom salts => Magnesium Sulphate														
Ethanol	C ₂ H ₅ OH	100%	-	+	+	+	+	-	+	-	+	+	+	1
Ethanol Amine	HOCH ₂ H ₄ NH ₂	100%	o	n	+	-	+	-	+/o	-	o	+	+	1
Ethyl Acetate	CH ₃ COOC ₂ H ₅	100%	-	-	35%	+	+	-	+/o	-	+/o	+	+	1
Ethyl Acrylate	C ₂ H ₃ COOC ₂ H ₅	100%	-	-	+	o	+	-	+/o	-	-	+	+	2
Ethyl Benzene	C ₆ H ₅ -C ₂ H ₅	100%	-	-	o	+	+	o	-	-	-	o	+	1
Ethyl Benzoate	C ₆ H ₅ COOC ₂ H ₅	100%	n	-	+	o	+	+	-	-	-	+	+	1
Ethyl Bromide	C ₂ H ₅ Br	100%	-	n	+	+	n	+	-	-	o	+	+	2
Ethyl Chloroacetate	ClCH ₂ COOC ₂ H ₅	100%	-	o	+	+	+	+	-	-	-	+	+	2
Ethyl Chlorocarbonate	ClCO ₂ C ₂ H ₅	100%	n	n	n	n	n	+	-	n	n	n	n	(2)
Ethyl Cyclopentane	C ₅ H ₄ C ₂ H ₅	100%	+	+	+	+	+	+	-	-	-	+	+	(1)
Ethylacetoacetate	C ₆ H ₁₀ O ₃	100%	n	-	+	+	+	-	+/o	-	+/o	+	+	1
Ethylacrylic Acid	C ₄ H ₇ COOH	100%	n	n	+	+	+	n	+/o	n	n	+	+	(1)
Ethylene Diamine	(CH ₂ NH ₂) ₂	100%	o	o	+	-	o	-	+	n	n	+	o	2
Ethylene Dibromide => Dibromoethane														
Ethylene Dichloride => Dichloro Ethane														
Ethylene Glycol => Glycol														
Ethylenglycol Ethylether	HOCH ₂ H ₄ OC ₂ H ₅	100%	n	n	+	+	+	n	+/o	-	o	+	+	1
Ethylhexanol	C ₈ H ₁₆ O	100%	n	+/o	+	+	+	+	+	-	-	+	+	2
Fatty Acids	R-COOH	100%	+	+	+	+	+	+	o	-	o	+	+	1
Ferric Chloride	FeCl ₃	s	+	+	+	+	-	+	+	+	+	+	+/o	1
Ferric Nitrate	Fe(NO ₃) ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Ferric Phosphate	FePO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Ferric Sulphate	Fe ₂ (SO ₄) ₃	s	+	+	+	+	o	+	+	+	+	+	+	1

ProMinent® Chemical Resistance List

Chemical	Formula	Conc	Acryl	PVC	PP	PVDF	1.4404	FPM	EPDM	Tygon	Pharmed	PE	HastelloyC	WPC
Ferrous Chloride	FeCl ₂	s	+	+	+	+	-	+	+	+	+	+	+/o	1
Ferrous Sulphate	FeSO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Fixing Salt => Sodium Thiosulphate														
Fluoro Benzene	C ₆ H ₅ F	100%	-	-	+	+	+	o	-	-	-	o	+	2
Fluoroboric Acid	HF	35%	+	+	+	+	o	+	+	+	-	+	+	1
Fluorosilicic Acid	H ₂ SiF ₆	100%	+	30%	30%	+	+	+	+	25%	o	40%	+/o	2
Formaldehyde	CH ₂ O	40%	+	+	+	+	+	-	+/o	-	-	+	+	2
Formalin => Formaldehyde														
Formamide	HCONH ₂	100%	+	-	+	+	+	+	+	n	n	+	+	1
Formic Acid	HCOOH	s	-	+/o	+	+	+	-	-	+/o	+/o	+	+	1
Furane	C ₄ H ₄ O	100%	-	-	+	-	+	-	n	-	-	+	+	3
Furane Aldehyde	C ₅ H ₅ O ₂	100%	n	n	n	o	+	-	+/o	-	-	n	n	2
Furfuryl Alcohol	OC ₄ H ₃ CH ₂ OH	100%	-	-	+	o	+	n	+/o	-	-	+	+	1
Gallic Acid	C ₆ H ₂ (OH) ₃ COOH	5%	+	+	+	+	+	+	+/o	+	+	+	+	1
Gasoline		100%	-	-	+	+	+	+	-	-	-	+	+	2
Glauber's Salt => Sodium Sulphate														
Glucose	C ₆ H ₁₂ O ₆	s	+	+	+	+	+	+	+	+	+	+	+	1
Glycerol	C ₃ H ₅ (OH) ₃	100%	+	+	+	+	+	+	+	+	+	+	+	1
Glycerol Triacetate	C ₃ H ₅ (CH ₃ COO) ₃	100%	n	n	+	+	+	-	+	n	n	+	+	1
Glycine	NH ₂ CH ₂ COOH	10%	+	+	+	+	+	+	+	+	+	+	+	1
Glycol	C ₂ H ₄ (OH) ₂	100%	+	+	+	+	+	+	+	+	+	+	+	1
Glycolic Acid	CH ₂ OHCOOH	70%	+	37%	+	+	+	+	+	+	+/o	+	+	1
Gypsum => Calcium Sulphate														
Heptane	C ₇ H ₁₆	100%	+	+	+	+	+	+	-	-	-	+	+	1
Hexachloroplatinic Acid	H ₂ PtCl ₆	s	n	+	+	+	-	n	+	n	n	+	-	
Hexanal	C ₆ H ₁₁ CHO	100%	n	n	+	+	+	-	+/o	-	-	+	+	1
Hexane	C ₆ H ₁₄	100%	+	+	+	+	+	+	-	-	-	+	+	1
Hexanol	C ₆ H ₁₃ OH	100%	-	-	+	+	+	n	+	-	o	+	+	1
Hexantriol	C ₆ H ₉ (OH) ₃	100%	n	n	+	+	+	+	+	n	n	+	+	1
Hexene	C ₆ H ₁₂	100%	n	+	+	+	+	+	-	-	-	+	+	1
Hydrazine Hydrate	N ₂ H ₄ * H ₂ O	s	+	+	+	+	+	n	+	-	o	+	+	3
Hydrobromic Acid	HBr	50%	+	+	+	+	-	-	+	+	-	+	o	1
Hydrochloric Acid	HCl	38%	32%	+	+	+	-	+	o	+	+	+	o	1
Hydrofluoric Acid	HF	80%	-	40%*	40%**	+	-	+	o	40%	-	40%	+/o	1
Hydrogen Cyanide	HCN	s	+	+	+	+	+	+	+	+	+	+	+	3
Hydrogen Peroxide	H ₂ O ₂	90%	40%	40%*	30%	+	+	30%	30%	30%	+	+	+	1
Hydroiodic Acid	HI	s	+	+	+	+	-	-	n	+	-	+	n	1
Hydroquinone	C ₆ H ₄ (OH) ₂	s	o	+	+	+	+	+	-	+	+/o	+	+	2
Hydroxylamine Sulphate	(NH ₂ OH) ₂ * H ₂ SO ₄	10%	+	+	+	+	+	+	+	+	+	+	+	2
Hypochlorous Acid	HOCl	s	+	+	o	+	-	+	+/o	+	+	o	+	(1)
Iodine	I ₂	s	o	-	+	+	-	+	+/o	+	+	o	+/o	
Iron Vitriol => Ferrous Sulphate														
Isobutanol => Isobutyl Alcohol														
Isobutyl Alcohol	C ₂ H ₅ CH(OH)CH ₃	100%	-	+	+	+	+	+	+	-	o	+	+	1
Isopropanol => Isopropyl Alcohol														
Isopropyl Acetate	CH ₃ COOCH(CH ₃) ₂	100%	-	-	+	+	+	-	+/o	-	+/o	+	+	1
Isopropyl Alcohol	(CH ₃) ₂ CHOH	100%	-	+/o	+	+	+	+	+	-	o	+	+	1
Isopropyl Benzene	C ₆ H ₅ CH(CH ₃) ₂	100%	-	-	o	+	+	+	-	-	-	o	+	1
Isopropyl Chloride	CH ₃ CHClCH ₃	80%	-	-	o	+	+	+	-	-	o	o	+/o	2
Isopropyl Ether	C ₆ H ₁₄ O	100%	-	-	o	+	+	-	-	-	o	o	+	1
Kitchen Salt => Sodium Chloride														
Lactic Acid	C ₃ H ₆ O ₃	100%	-	+	+	+	+/o	+	10%	-	+/o	+	+	1
Lead Acetate	Pb(CH ₃ COO) ₂	s	+	+	+	+	+	+	+	+	+	+	+	2
Lead Nitrate	Pb(NO ₃) ₂	50%	+	+	+	+	+	+	+	+	+	+	+	2
Lead Sugar => Lead Acetate														
Lead Sulphate	PbSO ₄	s	+	+	+	+	+	+	+	+	+	+	+	(2)
Lead Tetraethyl	Pb(C ₂ H ₅) ₄	100%	+	+	+	+	+	+	-	n	n	+	+	3
Lime Milk => Calcium Hydroxide														
Liquid Ammonia => Ammonium Hydroxide														
Lithium Bromide	LiBr	s	+	+	+	+	+	+	+	+	+	+	+	1
Lithium Chloride	LiCl	s	+	+	+	+	-	+	+	+	+	+	n	1
Lunar Caustic => Silver Nitrate														
Magnesium Carbonate	MgCO ₃	s	+	+	+	+	+	+	+	+	+	+	+/o	1
Magnesium Chloride	MgCl ₂	s	+	+	+	+	o	+	+	+	+	+	+	1
Magnesium Hydroxide	Mg(OH) ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Magnesium Nitrate	Mg(NO ₃) ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Magnesium Sulphate	MgSO ₄	s	+	+	+	+	+	+	+	+	+	+	+/o	1
Maleic Acid	C ₄ H ₄ O ₄	s	+	+	+	+	+	+	+	-	o	+	+	1
Malic Acid	C ₄ H ₆ O ₅	s	+	+	+	+	+	+	+	+	+	+	+	1

ProMinent® Chemical Resistance List

Chemical	Formula	Conc	Acryl	PVC	PP	PVDF	1.4404	FPM	EPDM	Tygon	Pharmed	PE	HastelloyC	WPC
Manganese-II-Chloride	MnCl ₂	s	+	+	+	+	-	+	+	+	+	+	+	1
Manganese-II-Sulphate	MnSO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
MEK => Methyl Ethyl Ketone														
Mercury	Hg	100%	+	+	+	+	+	+	+	+	+	+	+	3
Mercury-II-Chloride	HgCl ₂	s	+	+	+	+	-	+	+	+	+	+	+	3
Mercury-II-Cyanide	Hg(CN) ₂	s	+	+	+	+	+	+	+	+	+	+	+	3
Mercury-II-Nitrate	Hg(NO ₃) ₂	s	+	+	+	+	+	+	+	+	+	+	+	3
Mesityl Oxide	C ₆ H ₁₀ O	100%	-	-	n	n	+	-	+/o	-	-	n	+	1
Methacrylic Acid	C ₃ H ₅ COOH	100%	n	n	+	+	+	o	+/o	-	+/o	+	+	1
Methanol	CH ₃ OH	100%	-	-	+	+	+	o	+	-	+/o	+	+	1
Methoxybutanol	CH ₃ O(CH ₂) ₄ OH	100%	-	-	+	+	+	+	o	-	o	+	+	(1)
Methyl Acetate	CH ₃ COOCH ₃	60%	-	-	+	+	+	-	+/o	-	+/o	+	+	2
Methyl Acrylate	C ₂ H ₃ COOCH ₃	100%	-	-	+	+	+	-	+/o	-	o	+	+	2
Methyl Benzoate	C ₆ H ₅ COOCH ₃	100%	-	-	+	o	+	+	-	-	-	+	+	2
Methyl Catechol	C ₆ H ₃ (OH) ₂ CH ₃	s	+	+	+	+	+	+	-	+	+o	+	+	(1)
Methyl Cellulose		s	+	+	+	+	+	+	+	+	+	+	+	1
Methyl Chloroacetate	ClCH ₂ COOCH ₃	100%	-	o	+	+	+	o	-	-	-	+	+	2
Methyl Cyclopentane	C ₅ H ₉ CH ₃	100%	+	+	+	+	+	+	-	-	-	+	+	(1)
Methyl Dichloroacetate	Cl ₂ CHCOOCH ₃	100%	-	-	+	n	+	-	n	-	-	+	+	2
Methyl Ethyl Ketone	CH ₃ COC ₂ H ₅	100%	-	-	+	-	+	-	+	-	-	+	+	1
Methyl Glycol	C ₃ H ₈ O ₂	100%	+	+	+	+	+	-	+/o	+	+	+	+	1
Methyl Isobutyl Ketone	CH ₃ COC ₄ H ₉	100%	-	-	+	-	+	-	o	-	-	+	+	1
Methyl Isopropyl Ketone	CH ₃ COC ₃ H ₇	100%	-	-	+	-	+	-	+/o	-	-	+	+	1
Methyl Methacrylate	C ₃ H ₅ COOCH ₃	100%	-	-	+	+	+	-	-	-	-	+	+	1
Methyl Oleate	C ₁₇ H ₃₃ COOCH ₃	100%	n	n	+	+	+	+	+/o	n	n	+	+	1
Methyl Salicylate	HO-C ₆ H ₄ -COOCH ₃	100%	-	-	+	+	+	n	+/o	-	-	+	+	1
Methylacetyl Acetate	C ₅ H ₈ O ₃	100%	-	-	+	+	+	-	+/o	-	o	+	+	2
Methylamine	CH ₃ NH ₂	32%	+	o	+	o	+	+	+	+	+	+	+	2
Methylene Chloride => Dichloro Methane														
Mirabilit => Sodium Sulphate														
Morpholine	C ₄ H ₉ ON	100%	-	-	+	-	+	n	n	-	-	+	+	2
Muriatic Acid => Hydrochloric Acid														
Natron => Sodium Bicarbonate														
Nickel-II-Acetate	(CH ₃ COO) ₂ Ni	s	+	+	+	+	+	-	+	+	+	+	+	(2)
Nickel-II-Chloride	NiCl ₂	s	+	+	+	+	-	+	+	+	+	+	+	2
Nickel-II-Nitrate	Ni(NO ₃) ₂	s	+	+	+	+	+	+	+	+	+	+	+/o	2
Nickel-II-Sulphate	NiSO ₄	s	+	+	+	+	+	+	+	+	+	+	+/o	2
Nitrate of Lime => Calcium Nitrate														
Nitric Acid	HNO ₃	99%	10%	10%*	50%	65%	50%	65%	10%	35%	35%	50%	65%	1
Nitro Methane	CH ₃ NO ₂	100%	-	-	+	o	+	-	+/o	-	-	+	+	2
Nitro Propane	(CH ₃) ₂ CHNO ₂	100%	-	-	+	n	+	-	+/o	-	-	+	+	2
Nitro Toluene	C ₆ H ₄ NO ₂ CH ₃	100%	-	-	+	+	+	o	-	-	-	+	+	2
Octane	C ₈ H ₁₈	100%	o	+	+	+	+	+	-	-	-	+	+	1
Octanol	C ₈ H ₁₇ OH	100%	-	-	+	+	+	+	+	-	-	+	+	1
Octyl Cresol	C ₇ H ₂₄ O	100%	-	-	+	+	+	o	n	-	-	+	+	(1)
Oil => Engine Oils														
Oleum	H ₂ SO ₄ + SO ₃	s	n	-	-	-	+	+	-	+	+	-	+	2
Orthophosphoric Acid => Phosphoric Acid														
Oxalic Acid	(COOH) ₂	s	+	+	+	+	10%	+	+	+/o	+/o	+	+/o	1
Pentane	C ₅ H ₁₂	100%	+	+	+	+	+	+	-	-	-	+	+	1
Pentanol => Amyl Alcohol														
Perchloric Acid	HClO ₄	70%	n	10%	10%	+	-	+	+/o	o	+	+	n	1
Perchloroethylene => Tetrachloro Ethylene														
Perhydrol => Hydrogen Peroxide														
Petroleum Ether	C _n H _{2n+2}	100%	+	+/o	+	+	+	+	-	-	-	+	+	1
Phenole	C ₆ H ₅ OH	100%	-	-	+	+	+	+	-	10%	+	+	+	2
Phenyl Ethyl Ether	C ₆ H ₅ OC ₂ H ₅	100%	-	-	+	n	+	-	-	-	-	+	+	2
Phenyl Hydrazine	C ₆ H ₅ NHNH ₂	100%	-	-	o	+	+	o	-	-	-	o	+	2
Phosphoric Acid	H ₃ PO ₄	85%	50%	+	+	+	+	+	+	+	+	+	+	1
Phosphorous Oxychloride	POCl ₃	100%	-	-	+	+	n	+	+	n	n	+	+	1
Phosphorous Trichloride	PCl ₃	100%	-	-	+	+	+	o	+	+	+/o	+	+	1
Phthalic Acid	C ₆ H ₄ (COOH) ₂	s	+	+	+	+	+	+	+	-	+	+	+	1
Picric Acid	C ₆ H ₂ (NO ₃) ₃ OH	s	+	+	+	+	+	+	+	+	-	+	+	2
Piperidine	C ₅ H ₁₁ N	100%	-	-	n	n	+	-	-	-	-	n	+	2
Potash Alum => Potassium Aluminium Sulphate														
Potassium Acetate	CH ₃ COOH	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Aluminium Sulphate	KAl(SO ₄) ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Bicarbonate	KHCO ₃	40%	+	+	+	+	+	+	+	+	+	+	+/o	1
Potassium Bifluoride	KHF ₂	s	n	+	+	+	+	+	+	+	+	+	+	1

ProMinent® Chemical Resistance List

Chemical	Formula	Conc	Acryl	PVC	PP	PVDF	1.4404	FPM	EPDM	Tygon	Pharmed	PE	HastelloyC	WPC
Potassium Bisulphate	KHSO ₄	5%	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Bitartrate	KC ₄ H ₅ O ₆	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Borate	KBO ₂	s	+	+	+	+	+	+	+	+	+	+	+	(1)
Potassium Bromate	KBrO ₃	s	+	+	+	+	+	+	+	+	+	+	+	2
Potassium Bromide	KBr	s	+	+	+	+	10%	+	+	+	+	+	0,1	1
Potassium Carbonate	K ₂ CO ₃	s	+	+	+	+	+	+	+	55%	55%	+	+	1
Potassium Chlorate	KClO ₃	s	+	+	+	+	+	+	+	+	+	+	+	2
Potassium Chloride	KCl	s	+	+	+	+	-	+	+	+	+	+	+/o	1
Potassium Chromate	K ₂ CrO ₄	10%	+	+	+	+	+	+	+	+	+	+	+	3
Potassium Chrome Sulphate	KCr(SO ₄) ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Cyanate	KOCN	s	+	+	+	+	+	+	+	+	+	+	+	2
Potassium Cyanide	KCN	s	+	+	+	+	5%	+	+	+	+	+	5%	3
Potassium Cyanoferrate II	K ₄ Fe(CN) ₆	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Cyanoferrate III	K ₃ Fe(CN) ₆	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Dichromate	K ₂ Cr ₂ O ₇	s	+	+	+	+	25%	+	+	+	+	+	10%	3
Potassium Fluoride	KF	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Hydroxyde	KOH	50%	+	+	+	+	+(25 °C)	-	+	10%	10%	+	+	1
Potassium Iodide	KI	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Nitrate	KNO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Perchlorate	KClO ₄	s	+	+	+	+	n	+	+	+	+	+	+	1
Potassium Permanganate	KMnO ₄	s	+	+	+	+	+	+	+	6%	6%	+	+	2
Potassium Persulphate	K ₂ S ₂ O ₈	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Phosphate	KH ₂ PO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Pyrochromate => Potassium Dichromate														
Potassium Sulphate	K ₂ SO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Potassium Sulphite	K ₂ SO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Propionic Acid	C ₂ H ₅ COOH	100%	o	+	+	+	+	+	+	-	+/o	+	+	1
Propionitrile	CH ₃ CH ₂ CN	100%	n	n	+	+	+	+	-	-	-	+	+	2
Propyl Acetate	CH ₃ COOC ₃ H ₇	100%	-	-	+	+	+	-	+/o	-	-	+	+	1
Propylene Glycol	CH ₃ CHOHCH ₂ OH	100%	+	+	+	+	+	+	+	+	+	+	+	1
Prussic Acid => Hydrogen Cyanide														
Pyridine	C ₅ H ₅ N	100%	-	-	o	-	+	-	-	-	o	+	+	2
Pyroole	C ₄ H ₄ NH	100%	n	n	+	n	+	-	-	-	-	+	+	2
Roman Vitriol => Copper Sulphate														
Salicylic Acid	HOC ₆ H ₄ COOH	s	+	+	+	+	+	+	+	+	+	+	+/o	1
Salmiac => Ammonium Chloride														
Saltpeter => Potassium Nitrate														
Silic Acid	SiO ₂ * x H ₂ O	s	+	+	+	+	+	+	+	+	+	+	+	1
Silver Bromide	AgBr	s	+	+	+	+	+/o	+	+	+	+	+	+	1
Silver Chloride	AgCl	s	+	+	+	+	-	+	+	+	+	+	+/o	1
Silver Nitrate	AgNO ₃	s	+	+	+	+	+	+	+	+	+	+	+/o	3
Slaked Lime => Calcium Hydroxide														
Soda => Sodium Carbonate														
Sodium Acetate	NaCH ₃ COO	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Benzoate	C ₆ H ₅ COONa	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Bicarbonate	NaHCO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Bisulphate	NaHSO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Bisulphite	NaHSO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Borate	NaBO ₂	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Bromate	NaBrO ₃	s	+	+	+	+	+	+	+	+	+	+	+	3
Sodium Bromide	NaBr	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Carbonate	Na ₂ CO ₃	s	+	+	+	+	+/o	+	+	+	+	+	+	1
Sodium Chlorate	NaClO ₃	s	+	+	+	+	+	+	+	+	+	+	+	2
Sodium Chloride	NaCl	s	+	+	+	+	-	+	+	+	+	+	+	1
Sodium Chlorite	NaClO ₂	24%	+	+	+	+	10%	+	+	+	+	+	10%	2
Sodium Chromate	Na ₂ CrO ₄	s	+	+	+	+	+	+	+	+	+	+	+	3
Sodium Cyanide	NaCN	s	+	+	+	+	+	+	+	+	+	+	+	3
Sodium Dichromate	Na ₂ Cr ₂ O ₇	s	+	+	+	+	+	+	+	+	+	+	+	3
Sodium Dithionite	Na ₂ S ₂ O ₄	s	+	10%	10%	+	+	n	n	+	+	10%	+/o	1
Sodium Fluoride	NaF	s	+	+	+	+	10%	+	+	+	+	+	+	1
Sodium Hydrogen Sulphate => Sodium Bisulphate														
Sodium Hydroxide	NaOH	50%	+	+	+	+	+(60%/ 25 °C)	-	+	10%	30%	+	+	1
Sodium Hypochlorite	NaOCl + NaCl	12%	+	+	o	+	-	+	+	+	+	o	> 10%	2
Sodium Iodide	NaI	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Metaphosphate	(NaPO ₃) _n	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Nitrate	NaNO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Nitrite	NaNO ₂	s	+	+	+	+	+	+	+	+	+	+	+	2

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Chemical	Formula	Conc	Acryl	PVC	PP	PVDF	1.4404	FPM	EPDM	Tygon	Pharmed	PE	HastelloyC	WPC
Sodium Oxalate	Na ₂ C ₂ O ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Perborate	NaBO ₂ *H ₂ O ₂	s	+	+/o	+	+	+	+	+	+	+	+	+/o	1
Sodium Perchlorate	NaClO ₄	s	+	+	+	+	10%	+	+	+	+	+	10%	1
Sodium Peroxide	Na ₂ O ₂	s	+	+	+	+	+	+	+	n	n	-	+	1
Sodium Persulphate	Na ₂ S ₂ O ₈	s	n	+	+	+	+	+	+	+	+	+	+	1
Sodium Pyrosulphite	Na ₂ S ₂ O ₅	s	+	+	+	+	+	n	n	+	+	+	+	1
Sodium Salicylate	C ₆ H ₄ (OH)COONa	s	+	+/o	+	+	+	+	+	+	+	+	+	1
Sodium Silicate	Na ₂ SiO ₃	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Sulphate	Na ₂ SO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Sulphide	Na ₂ S	s	+	+	+	+	+	+	+	+	+	+	+	2
Sodium Sulphite	Na ₂ SO ₃	s	+	+	+	+	50%	+	+	+	+	+	50%	1
Sodium Tetraborate	Na ₂ B ₄ O ₇ *10H ₂ O	s	+	+	+	+	+	+	+	+	+	+	+	1
Sodium Thiosulphate	Na ₂ S ₂ O ₃	s	+	+	+	+	25%	+	+	+	+	+	25%	1
Sodium Tripolyphosphate	Na ₅ P ₃ O ₁₀	s	+	+	+	+	+	+/o	+	+	+	+	+	1
Starch	(C ₆ H ₁₀ O ₅) _n	s	+	+	+	+	+	+	n	+	+	+	+	1
Starch Gum		s	+	+	+	+	+	+	+	+	+	+	+	1
Styrene	C ₆ H ₅ CHCH ₂	100%	-	-	o	+	+	o	-	-	-	o	+	2
Sublimate => Mercury-II-Chloride														
Succinic Acid	C ₄ H ₆ O ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Sugar Syrup		s	+	+	+	+	+	+	+	+	+	+	+	1
Sulphur Chloride => Disulphur Dichloride														
Sulphuric Acid	H ₂ SO ₄	98%	30%	50%	85%	+	20%	+	+	30%	30%	80%	+	1
Sulphuric Acid, fuming -> Oleum														
Sulphurous Acid	H ₂ SO ₃	s	+	+	+	+	10%	+	+	+	+	+	+	(1)
Sulphuryl Chloride	SO ₂ Cl ₂	100%	-	-	-	o	n	+	o	-	-	-	n	1
Tannic Acid	C ₇₆ H ₅₂ O ₄₆	50%	+	+	+	+	+	+	+	+	+	+	+	1
Tartaric Acid	C ₄ H ₆ O ₆	s	50%	+	+	+	+	+	+/o	+	+	+	+	1
Tetrachloro Ethane	C ₂ H ₂ Cl ₄	100%	-	-	o	+	+	o	-	-	o	o	+	3
Tetrachloro Ethylene	C ₂ Cl ₄	100%	-	-	o	+	+	o	-	-	o	o	+	3
Tetrachloromethane => Carbon Tetrachloride														
Tetrahydro Furane	C ₄ H ₈ O	100%	-	-	o	-	+	-	-	-	-	o	+	1
Tetrahydro Naphthalene	C ₁₀ H ₁₂	100%	-	-	-	+	+	+	-	-	-	o	+	3
Tetraalin => Tetrahydro Naphthalene														
THF => Tetrahydrofuran														
Thionyl Chloride	SOCl ₂	100%	-	-	-	+	n	+	+	+	+	-	n	1
Thiophene	C ₄ H ₄ S	100%	n	-	o	n	+	-	-	-	-	o	+	3
Tin-II-Chloride	SnCl ₂	s	+	o	+	+	-	+	+	+	+	+	+/o	1
Tin-II-Sulphate	SnSO ₄	s	n	+	+	+	+	+	+	+	+	+	+/o	(1)
Tin-IV-Chloride	SnCl ₄	s	n	+	+	+	-	+	+	+	+	+	+	1
Titanium Tetrachloride	TiCl ₄	100%	n	n	n	+	n	o	-	n	n	n	n	1
Toluene	C ₆ H ₅ CH ₃	100%	-	-	o	+	+	o	-	-	-	o	+	2
Toluene Diisocyanate	C ₇ H ₃ (NCO) ₂	100%	n	n	+	+	+	-	+/o	n	n	+	+	2
Tributyl Phosphate	(C ₄ H ₉) ₃ PO ₄	100%	n	-	+	+	+	-	+	o	+	+	+	1
Trichloro Ethane	CCl ₃ CH ₃	100%	-	-	o	+	+	+	-	-	o	o	+	3
Trichloro Ethylene	C ₂ HCl ₃	100%	-	-	o	+	+/o	o	-	-	o	o	+	3
Trichloro Methane => Chloroform														
Trichloroacetaldehyde Hydrate	CCl ₃ CH(OH) ₂	s	-	-	o	-	+	o	o	n	n	+	+	2
Trichloroacetic Acid	CCl ₃ COOH	50%	-	+	+	+	-	-	o	+	+/o	+	+	1
Tricresyl Phosphate	(C ₇ H ₇) ₃ PO ₄	90%	-	-	+	n	+	o	+	o	+	+	+	2
Triethanol Amine	N(C ₂ H ₄ OH) ₃	100%	+	o	+	n	+	-	+/o	-	o	+	+	1
Trilene => Trichloro Ethane														
Trioctyl Phosphate	(C ₈ H ₁₇) ₃ PO ₄	100%	n	-	+	+	+	o	+	o	+	+	+	2
Trisodium Phosphate	Na ₃ PO ₄	s	+	+	+	+	+	+	+	+	+	+	+	1
Urea	CO(NH ₂) ₂	s	+	+/o	+	+	+	+	+	20%	20%	+	+	1
Vinyl Acetate	CH ₂ =CHOOCCH ₃	100%	-	-	+	+	+	n	n	-	+/o	+	+	2
Water Glass => Sodium Silicate														
Xylene	C ₆ H ₄ (CH ₃) ₂	100%	-	-	-	+	+	o	-	-	-	o	+	2
Zinc Acetate	(CH ₃ COO) ₂ Zn	s	+	+	+	+	+	-	+	+	+	+	+	1
Zinc Chloride	ZnCl ₂	s	+	+	+	+	-	+	+	+	+	+	n	1
Zinc Sulphate	ZnSO ₄	s	+	+	+	+	+	+	+	+	+	+	+/o	1

ProMinent® Chemical Resistance List

Overview of the resistance of soft PVC hoses (Guttasyn®) to the most common chemicals

This data applies to standard conditions (20 °C, 1013 mbar).

+	=	resistant
o	=	conditionally resistant
-	=	not resistant

The data has been taken from relevant manufacturers' literature and supplemented by our own tests and experience. As the resistance of a material also depends on other factors, especially pressure and operating conditions etc., this list should merely be regarded as an initial guide and does not claim to offer any guarantees. Take into consideration the fact the conventional dosing agents are largely compounds, the corrosiveness of which cannot simply be calculated by adding together the corrosiveness of each individual component. In cases such as these the material compatibility data produced by the chemical manufacturer must be read as a matter of priority when selecting a material. Safety data sheets do not provide this information and cannot therefore replace application-specific documentation.

Corrosive agent	Concentration in %	Temperature in °C	Evaluation
Acetic acid	50	20	o
Acetic acid (wine vinegar)		20	o
Acetic acid (wine vinegar)		40	o
Acetic acid anhydride	100	20	-
Acetic acid, aqueous	6	20	+
Acetic acid, aqueous	6	40	o
Acetic acid, aqueous	6	60	o
Acetic ester	100	20	-
Acetone	all	20	-
Acetylene	100	20	o
Acetylene chlorohydrin solution		20	-
Acetylene tetrabromide	100	20	-
Aluminium salts, aqueous	all	40	+
Aluminium sulphate, aqueous	all	60	+
Alums of all kinds, aqueous	all	40	+
Ammonium salts	all	60	+
Ammonium, aqueous	15	40	+
Ammonium, aqueous	saturated	40	+
Aniline	100	20	-
Benzene	100	20	-
Benzine	100	20	o
Bisulphite, aqueous	all	40	+
Bisulphite, aqueous	all	60	o
Borax solution	all	40	+
Borax solution	all	60	o
Boric acid, aqueous	all	60	+
Bromine, vaporous and liquid		20	+
Buna latex		20	+
Butadiene	100	20	-
Butanol	100	20	-
Butyl acetate	100	20	-
Butyric acid, aqueous	20	20	o
Butyric acid, aqueous	conc.	20	-
Calcium chloride, aqueous	all	60	+
Carbon disulphide	100	20	-
Carbonic acid	all	40	+
Caustic potash	aqueous	20	+
Caustic potash	6	40	+
Caustic potash	6	60	o
Caustic potash	15	20	+
Caustic potash	30	20	o
Caustic potash	conc.	20	o
Caustic potash	conc.	40	-
Chlorinated hydrocarbons	all	20	-
Chlorine, gaseous, moist	all	20	-

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Corrosive agent	Concentration in %	Temperature in °C	Evaluation
Chloromethyl	100	20	-
Chrome-alum, aqueous	all	40	+
Chromic acid, aqueous	0,5-10	20	+
Copper sulphate, aqueous	all	60	+
Creosote		20	-
Dextrin, aqueous	saturated	60	+
Diesel oils, compressed oils	100	40	o
Diesel oils, compressed oils	100	60	-
Difluorodichloromethane	100	20	o
Ethanol	96	20	-
Ethyl acetate	100	20	-
Ethyl ether	100	20	-
Ethylene glycol	100	40	o
Ethylene glycol	100	60	-
Fats, animal and plant	100	20	-
Fats, aqueous suspension		20	o
Ferric chloride, aqueous	all		+
Fixing bands, phat.		40	+
Formaldehyde, aqueous	30	20	o
Glacial acetic acid	100		-
Glucose, aqueous	saturated	20	+
Glycerol	100	20	o
Glycol	100	20	o
Halogens	all	20	-
Hydrochloric acid, aqueous	10	20	+
Hydrogen bromide	all	40	+
Hydrogen peroxide	to 30	20	+
Hydrogen sulphide, gaseous	100	20	o
Hydrogen sulphide, gaseous	100	40	-
Ink		30	+
Lead acetate, aqueous		20	+
Lubricating grease	100	40	o
Lubricating oil and similar			
Lubricating oil, spindle oil and similar	100	40	o
Lubricating oil, spindle oil and similar	100	60	-
Magnesium salts, aqueous	all	60	+
Methyl alcohol	100	20	-
Methylene chloride	100	20	-
Monobromine-naphtaline	100	20	-
Nickel salts, aqueous	all	60	+
Nitric acid	aqueous	20	+
Nitric acid, aqueous	6.3	20	+
Nitric acid, aqueous	6.3	40	o
Nitric acid, aqueous	6.3	60	o
Nitric acid, aqueous	15	20	+
Nitric acid, aqueous	65	20	o
Nitric acid, aqueous	65	40	-
Nitrocellulose lacquer	solid	20	-
Nitroglycerol	100	20	-
Oils, sh. fats, diesel oil			
Oleum	10	20	-
Oxygen	all	60	+
Ozone		20	
Perchloric acid	all	20	o
Phenol, aqueous	all	20	o
Phosphoric acid, aqueous	100	20	-
PMMA (acrylic glass)	all	60	+
PMMA (acrylic glass)	Spec. additives		+
Potassium bichromate, aqueous	saturated	20	+
Potassium ferri- and ferrocyanide	all	60	+
Potassium persulphate, aqueous	saturated	40	+

ProMinent® Chemical Resistance List

Corrosive agent	Concentration in %	Temperature in °C	Evaluation
Potassium salts, aqueous	all	60	+
Sea water		40	+
Sea water		60	o
Silver nitrate	10	60	+
Soap solution	saturated	20	+
Soap solution	saturated	60	o
Sodium chloride, aqueous	all	60	+
sodium hydroxide	aqueous	20	+
Sodium hydroxide, aqueous	4	40	+
Sodium hydroxide, aqueous	4	60	o
Sodium hydroxide, aqueous	50	40	o
Sodium hydroxide, aqueous	50	60	-
Sodium hypochlorite	15	20	o
Sodium salts, sh. Sodium chloride (common salt)			
Sulphur dioxide, gaseous	all	40	o
Sulphuric acid	to 60	60	o
Sulphuric acid	98	20	-
Tetrachloromethane	100	20	-
Toluene	100	20	-
Transformer oil	100	40	o
Transformer oil	100	60	-
Trichloroethylene	100	20	-
Urea, aqueous	all	60	+
Urine		20	+
Water	100	20	+
Xylene	100	20	-
Zinc salts	all	60	+

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1 Solenoid-Driven Metering Pumps

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1 Solenoid-Driven Metering Pumps

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1.0 Overview Of Solenoid-Driven Metering Pumps

1.0.1 Product Overview

alpha Motor-Driven Diaphragm Metering Pump

Output range 1.0 - 30.6 l/h, 10 - 2 bar,

This metering pump is designed for simple applications. The pump is ideal for tasks involving continuous metering.

- Control via power ON/OFF
- Stroke length adjustment in steps of 10%



pk_1_135

Solenoid-Driven Diaphragm Metering PumpBeta® b

Output range 0.74 - 32 l/h, 16 - 2 bar.

This metering pump stands out not only on account of its versatility and reliability but the cost-effectiveness of this all-round pump is also exceptional.

- Manual operation and external contact activation with pulse step-up and step-down
- Continuous stroke length adjustment
- Universal power supply unit 100 - 230 V
- Connection for 2-stage level switch



Beta_B_farb

NEW

gamma/ L Solenoid-Driven Diaphragm Metering Pump

Output range 0.74 – 32 l/h, 16 – 2 bar

This metering pump satisfies the most demanding requirements: Varied adjustment and activation options for standalone applications or use in complex bus-networked systems.

- Manual operation, external contact and analogue activation
- Continuous stroke length adjustment
- Connection for 2-stage level switch
- Optional PROFIBUS® interface and 14-day process timer



pk_1_137

delta® Solenoid-Driven Diaphragm Metering Pump

Output range 7.5 – 75 l/h, 16 – 2 bar

delta® Series with optoDrive® technology for highly effective adaptation to the metering task and monitoring of hydraulic periphery.

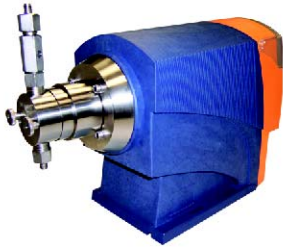
- Optional continuous or pulsating metering
- Integrated hydraulic monitoring functions
- Manual operation, external contact and analogue activation
- Continuous stroke length adjustment
- Connection for 2-stage level switch
- Large backlit graphic display
- Optional interfaces for PROFIBUS® or CAN-bus
- Optional 14-day process timer for time and event-dependent metering tasks



pk_1_138

NEW

1.0 Overview Of Solenoid-Driven Metering Pumps



P_DE_0004_C

NEW

mikro delta

- Output range 150 - 1,500 m/h, 40 - 6 bar
- Stroke volume 1-250 µl
- Material versions PTFE and stainless steel
- Metering reproducibility: ± 0,5 %
- Continuous or pulsing operation
- Adaptation of the pump to the feed chemical
- Continuous stroke length adjustment from 0 - 100 %
- Adjustment and display of the feed rate, either as strokes/min or l/h via the keyboard
- Large illuminated graphic display
- External activation via potential-free contacts with pulse step-up and step-down
- External activation by standard signal 0/4-20 mA (optional)
- Interface for PROFIBUS® or CANopen (optional)
- 14-day process timer for time- and event-dependent metering tasks (optional)
- Connection for 2-stage level switch
- 3 LED display for operation, warning and error messages in plain text
- Concentration input for volume-proportional metering

Further technical details on request

Available from 2nd quarter of 2010

Pneumados b

Capacity range 0.76 - 16.7 l/h, 16 - 2 bar.

Pneumados is a pneumatically-operated metering pump in the capacity range of max. 0.76 - 16.7 l/h at a maximum backpressure of 16 - 2 bar.

The metering stroke is effected by a pneumatically actuated diaphragm, the suction stroke by spring force. The metering capacity can be varied via the stroke length and the stroke frequency.

- Continuous stroke length adjustment
- Material version PVDF and stainless steel
- Stroke frequency up to 180 strokes/min



P_PN_0007_C

DULCO®flex Peristaltic Pumps

DF2a

Output range: 0.4 – 2.4 l/h, 1.5 bar

Typical applications include processes requiring lose delivery pressure such as in docent conditioners in private swimming pools. Spring-loaded rollers ensure a consistent rolling pressure while extending the service life of the pump.

- Rotor in cover mounted in ball bearings for longer service life
- Reliable dosing of small quantities, including gas-emitting chemicals
- Virtually silent operation



pk_1_143

DF3a

Output range: 0.4 – 2.4 l/h, 1.5 bar

The DF3a was specifically developed for the purpose of dosing fragrances. It is equipped with relay outputs for two further metering pumps and three solenoid valves for the diluting water. Spring-loaded rollers ensure a consistent rolling pressure while extending the service life of the pump.

- Viton® hose material, used specifically for dosing fragrances in wellness application
- Program control for the pump and two further peristaltic pumps
- Virtually silent operation



P_DX_0004_C

1.0 Overview Of Solenoid-Driven Metering Pumps



DF4a

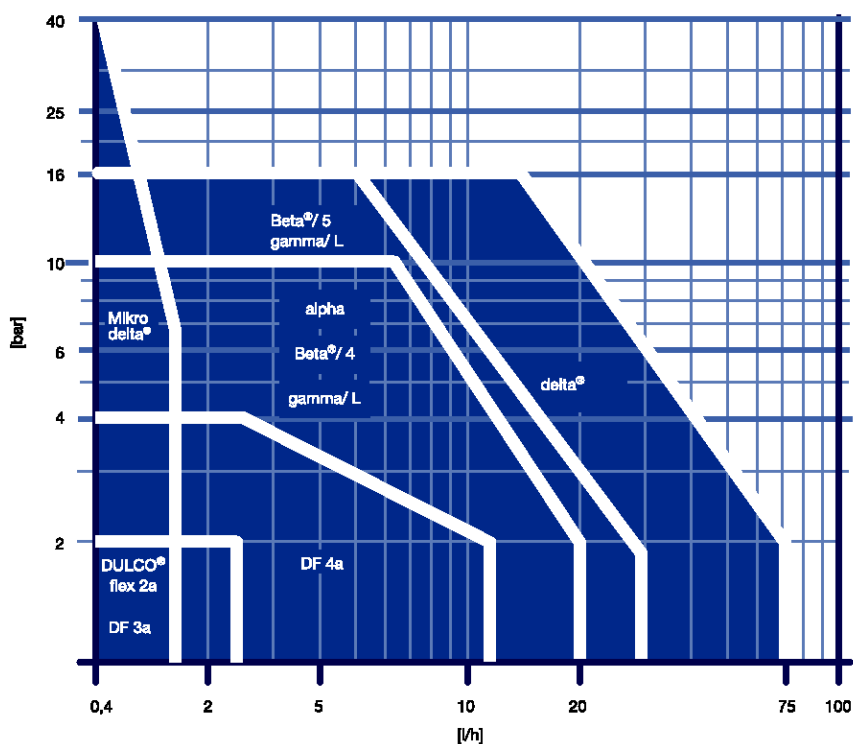
Output range 1.5 - 12 l/h, 4 - 2 bar

Stepper motor-actuated peristaltic pump for metering chemicals. It is available in three versions which are geared to the respective application:

- metering of flocculants
- metering of activated carbon
- metering of chemicals in general

P_DX_0005_C

1.0.2 Selection Guide



SG_0001_C

Back pressure [bar] as a function of feed rate [l/h]

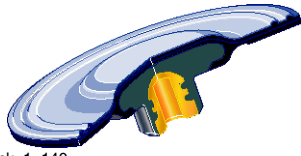
ProMinent offers a wide range of solenoid-driven metering pumps in the output range from 0.74 to 75 l/h at a backpressure of 16 – 2 bar. ProMinent solenoid-driven diaphragm pumps perform their metering task reliably even under the toughest operating conditions. Maintenance and repair costs are therefore kept low. With a wide range of different materials, these metering pumps are suitable for practically all liquid chemicals.

1.0 Overview Of Solenoid-Driven Metering Pumps

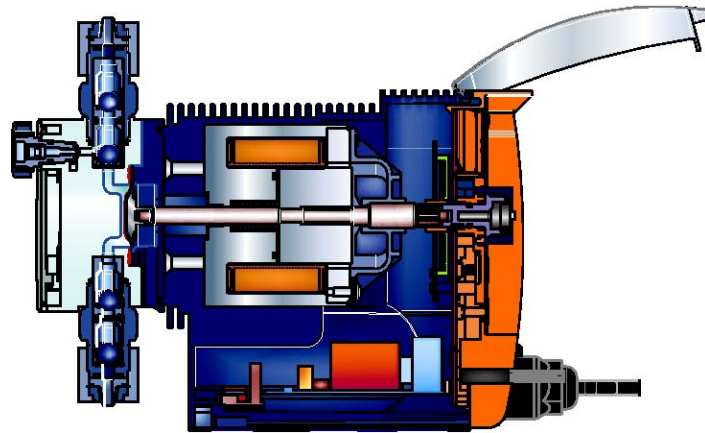
Functional Principle/Features

A solenoid is switched on and off to move the magnetic spindle forward and backward. This stroke motion is transmitted to the metering diaphragm in the liquid end. Two non-return valves prevent the metered medium flowing back during pump operation. The metering capacity of a solenoid-driven diaphragm-type metering pump can be adjusted by way of the stroke length and the stroke rate.

- Virtually wear-free drive as there is only one moving part. Pump operates without lubricated bearings or shafts
- Outstanding continuous operation properties



pk_1_140



pk_1_139

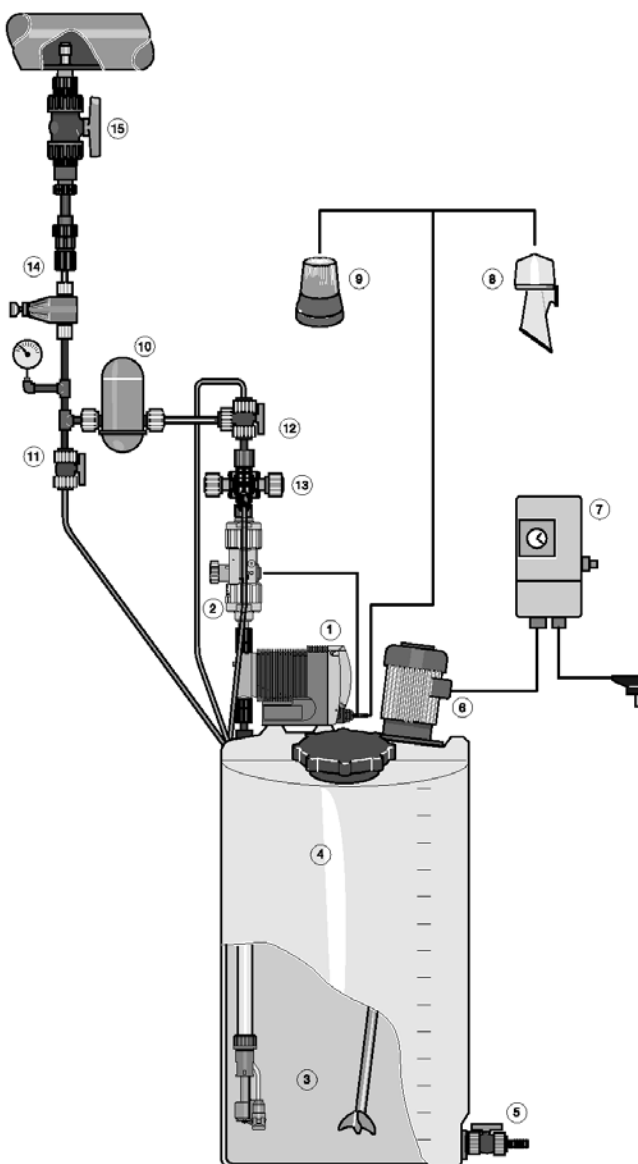
1.0 Overview Of Solenoid-Driven Metering Pumps

1.0.3 Installation Option

ProMinent® Dosing Station

Comprehensive Accessory Range Ensures Processing Safety

Note: Excessive pressure can built up if solenoid metering pumps are used where a discharge line is blocked, or a line is closed off via a stop valve. In these conditions, therefore, we strongly advise the use of a multifunction valve (13).
When metering at atmospheric pressure the pump can achieve several times the stated feed rate. For this reason we recommend installing a multi-function valve (13).



- 1 gamma/ L metering pump with alarm relay
- 2 Flow control monitor
- 3 Suction assembly with float switch
- 4 ProMinent® chemical tank
- 5 Drainage tap
- 6 Electric stirrer
- 7 ProMinent® timer
- 8 Warning siren
- 9 Warning light
- 10 Accumulator, pulsation dampener
- 11 Vent valve for accumulator
- 12 Aeration valve for accumulator
- 13 Multi-function valve
- 14 Back pressure valve if pulsation dampener installed
- 15 Injection lance or injection valve

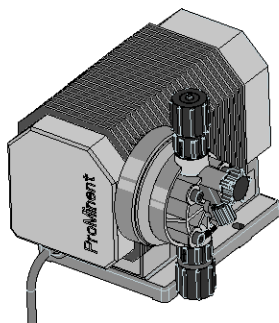
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1.0 Overview Of Solenoid-Driven Metering Pumps

1.1 alpha Motor Driven Diaphragm Metering Pumps

1.1.1

alpha Motor Driven Diaphragm Metering Pumps



P_ALP_0004_SW

- Output range 1.0 - 30.6 l/h, 10 - 2 bar
- Stroke length adjustment in steps of 10% from 0 - 100 %
- Material versions PVDF and Acrylic/PVC
- Patented coarse / fine bleed valve
- Constant stroke rate
- Control via mains supply ON/OFF

The alpha is a metering pump designed for simple operations. It is ideal for continuous metering.

It is an oscillating motor diaphragm metering pump for liquid chemicals and consists of drive and delivery unit as main components. The drives are available in 2 gear ratios, delivery units in 4 sizes and in the materials acrylic/PVC. It is therefore possible to specify the required output and the material combination. The alpha pumps are switched on/off via the mains power supply, the metering output can be changed via the stroke length adjustment between 100 % and 0.

The drive consists of a powerful split pole motor with gearbox, eccentric shaft and connecting rod as driving rod. The housing is made of glass fibre reinforced plastic and is resistant to shock and chemicals. The eccentric for the stroke movement is guided in an eccentric cam. Suction and pressure stroke are positively driven.

The stroke length adjustment is carried out by varying the eccentricity in 10 % steps via a notched slide when the pump is not working. This means that the diaphragm deflection is always made from the neutral centre position.

During operation, the alpha pump with its positively driven suction and metering strokes as well as the stroke length adjustment by varying the eccentricity produces a smooth, sinusoidal stroke action for suction and metering stroke with diaphragm deflection from the centre position.

The result is good suction performance, smooth metering stroke and consistently accurate metering with low mechanical load on the metering diaphragm.

The delivery unit consists of liquid end, metering diaphragm and head disc. The liquid end in the material combinations PVDF or plexiglass/PVC is equipped with double ball valves on the suction and pressure side as well as coarse/fine bleeding. The bleed valve facilitates suctioning and bleeding at full operating pressure without having to interrupt and de-pressurise the metering line. For media of higher viscosity, the valves can be spring-loaded.

1.1 alpha Motor Driven Diaphragm Metering Pumps

Technical Data

Pump type	Delivery rate at max. back-pressure			Delivery rate at medium backpressure			Number of strokes	Stroke length	Connection size o Ø x i Ø	Suction head	Shipping weight
	Delivery rate bar	l/h	ml/stroke	bar	l/h	ml/stroke					
50 Hz version											
ALPc 1001	10	1,0	0,29	5	1,1	0,32	58	2	6 x 4	5,1	3,0
ALPc 1002	10	1,8	0,52	5	2,1	0,60	58	2	6 x 4	5,1	3,0
ALPc 1004	10	3,5	1,01	5	3,9	1,12	58	3	8 x 5	5,1	3,0
ALPc 1008	10	7,7	1,00	5	8,6	1,12	128	3	8 x 5	5,1	3,0
ALPc 0708	7	6,0	2,27	3	7,7	2,53	58	3	8 x 5	4,1	3,0
ALPc 0417	4	17,0	2,51	2	18,3	2,76	128	3	8 x 5	4,1	3,0
ALPc 0230	2	30,6	3,98	1	32,7	4,26	128	3	12 x 9	3,1	3,0
60 Hz version											
ALPc 1001	10	1,2	0,29	5	1,3	0,31	69	2	6 x 4	5,1	3,0
ALPc 1002	10	2,2	0,53	5	2,6	0,63	69	2	6 x 4	5,1	3,0
ALPc 1003	10	4,1	0,99	5	4,7	1,14	69	3	8 x 5	5,1	3,0
ALPc 1008	10	8,9	0,96	5	10,4	1,13	154	3	8 x 5	5,1	3,0
ALPc 0708	7	8,3	2,27	3	9,2	2,56	69	3	8 x 5	4,1	3,0
ALPc 0417	4	20,6	2,45	2	21,9	2,75	154	3	8 x 5	4,1	3,0
ALPc 0230	2	34,4	3,72	1	39,2	4,24	154	3	12 x 9	3,1	3,0

Materials in contact with medium

	Liquid end	Suction/discharge connector	Seals	Balls
PPE	Polypropylene	Polypropylene	EPDM	Ceramic
PPB	Polypropylene	Polypropylene	FPM	Ceramic
NPE	Acrylic glass	PVC	EPDM	Ceramic
NPB	Acrylic glass	PVC	FPM	Ceramic
PVT	PVDF	PVDF	PTFE	Ceramic

Metering diaphragm with PTFE coating for all types.

FPM = fluororubber

The system includes: Metering pump with mains cable (2 m) and connector, connecting kit for hose/pipe connection as per table.

Motor Data

Type:	Split pole motor with integrated thermal overload protection
Power supply:	220-240 V, 50/60 Hz (version A)
Power input:	50 W (at 230 V/50 Hz)
Power consumption:	0.4 A (at 230 V/50 Hz)

Guarantee: The warranties given under "General Commercial Terms and Conditions" apply. The alpha pump drive is, however, supplied with a 12 month warranty.

1.1 alpha Motor Driven Diaphragm Metering Pumps

1.1.2 Identcode Ordering System

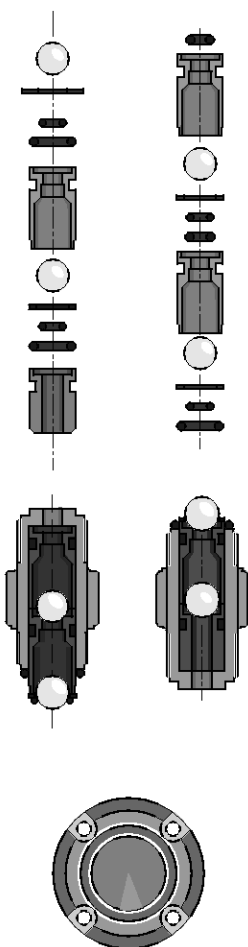
Series alpha, version c

ALPc	Type	Capacity		Capacity	
		l/h	bar	l/h	bar
	1001	1,0	10	1,2	10,0
	1002	1,8	10	2,2	10,0
	1004	3,5	10	4,1	10,0
	1008	7,7	10	8,9	10,0
	0708	6,9	7	8,3	7,0
	0417	17,0	4	20,6	4,0
	0230	30,6	2	34,4	2,0
Liquid end material					
	PPE	Polypropylene/polypropylene/EPDM			
	PPB	Polypropylene/polypropylene/FPM			
	NPE	Acrylic/PVC/EPDM			
	NPB	Acrylic/PVC/FPM			
	PVT	PVDF/PVDF/PTFE			
Valve springs					
	2	without valve spring, with bleeding			
	3	with 2 valve springs approx. 0.1 bar, material 1.4571, with bleeding			
Hydraulic connectors					
	0	Standard according to technical data			
Version					
	0	With ProMinent® logo			
Electrical connection					
	A	230 V, 50/60 Hz, 2 m, Euro. plug			
	B	230 V, 50/60 Hz, 2 m, Swiss plug			
	C	230 V, 50/60 Hz, 2 m, Austral. plug			
	D	115 V, 50/60 Hz, 2 m, USA plug			
Accessories					
	0	No ancillary equipment			
	1	with foot and metering valve, 2 m PVC suction line, 5 m PE metering line			

FPM = Fluorine Rubber

1.1 alpha Motor Driven Diaphragm Metering Pumps

1.1.3 Spare Parts Kits, Replacement Diaphragms



pk_1_008

Spare parts kits for alpha, consisting of

- 1 pump diaphragm
- 1 suction valve compl.
- 1 discharge valve compl.
- 2 valve balls
- 1 seal set
- 1 connector set

Spare parts kits alpha

Type		Order no.
for alpha c, type 1001	PPE	1001646
	PPB	1001654
	NPE	1001715
	NPB	1001723
	PVT	1023109
for alpha c, type 1002, 1004, 1008	PPE	1001647
	PPB	1001655
	NPE	1001716
	NPB	1001724
	PVT	1023110
for alpha c, type 0708, 0417	PPE	1001649
	PPB	1001657
	NPE	1001718
	NPB	1001726
	PVT	1023112
for alpha c, type 0230	PPE	1001650
	PPB	1001658
	NPE	1001719
	NPB	1001727
	PVT	1023113

Replacement diaphragms

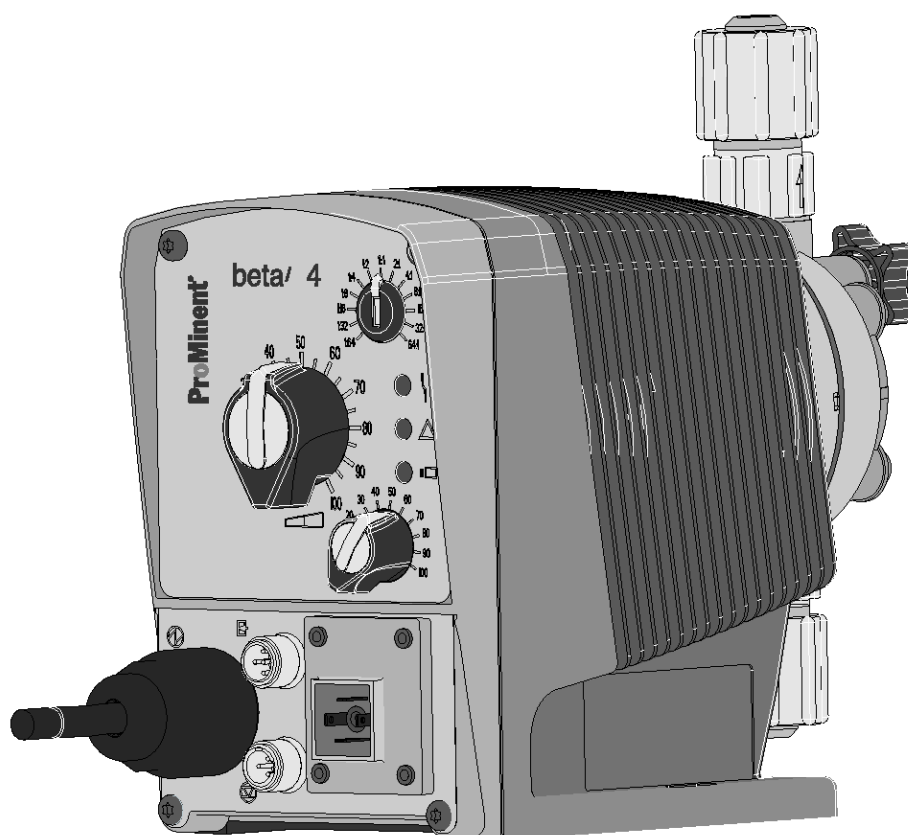
Type	Order no.
for alpha c 1001	1000246
for alpha c 1002, 1004, 1008	1000247
for alpha c 0708, 0419	1000249
for alpha c 0230	1000250

1.2 Beta® b Solenoid Diaphragm Metering Pumps

1.2.1 Beta® b Solenoid Diaphragm Metering Pumps

- Capacity range 0.74-32 l/h, 25-2 bar
- Continuous stroke length adjustment from 0-100 % (recommended 30-100 %)
- Supplied in PP, Acrylic, PVDF, PTFE, stainless steel
- Patented deaeration for PP, Acrylic and PVDF
- Self-deaerating dosing head type in PP and Acrylic
- HV liquid end for highly viscous media
- Power supply 100 - 230 V as standard
- 10-setting stroke frequency adjustment from 10-100 %
- External control via volt-free contacts with impulse for speed increaser and reduction
- Connector for 2-stage level switch
- 3 LED display for operation, warning and fault indication

NEW



P_BE_0048_SW
Beta® b

1.2 Beta® b Solenoid Diaphragm Metering Pumps

Technical Data

Pump type	Delivery rate at max. backpressure			Delivery rate at medium backpressure			Number of strokes	Connection size o Ø x i Ø	Suction head	Average power consumption	Shipping weight	
	bar	l/h	ml/stroke	bar	l/h	ml/stroke					Strokes/min	mm
Beta® b												
BT4b 1000***	10	0,74	0,07	5,0	0,82	0,08	180	6 x 4	6,0**	7,2	2,9	3,6
BT4b 1601***	16	1,10	0,10	8,0	1,40	0,13	180	6 x 4	6,0**	9,6	2,9	3,6
BT4b 1602***	16	2,20	0,20	8,0	2,50	0,24	180	6 x 4	6,0**	11,2	2,9	3,6
BT4b 1604***	16	3,80	0,35	8,0	4,50	0,43	180	6 x 4	6,0**	15,2	3,1	3,9
BT4b 0708***	7	7,10	0,66	3,5	8,40	0,78	180	8 x 5	6,0**	15,2	3,1	3,9
BT4b 0413	4	12,30	1,14	2,0	14,20	1,31	180	8 x 5	3,0**	15,2	3,1	3,9
BT4b 0220	2	19,00	1,76	1,0	20,90	1,94	180	12 x 9	2,0**	15,2	3,3	4,4
BT5b 2504	25	2,90	0,27	10,0	5,00	0,46	180	8 x 4****	6,0**	19,2	4,5	5,3
BT5b 1008	10	6,80	0,63	5,0	8,30	0,76	180	8 x 5	6,0**	19,2	4,5	5,3
BT5b 0713	7	11,00	1,02	3,5	13,10	1,21	180	8 x 5	4,0**	19,2	4,5	5,3
BT5b 0420	4	17,10	1,58	2,0	19,10	1,77	180	12 x 9	3,0**	19,2	4,7	5,8
BT5b 0232	2	32,00	2,96	1,0	36,20	3,35	180	12 x 9	2,0**	19,2	5,1	6,6
Beta® b metering pumps with self-degassing dosing head®												
BT4b 1601	16	0,59	0,06	8,0	0,78	0,07	180	6 x 4	1,8**	9,6	2,9	–
BT4b 1602	16	1,40	0,13	8,0	1,70	0,16	180	6 x 4	2,1**	11,2	2,9	–
BT4b 1604	10	2,90	0,27	5,0	4,00	0,37	180	6 x 4	2,7**	15,2	3,1	–
BT4b 0708	7	6,60	0,61	3,5	7,50	0,69	180	8 x 5	2,0**	15,2	3,1	–
BT4b 0413	4	10,80	1,00	2,0	12,60	1,17	180	8 x 5	2,0**	15,2	3,1	–
BT4b 0220	2	16,20	1,50	1,0	18,00	1,67	180	12 x 9	2,0**	15,2	3,3	–
BT5b 1008	10	6,30	0,58	5,0	7,50	0,69	180	8 x 5	3,0**	19,2	4,5	–
BT5b 0713	7	10,50	0,97	3,5	12,30	1,14	180	8 x 5	2,5**	19,2	4,5	–
BT5b 0420	4	15,60	1,44	2,0	17,40	1,61	180	12 x 9	2,5**	19,2	4,7	–

Beta® b pumps with liquid ends for highly viscous media have 10-20 % less metering capacity and are not self-priming. G 3/4-DN connector with d16-DN10 nozzle union.

- * The values given in the capacity data tables are guaranteed minimum values, using medium hardness water at room temperature. Bypass connection on self-venting dosing head 6x4 mm.
- ** Suction lift readings when liquid end and suction tubing are full, or for self-degassing liquid end when the suction tubing contains air.
- *** Reduced pressure 4, 7 and 10 bar pump types are available for specialised applications, e.g. for use in swimming pool systems. Further information on request.
- **** 6 mm inner diameter in stainless steel version.

Materials in contact with medium

	dosing head	suction/pressure connector	seals	balls
PPE	Polypropylene	Polypropylene	EPDM	ceramic
PPB	Polypropylene	Polypropylene	FPM	ceramic
PPT	Polypropylene	PVDF	PTFE	ceramic
NPE	Acrylic	PVC	EPDM	ceramic
NPB	Acrylic	PVC	FPM	ceramic
NPT	Acrylic	PVDF	PTFE	ceramic
PVT	PVDF	PVDF	PTFE	ceramic
TTT	PTFE with carbon	PTFE with carbon	PTFE	ceramic
SST	stainless steel no 1.4404	stainless steel no 1.4404	PTFE	ceramic

Only the self-degassing version available in PPE, PPB, NPE and NPB. Supplied with Hastelloy valve springs, PVDF valve core. Dosing diaphragm with PTFE-coating.

FPM = Fluorine Rubber

Reproducible dosing accuracy ± 2 % under correct conditions (see operating instructions).

Ambient temperature -10 °C to +45 °C.

Type of enclosure: IP 65, insulation class F

Metering pumps supplied with mains power cable (2 m) and plug, hose/pipe connector set as tables.

1.2 Beta[®] b Solenoid Diaphragm Metering Pumps

1.2.2 Identcode Ordering System

Beta[®] Version b

BT4b	Type	Capacity	
		bar	l/h
BT4b	1000	10	0,74
	1601	16	1,10
	1602	16	2,20
	1604	16	3,80
	0708	7	7,10
	0413	4	12,30
	0220	2	19,00
	BT5b	2504	25
1008		10	6,80
0713		7	11,00
0420		4	17,10
0232		2	32,00
Dosing head/valves material			
PP	Polypropylene/PVDF, for version self-degassing Polypropylene/Polypropylene		
NP	Acrylic glass/PVDF, for version self-degassing Acrylic glass/PVC		
PV	PVDF/PVDF		
TT	PTFE/PTFE		
SS	Stainless steel 1.4404/1.4404		
Seals/diaphragm material			
E	EPDM/PTFE coated, only for PP and NP self-degassing		
B	FPM-B/PTFE coated, only on PP and NP self-degassing		
T	PTFE/PTFE coated		
S	Diaphragm additionally with FPM coating for siliceous media		
Liquid end version			
0	Non-bleed version, no valve spring, for TT, SS and type 0232 only		
1	Non-bleed version, with valve spring, for TT, SS and type 0232 only		
2	With deaerator, no valve spring, PP, PV, NP only, not type 0232		
3	With deaerator, with valve spring, PP, PV, NP only, not type 0232		
4	version for highly viscous media, only PVT, types 1005, 1605, 0708, 1008, 0413, 0713, 0220, 0420		
9	self-degassing for PP, NP only, not for types 1000 and 0232		
Hydraulic connections			
0	Standard according to technical data		
5	Connector for 12/6 hose, delivery side only		
9	Connector for 10/4 hose, delivery side only		
Version			
0	Standard		
Logo			
0	with ProMinent [®] logo		
Power supply			
U	100-230 V ± 10 %, 50/60 Hz		
Cable and plug			
A	2 m European		
B	2 m Swiss		
C	2 m Australian		
D	2 m USA		
1	2 m, open-ended		
Relay			
0	No relay		
1	Fault indicating relay, normally energised, 1 x changeover contact 230 V - 2 A		
3	Fault indicating relay, normally de-energised, 1 x changeover contact 230 V - 2 A		
4	as 1 + pacing relay 2 x normally open contacts 24 V - 100 mA		
5	as 3 + pacing relay 2 x normally open contacts 24 V - 100 mA		
Accessories			
0	No accessories		
1	With foot and dosing valve, 2 m PVC suction tubing, 5 m PE discharge tubing		
Control type			
0	No lock		
1	With lock: manual operation locked when external cable plugged in		
Control Variants			
0	Standard		
Options on request			
00	No options		

1.2 Beta® b Solenoid Diaphragm Metering Pumps

1.2.3 Spare Parts Kits, Replacement Diaphragms

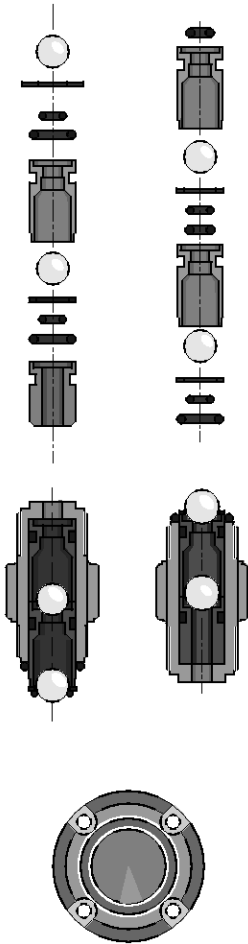
Spare parts kits for Beta® consisting of:

- 1 pump diaphragm
- 1 suction valve compl.
- 1 discharge valve compl.
- 2 valve balls
- 1 set seals
- 1 connector set

Suction and pressure valve set not included with stainless steel version.

Spare parts kits Beta®

Type	Materials in contact with medium	Order no.
Type 1000	PPT, NPT, PVT	1023107
	TTT	1001737
	SST	1001729
Type 1601	PPT, NPT, PVT	1023108
	TTT	1001738
	SST	1001730
Type 1602	PPT, NPT, PVT	1023109
	TTT	1001739
	SST	1001731
Type 1604 and Type 2504	PPT, NPT, PVT	1035332
	PVT HV	1035342
	TTT	1035330
	SST	1035331
Type 0708 and Type 1008	PPT, NPT, PVT	1023111
	PVT HV	1019067
	TTT	1001741
	SST	1001733
Type 0413 and Type 0713	PPT, NPT, PVT	1023112
	PVT HV	1019069
	TTT	1001742
	SST	1001734
Type 0220 and Type 0420	PPT, NPT, PVT	1023113
	PVT HV	1019070
	TTT	1001754
	SST	1001735
Type 0232	PPT, NPT, PVT	1023124
	TTT	1001755
	SST	1001736



pk_1_008

1.2 Beta® b Solenoid Diaphragm Metering Pumps

Spare parts kits Beta® with self-degassing dosing head

Spare parts kits for Beta® with self-degassing head, consisting of:

- 1 pump diaphragm
- 1 suction valve compl.
- 1 discharge valve compl.
- 1 pressure control valve compl.
- 2 valve balls
- 1 set seals
- 1 connector set

Type	Materials in contact with medium	Order no.
Type 1601	PPE	1001756
	PPB	1001762
	NPE	1001660
	NPB	1001666
Type 1602	PPE	1001757
	PPB	1001763
	NPE	1001661
	NPB	1001667
Type 1604	PPE	1035335
	PPB	1035336
	NPE	1035333
	NPB	1035334
Type 0708 and Type 1008	PPE	1001759
	PPB	1001765
	NPE	1001663
	NPB	1001669
Type 0413 and Type 0713	PPE	1001760
	PPB	1001766
	NPE	1001664
	NPB	1001670
Type 0220 and Type 0420	PPE	1001761
	PPB	1001767
	NPE	1001665
	NPB	1001671

Replacement diaphragms for Beta® range

Type	Materials in contact with medium	Order no.
Type 1000	all materials	1000244
Type 1601	all materials	1000245
Type 1602	all materials	1000246
Type 1604 and Type 2504	all materials	1034612
Type 0708 and Type 1008	all materials	1000248
Type 0413 and Type 0713	all materials	1000249
Type 0220 and Type 0420	all materials	1000250
Type 0232	all materials	1000251

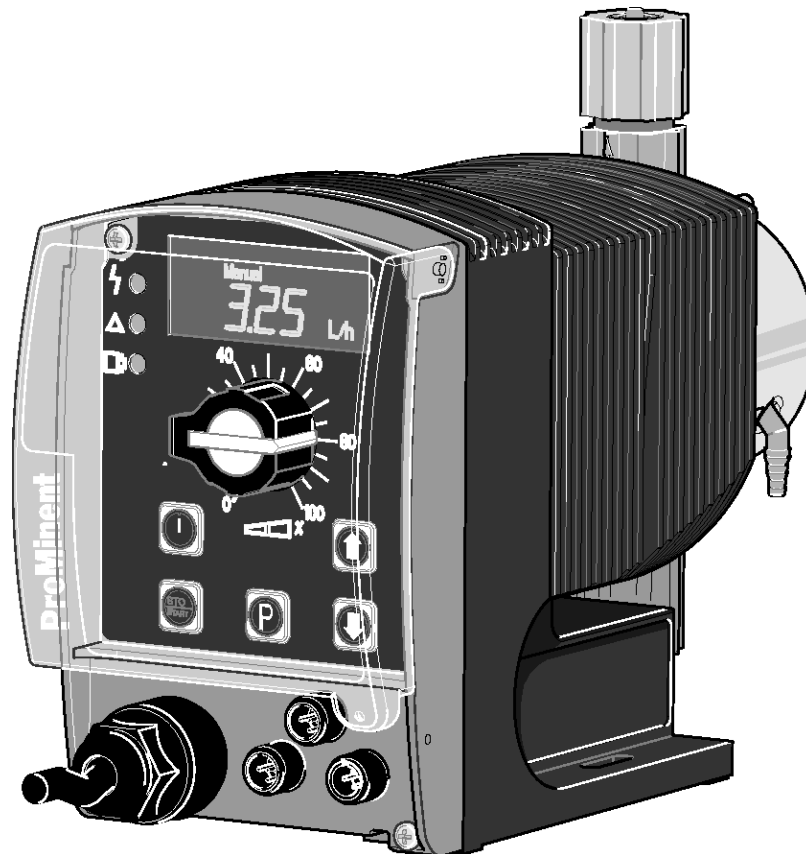
1.2 Beta® b Solenoid Diaphragm Metering Pumps

1.3 gamma/ L Solenoid Diaphragm Metering Pumps

1.3.1

gamma/ L Solenoid Diaphragm Metering Pumps

- Capacity range 0.74-32 l/h, 16-2 bar
- Continuous stroke length adjustment from 0-100 % (recommended 30-100%)
- Material options: PP, PVDF, Acrylic/PVC, PVDF, PTFE, stainless steel
- Patented bleeding on PP, PVDF and Acrylic/PVC versions
- Self-bleeding liquid end version in PP and Acrylic/PVC
- HV liquid end for highly viscous media
- Digitally accurate stroking rate via keypad and large LCD display
- Select feed rate display in strokes/min. or l/h
- Programmable pressure levels
- Dosing monitor input, adjustable error stroke counter
- External control via voltage free contact with optional increase/decrease pulse function
- Optional external control via standard signal 0/4-20 mA
- Interface for PROFIBUS® DP
- Connector for 2-stage level switch
- Optional 14-day process timer
- 12-24 V DC, 24 V AC low voltage version
- 3 LED display for operation, warning and fault indication
- Concentration entry option for proportional flow dosing
- Option 4-20 mA output corresponds to the product of stroke length and stroke frequency
- Power relay, especially in combination with the process timer for switching higher powers (230 V-8 A)
- Audible alarm for early warning/fault corresponding to intermittent tone/continuous tone



pk_1_005

1.3 gamma/ L Solenoid Diaphragm Metering Pumps

Technical Data

Pump type	Delivery rate at max. back-pressure			Delivery rate at medium backpressure			Number of strokes	Conne- ction size o Ø x i Ø	Suc- tion head	Shipping weight	
	bar	l/h	ml/stro- ke	bar	l/h	ml/stro- ke				Strokes/ min	mm
gamma/ L											
GALa 1000	10	0,74	0,07	5,0	0,82	0,08	180	6 x 4	6,0**	2,9	3,6
GALa 1601	16	1,10	0,10	8,0	1,40	0,13	180	6 x 4	6,0**	2,9	3,6
GALa 1602	16	2,10	0,19	8,0	2,50	0,24	180	6 x 4	6,0**	2,9	3,6
GALa 1005	10	4,40	0,41	5,0	5,00	0,46	180	8 x 5***	6,0**	3,1	3,9
GALa 0708	7	7,10	0,66	3,5	8,40	0,78	180	8 x 5	6,0**	3,1	3,9
GALa 0413	4	12,30	1,14	2,0	14,20	1,31	180	8 x 5	3,0**	3,1	3,9
GALa 0220	2	19,00	1,76	1,0	20,90	1,93	180	12 x 9	2,0**	3,3	4,4
GALa 1605	16	4,10	0,38	8,0	4,90	0,45	180	8 x 5***	6,0**	4,5	5,3
GALa 1008	10	6,80	0,63	5,0	8,30	0,76	180	8 x 5	6,0**	4,5	5,3
GALa 0713	7	11,00	1,02	3,5	13,10	1,21	180	8 x 5	4,0**	4,5	5,3
GALa 0420	4	17,10	1,58	2,0	19,10	1,77	180	12 x 9	3,0**	4,7	5,8
GALa 0232	2	32,00	2,96	1,0	36,20	3,35	180	12 x 9	2,0**	5,1	6,6
gamma/ L metering pumps with self-degassing dosing head											
GALa 1601	16	0,59	0,06	8,0	0,78	0,07	180	6 x 4	1,8**	2,9	–
GALa 1602	16	1,40	0,13	8,0	1,70	0,16	180	6 x 4	2,1**	2,9	–
GALa 1005	10	3,60	0,33	5,0	4,00	0,37	180	8 x 5	2,7**	3,1	–
GALa 0708	7	6,60	0,61	3,5	7,50	0,69	180	8 x 5	2,0**	3,1	–
GALa 0413	4	10,80	1,00	2,0	12,60	1,17	180	8 x 5	2,0**	3,1	–
GALa 0220	2	16,20	1,50	1,0	18,00	1,67	180	12 x 9	2,0**	3,3	–
GALa 1605	16	3,30	0,31	8,0	3,80	0,35	180	8 x 5	3,0**	4,5	–
GALa 1008	10	6,30	0,58	5,0	7,50	0,69	180	8 x 5	3,0**	4,5	–
GALa 0713	7	10,50	0,97	3,5	12,30	1,14	180	8 x 5	2,5**	4,5	–
GALa 0420	4	15,60	1,44	2,0	17,40	1,61	180	12 x 9	2,5**	4,7	–

gamma/ L pumps with liquid ends for highly viscous media have 10-20 % less metering capacity and are not self-priming. G 3/4-DN connector with d16-DN10 nozzle union.

* The values given in the capacity data tables are guaranteed minimum values, using medium hardness water at room temperature. Bypass connection on self-venting dosing head 6x4 mm.

** Suction lift readings when liquid end and suction tubing are full, or for self-degassing liquid end when the suction tubing contains air.

*** 6 mm inner diameter in stainless steel version.

Materials in contact with medium

	dosing head	suction/pressure connector	seals	balls
PPE	Polypropylene	Polypropylene	EPDM	ceramic
PPB	Polypropylene	Polypropylene	FPM-B	ceramic
NPE	Acrylic	PVC	EPDM	ceramic
NPB	Acrylic	PVC	FPM-B	ceramic
PVT	PVDF	PVDF	PTFE	ceramic
TTT	PTFE with carbon	PTFE with carbon	PTFE	ceramic
SST	stainless steel no. 1.4404	stainless steel no. 1.4404	PTFE	ceramic

Self-degassing version available in PP and NP only. Supplied with Hastelloy valve springs, PVDF valve core. Dosing diaphragm with PTFE-coating.

FPM = Fluorine Rubber

Reproducible dosing accuracy ± 2 % under correct conditions (see operating instructions).

Ambient temperature -10 °C to +45 °C

Medium power consumption: Type 1000-0220: 17 W, Type 1605-0232: 22 W

Type of enclosure: IP 65, insulation class F

Metering pumps supplied with mains power cable (2 m) and plug, hose/pipe connector set as tables.

1.3 gamma/ L Solenoid Diaphragm Metering Pumps

1.3.2 Identcode Ordering System

gamma/ L, Version a

GALa	Type	Capacity		bar		l/h		bar		l/h	
		bar	l/h	bar	l/h	bar	l/h	bar	l/h	bar	l/h
1605	16	4,10	1008	10	6,80	0713	7	11,00	0420	4	17,10
1602	16	2,10	1005	10	4,40	0708	7	7,10	0413	4	12,30
1601	16	1,10	1000	10	0,74				0232	2	32,00
									0220	2	19,00
Dosing head/valves material											
	PP	Polypropylene/Polypropylene									
	NP	Acrylic glass/PVC									
	PV	PVDF/PVDF									
	TT	PTFE/PTFE									
	SS	Stainless steel 1.4404/1.4404									
Seals/diaphragm material											
	E	EPDM/PTFE coated, only for PP and NP									
	B	FPM-B/PTFE coated, only on PP and NP									
	T	PTFE/PTFE coated, only on PV, TT and SS									
	S	Diaphragm additionally with FPM coating for siliceous media, FPM seals on PP and NP, PTFE on TT, PV and SS									
Liquid end version											
	0	Non-bleed version, no valve spring, for NP, TT and SS and type 0232 only									
	1	Non-bleed version, with valve spring, for NP, TT and SS and type 0232 only									
	2	Bleed function, no valve springs for PP, PVT, NP, not type 0232									
	3	Bleed function, with valve springs for PP, PVT, NP, not type 0232									
	4	version for highly viscous media, only PVDF, types 1005, 1605, 0708, 1008, 0413, 0713, 0220, 0420									
	9	self-degassing for PP, NP only, not for types 1000 and 0232									
Hydraulic connections											
	0	Standard according to technical data									
	5	Delivery side connection for hose 12/6, suction side standard									
	9	Delivery side connection for hose 10/4, suction side standard									
Version											
	0	With Prominent® logo									
Power supply											
	U	100-230 V, ±10 %, 50/60 Hz									
	M	12-24 V DC ±10 %, types 1000-0220 only									
	N	24 V DC ±10 %, types 1605-0232 only									
	P	24 V AC ±10 % all types									
Cable and plug											
	A	2 m European	C	2 m Australian	1	2 m, open-ended					
	B	2 m Swiss	D	2 m USA							
Relay											
	0	No relay									
	1	Fault indicating relay, normally energised, 1 x changeover contact 230 V - 2 A									
	3	Fault indicating relay, normally de-energised, 1 x changeover contact 230 V - 2 A									
	4	as 1 + pacing relay 2 x normally open contacts 24 V - 100 mA									
	5	as 3 + pacing relay 2 x normally open contacts 24 V - 100 mA									
	A	Disconnect and warning relay, normally de-energised 2 x normally open contacts 24 V - 100 mA									
	C	as 1 + 4-20 mA output 1 x normally open contact 24 V - 100 mA									
	G	Power relay, normally de-energised, 1 x changeover contact 230 V - 8 A									
	H	Acoustic alarm									
Accessories											
	0	No accessories									
	1	With foot valve and delivery valve, 2 m PVC suction tubing, 5 m PE delivery tube, for PP, PV and NP only									
	2	As 0 + calibrating cylinder									
	3	As 1 + calibrating cylinder									
Control variant											
	0	Manual + external 1:1									
	1	Manual + external with pulse control									
	2	Manual + external 1:1 + analogue current									
	3	Manual + external with pulse control + analogue 0/4 - 20 mA									
	4	as 0 + 14-day process timer									
	5	as 3 + 14-day process timer									
	7	as 1 + concentration entry									
	8	as 3 + concentration entry									
	R	as 3 + PROFIBUS® DP interface, M12									
	-	no relay with PROFIBUS® version									
Access code											
	0	No access code									
	1	With access code									
Metering monitor											
	0	Pulse signal input									
Pause/level											
	0	Pause N/C, level N/C									

1.3 gamma/ L Solenoid Diaphragm Metering Pumps

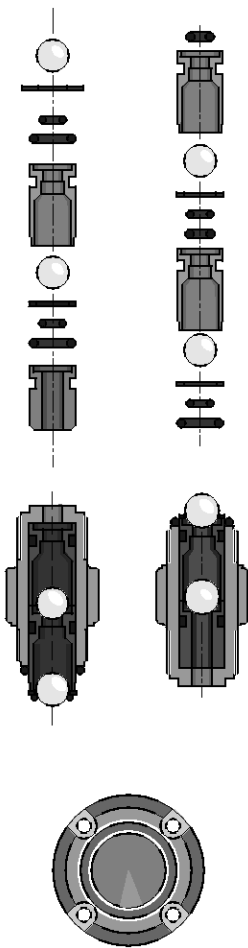
1.3.3 Spare Parts Kits, Replacement Diaphragms

Replacement parts kit for gamma/ L, consisting of:

- 1 Metering diaphragm
- 1 Suction valve compl.
- 1 Pressure valve compl.
- 2 Valve balls
- 1 Kit gaskets
- 1 Connecting kit

Suction and pressure valve set not included with stainless steel version.

Spare parts kits gamma/ L



pk_1_008

Type		Order no.
Type 1000	PPE	1001644
	PPB	1001652
	NPE	1001713
	NPB	1001721
	PVT	1023107
	TTT	1001737
	SST	1001729
Type 1601	PPE	1001645
	PPB	1001653
	NPE	1001714
	NPB	1001722
	PVT	1023108
	TTT	1001738
Type 1602	SST	1001730
	PPE	1001646
	PPB	1001654
	NPE	1001715
	NPB	1001723
	PVT	1023109
Type 1005 and Type 1605	TTT	1001739
	SST	1001731
	PPE	1001647
	PPB	1001655
	NPE	1001716
	NPB	1001724
	PVT	1023110
Type 0708 and Type 1008	PVT HV	1019066
	TTT	1001740
	SST	1001732
	PPE	1001648
	PPB	1001656
	NPE	1001717
	NPB	1001725
Type 0413 and Type 0713	PVT	1023111
	PVT HV	1019067
	TTT	1001741
	SST	1001733
	PPE	1001649
	PPB	1001657
	NPE	1001718
Type 0220 and Type 0420	NPB	1001726
	PVT	1023112
	PVT HV	1019069
	TTT	1001742
	SST	1001734
	PPE	1001650

1.3 gamma/ L Solenoid Diaphragm Metering Pumps

Type		Order no.
	PPB	1001658
	NPE	1001719
	NPB	1001727
	PVT	1023113
	PVT HV	1019070
	TTT	1001754
	SST	1001735
Type 0232	PPE	1001651
	PPB	1001659
	NPE	1001720
	NPB	1001728
	PVT	1023124
	TTT	1001755
	SST	1001736

Spare parts kits for gamma/ L with self-bleeding liquid end, consisting of:

- 1 pump diaphragm
- 1 suction valve set
- 1 discharge valve set
- 1 bleed valve set
- 2 valve balls
- 1 seal set
- 1 connector set

Spare parts kits gamma/ L with self-bleeding liquid end

Type	Materials in contact with medium	Order no.
Type 1601	PPE	1001756
	PPB	1001762
	NPE	1001660
	NPB	1001666
Type 1602	PPE	1001757
	PPB	1001763
	NPE	1001661
	NPB	1001667
Type 1005 and Type 1605	PPE	1001758
	PPB	1001764
	NPE	1001662
	NPB	1001668
Type 0708 and Type 1008	PPE	1001759
	PPB	1001765
	NPE	1001663
	NPB	1001669
Type 0413 and Type 0713	PPE	1001760
	PPB	1001766
	NPE	1001664
	NPB	1001670
Type 0220 and Type 0420	PPE	1001761
	PPB	1001767
	NPE	1001665
	NPB	1001671

1.3 gamma/ L Solenoid Diaphragm Metering Pumps

Spare diaphragm for gamma/ L series

Type	Materials in contact with medium	Order no.
Type 1000	all materials	1000244
Type 1601	all materials	1000245
Type 1602	all materials	1000246
Type 1005 and Type 1605	all materials	1000247
Type 0708 and Type 1008	all materials	1000248
Type 0413 and Type 0713	all materials	1000249
Type 0220 and Type 0420	all materials	1000250
Type 0232	all materials	1000251

1.4 delta® Solenoid-Driven Diaphragm Metering Pumps

1.4.1

delta® Diaphragm Metering Pumps with Controlled Solenoid Drive

optoDrive®
inside

- Continuous or pulsing operation
 - Adaptation of the pump to the feed chemical
 - Detection of blocked metering points, broken metering lines and trapped air or gas bubbles in the liquid end by the integral injection point monitor optoGuard®.
 - Output range 7.5 - 75 l/h, 25 - 2 bar
 - Large adjustment range: continuous 1:1,800, discontinuous 1:36,000
 - Stroke length continuously adjustable between 0 - 100 % (recommended 30 - 100 %)
 - Material versions PVDF, acrylic glass/PVC and stainless steel
 - Patented bleed
 - Diaphragm rupture detection and signalling (optional)
 - Adjustment and display of the feed rate, either as strokes/min or l/h via the keyboard
 - Large illuminated graphic display
 - External activation via potential-free contacts with pulse step-up and step-down
 - Option of external activation by standard signal 0/4-20 mA
 - Interface for PROFIBUS® or CANopen (optional)
 - Optional 14-day process timer for time- and event-dependent metering tasks (optional)
 - Connection for 2-stage level switch
 - 3 LED display for operation, warning and error messages in plain text
 - Concentration input for volume-proportional metering
 - Automatic bleed
 - Pump type 2508 with 7.5 l/h at 25 bar
 - Material version NP for pump types 2508, 1612, 1020 and 0730
 - HV liquid ends for higher-viscosity media
-
- Regelmodul mit Eingang für pH, Redox und Chlor
 - Dosierköpfe in Edelstahl mit EHEDG-Zertifikat

NEW



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1.4 delta® Solenoid-Driven Diaphragm Metering Pumps

Technical Data

Pump type	Max. pressure bar	Delivery rate l/h	Stroke Volume cm ³ /stroke	Max. stroke rate Strokes/min	Connection size o Ø x i Ø mm	Suction head mWC	Shipping weight	
							PVT	SST
DLTA 2508	25	7,5	0,62	200	8 x 4**	5*	10	11
DLTA 1608	16	7,8	0,65	200	8 x 5**	5*	10	11
DLTA 1612	16	11,3	0,94	200	8 x 5	6*	10	11
DLTA 1020	10	19,1	1,59	200	12 x 9	5*	10	11
DLTA 0730	7	29,2	2,43	200	12 x 9	5*	10	11
DLTA 0450	4	49,0	4,08	200	G3/4 - DN10	3*	10	11
DLTA 0280	2	75,0	6,25	200	G3/4 - DN10	2*	10	11

delta® metering pumps for higher-viscosity media have a 10 - 20 % lower metering capacity and are not self-priming. Connection G 3/4 - DN 10 with tube nozzle d16 - DN 10.

* Suction height (mWC) = suction height with primed liquid end and primed suction line

** For stainless steel version 6 mm connection width

Materials in contact with medium

Type	Liquid end	Suction/pressure port	Gaskets	Valve balls
NPE	Plexiglass	PVC	EPDM	Ceramic
NPB	Plexiglass	PVC	FPM	Ceramic
PVT	PVDF	PVDF	PTFE	Ceramic
SST	Stainless steel 1.4404	Stainless steel 1.4404	PTFE	Ceramic

Type of connections

Plastic	8-12 mm	Hose compression fitting
	DN 10	Hose grommet d16 DN 10
Stainless steel	6-12 mm	System Swagelok
	DN 10	Insert Rp 3/8

Metering diaphragm with PTFE coating

Reproducibility of metering $\pm 2\%$ when used in accordance with notes in the operating instructions.

Permissible ambient temperature -10° C to 45° C.

Mean power consumption 78 W

IP rating IP 65, insulation class F

Scope of delivery: Metering pump with mains cable (2 m) and connector, connecting kit for hose/pipe connection according to table.

1.4 delta[®] Solenoid-Driven Diaphragm Metering Pumps

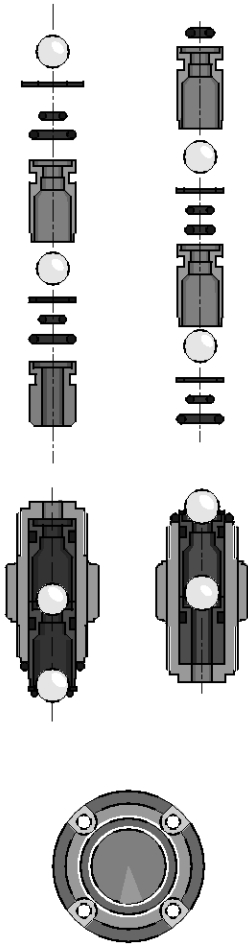
1.4.2 Identcode Ordering System

delta[®] series

DLTA	Type	Capacity			
		bar	l/h	bar	l/h
	2508	25,0	7,50	0730	7,0 29,20
	1608	16,0	7,80	0450	4,0 49,00
	1612	16,0	11,30	0280	2,0 75,00
	1020	10,0	19,10		
Dosing head/valves material					
	PV	PVDF/PVDF not for pump type 2508			
	NP	Acrylic glass/PVC only for pump type 2508, 1608, 1612, 1020, 0730			
	SS	Stainless steel/stainless steel			
Seals/diaphragm material					
	T	PTFE/PTFE coated			
	S	PTFE/diaphragm additionally with FPM coating for silica-laden media			
	B	FPM/PTFE-coated			
	E	EPDM/PTFE-coated			
Liquid end version					
	0	Without ventilation, without valve spring			
	1	Without ventilation, with valve spring			
	2	With ventilation, without valve spring			
	3	With ventilation, with valve spring			
	4	HV version for high-viscosity media			
Hydraulic connections					
	0	Standard connectors as per technical data			
	5	Discharge-side connector for 12/6 hose, suction-side standard			
	F	Connector on discharge side for 8/4 hose, standard on suction side			
Diaphragm rupture indicator					
	0	Without diaphragm failure indication			
	1	With diaphragm failure indication			
Version					
	0	With ProMinent logo			
Power supply					
	U	Universal controller 100-240 V			
Cable and plug					
	A	2 m Europe			
	B	2m Switzerland			
	C	2 m Australia			
	D	2 m USA / 115 V			
	1	2 m without plug			
Relay					
	0	Without relay			
	1	alarm relay normally energised 1 x C/O contact 230 V – 8 A			
	3	alarm relay normally de-energised 1 x C/O contact 230 V – 8 A			
	4	as 1 + pacing relay 2 x N.O. contacts 24 V – 100 mA			
	5	as 3 + pacing relay 2 x N.O. contacts 24 V – 100 mA			
	A	Shutdown and alarm relay normally energised 2 x N.O. contacts 24 V – 100 mA			
	C	as 1 + 4-20 mA output 1 x N.O. contact 24 V – 100 mA			
	F	with automatic bleeder not for pump type 2508			
Accessories					
	0	Without accessories			
	1	With foot and metering valve, 2m suction line and 5 m pressure line			
	2	As 0 + measuring cup (only for type 2508, 1608, 1612, 1020, and 0730)			
	3	As 1 + measuring cup (only for type 2508, 1608, 1612, 1020, and 0730)			
Control variant					
	0	Manual + external contact with pulse control			
	3	Manual + external contact with pulse control + analog 0/4-20 mA			
	4	as 0 + 14-day process timer			
	5	as 3 + 14-day process timer			
	C	CANopen			
	M	with pH, ORP and chlorine control modul			
	R	As 3 + PROFIBUS [®] interface, M12			
Access code					
	0	Without access code			
	1	With access code			
Language					
	DE	German			
	EN	English			
	FR	French			
	ES	Spanish			
Pause/level					
	0	Pause N.C. contact level, N.C. contact			

1.4 delta® Solenoid-Driven Diaphragm Metering Pumps

1.4.3 Spare Parts Kits, Replacement Diaphragms



pk_1_008

Replacement parts kit for delta®, consisting of:

- 1 metering diaphragm
- 1 suction valve compl.
- 1 pressure valve compl.
- 2 valve balls
- 1 kit gaskets
- 1 connecting kit

Stainless steel version without suction and pressure valve compl.

Spare parts kits for delta®

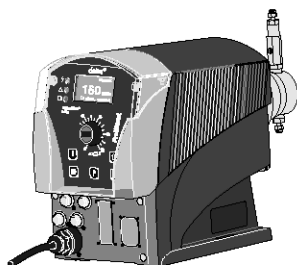
Type	Materials in contact with medium	Order no.
Type 2508	NPE	1033172
	NPB	1033171
	SST	1030226
Type 1608	NPE	1030620
	NPB	1030611
	PVT	1030225
	SST	1030226
Type 1612	NPE	1030536
	NPB	1030525
	PVT	1027081
	SST	1027086
Type 1020	NPE	1030537
	NPB	1030526
	PVT	1027082
	SST	1027087
Type 0730	NPE	1030621
	NPB	1030612
	PVT	1027083
	SST	1027088
Type 0450	PVT	1027084
	SST	1027089
Type 0280	PVT	1027085
	SST	1027090

Replacement diaphragms for delta® series

Type	Materials in contact with medium	Order no.
Type 2508/1608	all materials	1030353
Type 1612	all materials	1000248
Type 1020	all materials	1000249
Type 0730	all materials	1000250
Type 0450	all materials	1000251
Type 0280	all materials	1025075

1.5 mikro delta® Precision Piston Metering Pumps

1.5.1 mikro delta® Precision Piston Metering Pumps

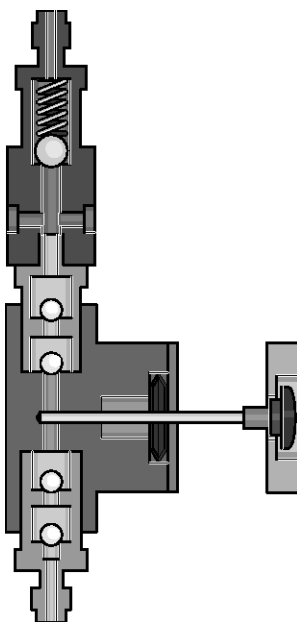


P_DE_0003_SW1

- Output range 150 - 1,500 m/h, 40 - 6 bar
- Stroke volume 1-250 µl
- Material versions PTFE and stainless steel
- Metering reproducibility: ± 0,5 %
- Continuous or pulsing operation
- Adaptation of the pump to the feed chemical
- Continuous stroke length adjustment from 0 - 100 %
- Adjustment and display of the feed rate, either as strokes/min or l/h via the keyboard
- Large illuminated graphic display
- External activation via potential-free contacts with pulse step-up and step-down
- External activation by standard signal 0/4-20 mA (optional)
- Interface for PROFIBUS® or CANopen (optional)
- 14-day process timer for time- and event-dependent metering tasks (optional)
- Connection for 2-stage level switch
- 3 LED display for operation, warning and error messages in plain text
- Concentration input for volume-proportional metering

Further technical details on request

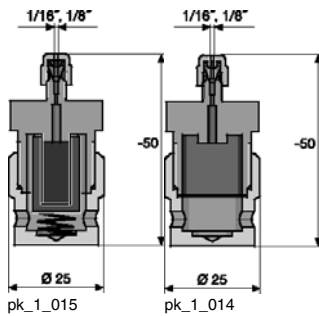
Available from 2nd quarter of 2010



pk_1_010
Liquid end

1.5 mikro delta® Precision Piston Metering Pumps

1.5.2 mikro® delta Accessories



Stainless steel suction filter

Without check ball, interchangeable filter element. Material: 1.4404/1.4310/SS 316/PTFE

Connection		Order no.
1/16" - 15 µm	(for mikro 50 and 200 ml head) (Fig. pk_1_015) for tube Ø 1.58	803253
1/8" - 15 µm	(for mikro 500 ml head) (Fig. pk_1_015) for tube Ø 3.175	803254
1/8" - 60 µm	(for SK metering pumps) (Fig. pk_1_014) for tube Ø 3.175	803255

Replacement filter elements for suction filter

		Order no.
Sintered elements	15 µm	403814
Screen mesh	60 µm	404523

Stainless steel discharge valve

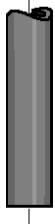
Housing in 1.4404 and springs in 1.4571, PTFE seals.



pk_1_016

Size	Connection	Order no.
Ø 20 x 48 mm	1/16" - 1/4" for tube Ø 1.58 and 1.75 mm	803251
Ø 22 x 56 mm	1/8" - 1/4" for tube Ø 3.175 and 3.2 mm	803252

Suction and discharge pipe



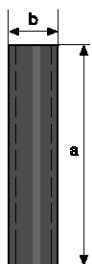
pk_1_013

	Permissible operating pressure bar	Order no.
PTFE 1.75 mm o. Ø x 1.15 mm i. Ø (1/16")	12*	037414
PTFE 3.2 mm o. Ø x 2.4 mm i. Ø (1/8")	8*	037415
Stainless steel pipe 1.4435 1.58 mm o. Ø x 0.9 mm i. Ø (1/16")	400*	1020384
Stainless steel pipe 1.4435 3.175 mm o. Ø x 1.5 mm i. Ø (1/8")	400*	1020775

* permitted operating pressure at 20 °C, provided media is compatible and pipe is correctly connected.

Nipple

1.4571 pipe nipple for mikro g/ 5 and gamma/ 4 SK for connecting 1/16" and 1/8" PTFE tubing.

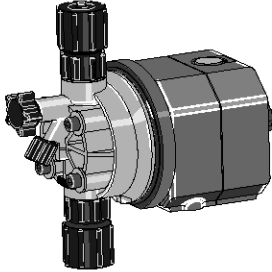


pk_1_017

	Order no.
Nipple 1/16" o. Ø 1.58 mm x i. Ø 0.9 mm, length 25 mm	403215
Nipple 1/8" o. Ø 3.175 mm x i. Ø 1.5 mm, length 30 mm	403216
Nipple 1/8-1/16" o. Ø 3.175 - 1.58 mm, length 45 mm	403217

1.6 Pneumados b Metering Pumps

1.6.1 Pneumados b Metering Pumps



P_PN_0005_SW

- Output range: 0.76 - 16.7 l/h, 16 - 2 bar
- Infinitely variable stroke length adjustment
- Material version PVDF and stainless steel
- Stroke rate up to 180 strokes/min

Pneumados b is a pneumatically operated metering pump in the output range from 0.76 l/h to 16.7 l/h at a max. backpressure of 16 - 2 bar. The pressure stroke takes place by means of compressed air applied against a diaphragm while the intake stroke is controlled by spring force. The metering output can be adjusted by means of the stroke length and stroke rate.

Typical applications of the Pneumados b include:

Animal feed treatment

- Metering and spraying animal feed with flavouring agents

Painting systems

- Metering coagulants

Greenhouses

- Metering fertilisers and minerals

Carwash systems

- Metering detergent, shampoo, brightener, wax, drying agent as well as preparing recycling water by metering flocculant, pH-corrector, antifoaming agent and de-emulsifier

in all systems with central controller (e.g. PLC) and compressed air supply

1.6 Pneumados b Metering Pumps

Technical Data

Pump type	Delivery rate at max. backpressure			Number of strokes Strokes/min	Connector Sizes	Suction head mWC	Shipping weight kg
	bar	l/h	ml/stroke				
PNDb 1000	10	0,76	0,07	180	6 x 4	6,0	1,0 - 1,7
PNDb 1601	16	1,00	0,09	180	6 x 4	6,0	1,0 - 1,7
PNDb 1602	16	1,70	0,16	180	6 x 4	6,0	1,0 - 1,7
PNDb 1005	10	3,80	0,35	180	8 x 5*	5,0	1,2 - 1,9
PNDb 0708	7	6,30	0,58	180	8 x 5	4,0	1,2 - 1,9
PNDb 0413	4	10,50	0,97	180	8 x 5	3,0	1,2 - 1,9
PNDb 0220	2	16,70	1,55	180	12 x 9	2,0	1,2 - 1,9

* Stainless steel version 6 x 4 mm

Filtered compressed air 6 bar $\pm 10\%$

Air consumption at 1 m feed line 47 l/min

Max. stroke rate 180 strokes/min

Connectors

Material	Øä x Øi	Version
for PV	6, 8 and 12 mm	Hose nozzle with clamping ring
for stainless steel SS	6, 8 and 12 mm	Swagelok system screw connection

Materials in contact with medium

	Liquid end	Intake/pressure connection	Seals	Balls
PVT	PVDF	PVDF	PTFE	Ceramic
SST	Stainless steel M. No. 1.4404	Stainless steel M. No. 1.4404	PTFE	Ceramic

DEVELOPAN® Metering diaphragm with PTFE coating.

Metering reproducibility $\pm 2\%$ when used in accordance with operating instructions. Permissible ambient temperature -10 °C to +50 °C.

1.6 Pneumados b Metering Pumps

1.6.2 Identcode Ordering System

Pneumados b

PNDb	Type	Capacity	
		bar	l/h
	1000	10,0	0,76
	1601	16,0	1,00
	1602	16,0	1,70
	1005	10,0	3,80
	0708	7,0	6,30
	0413	4,0	10,50
	0220	2,0	16,70
Dosing head/Valves material			
	PV	PVDF/PVDF	
	SS	SS Stainless steel 1.4404/1.4404	
Seals/diaphragm material			
	S	Metakorin diaphragm with Viton-B seal	
	T	Standard diaphragm with PTFE seal	
	X	Without delivery unit	
Liquid end version			
	0	Without bleeder, without valve spring only for SS	
	1	Without bleeder, with valve spring only for SS	
	2	With bleeder, without valve spring only for PV	
	3	With bleeder, with valve spring only for PV	
	X	Without delivery unit	
Hydraulic connectors			
	0	Standard connection as per technical data	
Version			
	0	With ProMinent logo	
Power connector			
	0	G 1/4 connector, compressed air 6 bar	
	1	6 x 4 connector, compressed air 6 bar	
Control type			
	0	Single-acting (standard), without control valves	
	1	Electropneumatic actuation, with electric clock generator 24 V DC, solenoid valve 24 V DC, wall bracket and mounting material for solenoid valve	
Approvals			
	01	CE	

1.6 Pneumados b Metering Pumps

1.6.3 Sample Order For Ancillary Equipment

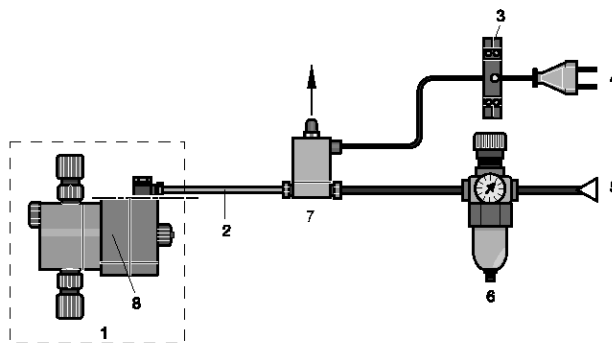
	Order no.
1 x PVC foot valve with filter and Ø 6 back pressure ball	924557
1 x PVC dosing valve with Ø 6 - R 1/2 ball check valve	924680
1 x 5 m suction and discharge pipe as compressed air line, PE 6 x 4 mm	1004492
1 x compressed air connector for Pneumados G 1/4 - 6 mm quick release connector LCK 1/4"	354641
1 x wall bracket Pneumados including fixtures and fittings	1030028

For electrical controller

	Order no.
1 x 3/2-way solenoid valve MHE3, 24Vdc, with connection fittings 6/4mm	1030275
1 x retaining bracket for solenoid valve	1030276
1 x sound absorber for solenoid valve	1030277
1 x electrical pulse generator 30-180 strokes/min., 24Vdc	1030351

Electrical/Pneumatic controller

Schematic diagram

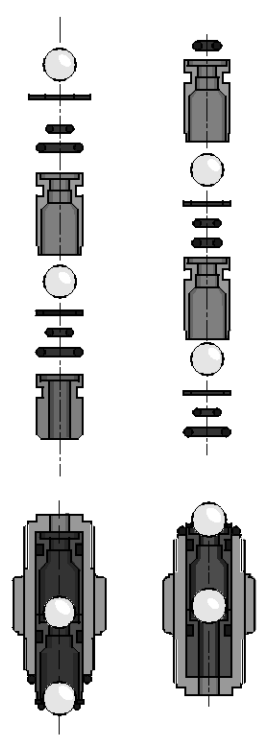


- 1 Pneumados supply limit
- 2 PE 6x4 max. 1 m
- 3 electrical pulse generator
- 4 230 V/50-60 Hz mains connector
- 5 compressed air
- 6 maintenance unit 6 bar
- 7 3/2 way solenoid valve with sound absorber
- 8 Pneumados

pk_1_035

1.6 Pneumados b Metering Pumps

1.6.4 Spare Parts Kits

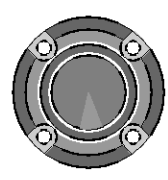


Replacement parts kit for Pneumados b consisting of

- 1 Metering diaphragm
- 1 Suction port compl.
- 1 Pressure port compl.
- 2 Valve balls
- 1 Kit gaskets
- 1 Connecting kit

Stainless steel version without suction and pressure valve compl.

Type		Order no.
Type 1000	PVT	1023107
	SST	1001729
Type 1601	PVT	1023108
	SST	1001730
Type 1602	PVT	1023109
	SST	1001731
Type 1005	PVT	1023110
	SST	1001732
Type 0708	PVT	1023111
	SST	1001733
Type 0413	PVT	1023112
	SST	1001734
Type 0220	PVT	1023113
	SST	1001735



pk_1_008

1.7 DULCO®flex Peristaltic Pumps

1.7.1

DULCO®flex DF2a

- Capacity range 0.4-2.4 l/h at max. 1.5 bar back pressure
- Hose material: Tygon® or PharMed®
- Control and/or quantity control via mains ON/OFF
- Practically silent operation
- Self-priming against max. 1.5 bar
- Gentle metering
- Sprung rollers for constant rolling pressure and extended service life of hose

The DULCO®flex is a peristaltic pump. The metering chemical is displaced in the direction of flow as rotor squeezes the hose. No valves are required which ensures that the chemical is treated gently.

Typical applications are processes in which only a limited feed pressure is required such as the metering of conditioning agents in private pools.

The robust, chemical-resistant PPE housing is protected on all sides from spray (IP 65), which guarantees its universal application capability. OEM versions are available on request.



pk_1_130

1.7 DULCO®flex Peristaltic Pumps

1.7.2 Identcode Ordering System

DULCO®flex System DF2a

DF2a	Type	Capacity	
		bar	l/h
	0204	1,5	0,4
	0208	1,5	0,8
	0216	1,5	1,6
	0224	1,5	2,4
Hose material			
	P	PharMed®	
	T	Tygon®	
	V	Viton® for fragrances (special version)	
Version			
	0	With ProMinent® logo	
	1	Without ProMinent® logo	
Hydraulic connectors			
	0	Connector for hose 6/4 mm priming and discharge side	
	9	Connector for hose 10/4 mm discharge side only	
Power supply			
	A	230 V ± 10 %, 50/60 Hz	
	B	115 V ± 10 %, 50/60 Hz	
Cable and plug			
	0	No mains lead	
	1	With 2 m mains lead, open ended	
Drive			
	0	Mains ON/OFF	
Installation			
	W	Wall mounted	
Accessories			
	0	No accessories	

Tygon®, Viton® and PharMed® are registered trademarks

Technical Data

Type	Capacity		Frequency rpm	Connector size o dia. x i dia.	Suction head mWC	Intake head mWC
	bar	l/h				
DULCO®flex DF2a						
0204	1,5	0,4	5	6x4/10x4	4	3
0208	1,5	0,8	10	6x4/10x4	4	3
0216	1,5	1,6	20	6x4/10x4	4	3
0224	1,5	2,4	30	6x4/10x4	4	3

Admissible ambient temperature: 10-45 °C
 Power consumption approx.: 5 W
 Switching duration: 100 %
 Enclosure rating: IP 65

	Order no.
Spare hose set, complete, PharMed®	1009480
Spare hose set Tygon®	1009481
replacement hose compl. Viton®	1023842

1.7 DULCO®flex Peristaltic Pumps

1.7.3

DULCO®flex DF3a

- Output range 0.4 - 2.4 l/h at max. 1.5 bar backpressure
- Hose material Viton®, used specifically for metering of fragrances in wellness applications
- Control of two further peristaltic pumps for different fragrances
- Control of a solenoid valve for the diluent water
- Almost silent operation
- Self-priming against max. 1.5 bar
- Sprung rollers for constant rolling pressure and increased service life of the hose

The DULCO®flex DF3a was specifically developed for metering fragrances in wellness facilities. This pump can be used wherever fragrances are metered in small quantities. Typical areas of application include the aroma infusion of douse water in saunas, steambaths, and whirlpools.

The metering pump is equipped with a process timer which can control two further peristaltic pumps for other essences. Since the essences used in saunas must not be used undiluted on the oven, the DF3a is equipped with three relays for controlling the diluent water.

To save essences when the sauna is not in use, the pump features a contact input to which e.g. a door contact or motion sensor can be connected. This ensures metering of fragrances only when the sauna is in use.



P_DX_0003_SW

1.7 DULCO®flex Peristaltic Pumps

1.7.4 Identcode Ordering System

DULCO®flex system DF3a

DF3a	Application	D	Fragrance dosing.
	Installation	W	Wall mounting.
	Version	0	with LCD, with ProMinent® logo.
		1	with LCD, without ProMinent® logo.
	Type	Capacity	
		bar	l/h
	0204	1,5	0,4
	0208	1,5	0,8
		bar	l/h
	0216	1,5	1,6
	0224	1,5	2,4
	Hose material	V	Viton®.
	Hydraulic connectors	0	Standard.
		9	Special connection 10x4 pressure side.
	Power supply	A	230 V, 50/60 Hz.
		B	115 V, 50/60 Hz.
	Cable and plug	0	Without cable.
		1	With cable 2.0 m; open end.
		A	With cable 2.0 m; Euro connector.
		B	With cable 2.0 m; Swiss connector.
	Accessories	0	Without accessories.
		1	Metering valve and foot valve; suction and discharge line.
	Hardware-flaring	0	None.
	Language	00	German.
	Relay	0	Without relay.
	Application relays	0	None.
		1	Solenoid valve.
		2	Solenoid valve + pump 2.
		3	Solenoid valve + pump 2 + pump 3.
	Control Variants	0	External contact.
	Pause/level	0	Pause break contact + level break contact.
		1	Pause make contact + level break contact.
		2	Pause break contact + level make contact.
		3	Pause make contact + level make contact.
	Approvals	01	CE-Symbol.

Viton® is a registered trademark.

Technical Data

Type	Capacity		Frequency rpm	Connector size o dia. x i dia.	Suction head mWC	Intake head mWC
	bar	l/h				
DULCO®flex system DF3a						
0204	1,5	0,4	5	6 x 4	4	2
0208	1,5	0,8	10	6 x 4	4	2
0216	1,5	1,6	20	6 x 4	4	2
0224	1,5	2,4	30	6 x 4	4	2

Permissible ambient temperature: 10-45 ?
 Approx. power consumption: 24 W
 Switching duration: 100 %
 Enclosure rating: IP 65

Order no.

replacemst hose compl. Viton®

1023842

1.7 DULCO®flex Peristaltic Pumps

1.7.5

DULCO®flex DF4a

- Output range 0.4 - 12 l/h, 4 - 2 bar
 - Hose material PharMed® and Tygon®
 - Powerful stepper motor, speed-controllable
 - Continuous adjustment of the metering rate manually or externally through contact or analogue signal 0/40-20 mA
 - Suction function (high speed)
 - Sprung rollers for constant rolling pressure and increased service life of the hose
 - Switchable output change, e.g. increase when needed or off-peak reduction
 - Display of the metering rate in l/h
 - Reversible direction of rotation, e.g. backflushing
 - Housing IP rating IP 65 pursuant to DIN EN 60529
-
- Pump type 04004, 0.4 l/h - 4 bar

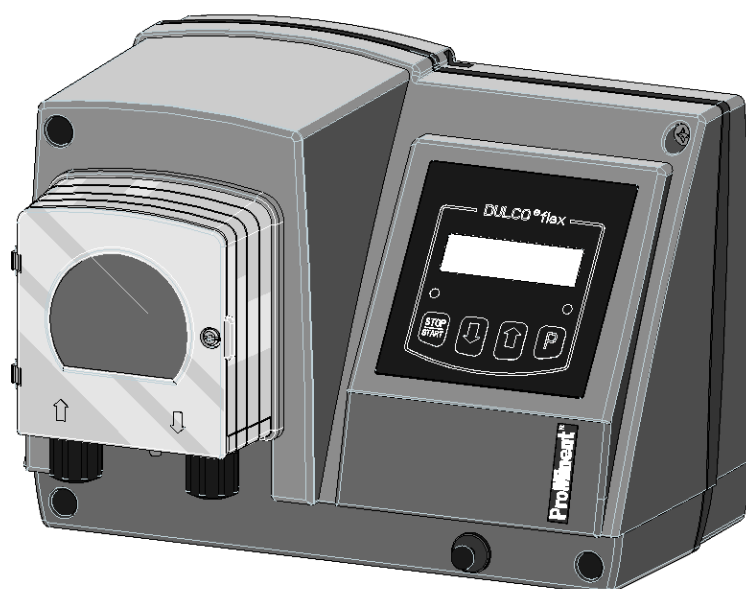
The DULCO®flex DF4a was developed for metering chemicals in swimming pool applications.

It is available in three versions with the system control menu as well as the inputs and outputs adapted to the respective application:

- 1 "Standard pump" as volume-adjustable metering pump for general applications (from 3rd quarter of 2010).
- 2 "Metering of activated carbon" with reversible direction of rotation for backflushing the hose over the entire output range.
- 3 "Metering of flocculants" with a continuous metering rate from approx. 5 ml/h. Up to two auxiliary inputs can be configured to realise an increase in the metering rate in case of sudden increased load and an off-peak reduction of the metering volume.

The metering volume can either be set in l/h on the display or specified via external control signals. The pump can process contact signals as well as analogue signals, e.g. 0/4 - 20 mA or 0 - 10 V.

Thanks to the universal controllability and the three output stages, the pump can be used for a wide range of metering tasks. PharMed® and Tygon® are available as hose materials.



P_DX_0006_SW

1.7 DULCO®flex Peristaltic Pumps

1.7.6 Identcode Ordering System

DULCO®flex system DF4a

DF4a	Application	
	0	Standard pump
	A	Activated carbon metering
	F	Flocculant metering
	Installation	
	W	Wall mounting
	Version	
	0	With ProMinent® logo
	1	Without ProMinent® logo
	Type Capacity	
		bar l/h
	04004	4,0 0,4
	04015	4,0 1,5
	03060	2,5 6,0
	02120	2,0 12,0
	Hose material	
	P	PharMed®
	T	Tygon®
	Hydraulic connectors	
	0	Standard
	9	Special connection 10x4 pressure side
	Power supply	
	U	100 - 240 VAC, 50/60 Hz
Cable and plug		
0	Without cable	
1	With cable 2.0 m; open end	
A	With cable 2.0 m; Euro connector	
B	With cable 2.0 m; Swiss connector	
Accessories		
0	Without accessories	
2	with lip-seal metering valve PCB and 10 m PE metering line	
Hardware-flaring		
0	None	
Language default		
00	Language-neutral	
Relay		
1	Fault signalling relay, drop-out action	
3	Fault signalling relay, pick-up action	
Control Variants		
0	manual + external contact	
2	manual + external contact and analogue 0/4 - 20 mA	
8	manual + external contact and analogue 0/4 - 20 mA + 0 - 10 V	
Further input		
1	Pause + 2-stage level + AUX1	
2	Pause + 1-stage level + AUX1 + AUX2	
Pause/level		
0	Pause break contact + level break contact	
Approvals		
01	CE-Symbol	

Tygon® and PharMed® are registered trademarks.

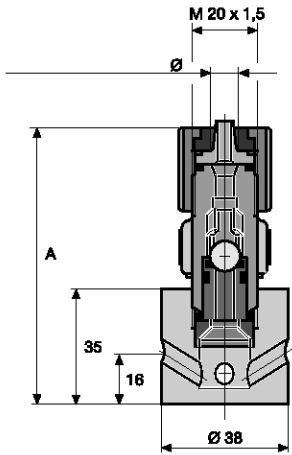
1.8 Mechanical-Hydraulic Accessories

1.8.1 Foot Valves

At end of intake line to protect against soiling and prevent backflow, with screen filter and non-return ball. For connections 6/4, 8/5, 12/6, 12/9 with ceramic weight.

PPE Foot valve

PP body, EPDM seals

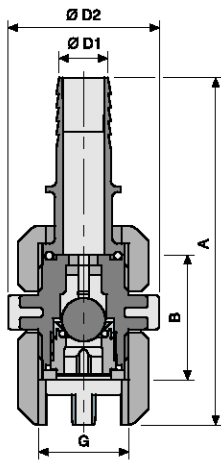


pk_1_038

Connector	oØ x iØ mm	A mm	fig.	Order no.
6/4 for hose	6 x 4	84	pk_1_038	924558
8/5 for hose	8 x 5	84	pk_1_038	809468
12/9 for hose	12 x 9	87	pk_1_038	809470
10/4 for hose	10 x 4	87	pk_1_038	1002916
12/6 for hose	12 x 6	87	pk_1_038	809469
6/4 for hose	6 x 4	57	pk_1_037	914554
G 3/4 - DN 10 for hose	20 x 15 and 24 x 16	93	P_AC_0206_SW	809465

PPB Foot valve

PP body, FPM (FPM) seals

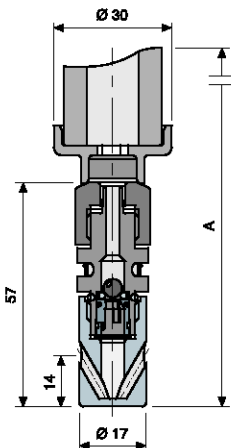


P_AC_0206_SW

Connector	oØ x iØ mm	A mm	fig.	Order no.
6/4 for hose	6 x 4	84	pk_1_038	924559
8/5 for hose	8 x 5	84	pk_1_038	924683
12/9 for hose	12 x 9	87	pk_1_038	924684
10/4 for hose	10 x 4	87	pk_1_038	1002915
12/6 for hose	12 x 6	87	pk_1_038	924685
G 3/4 - DN 10 for hose	20 x 15 and 24 x 16	93	P_AC_0206_SW	790189

PCB Foot valve

PVC housing, FPM seals.



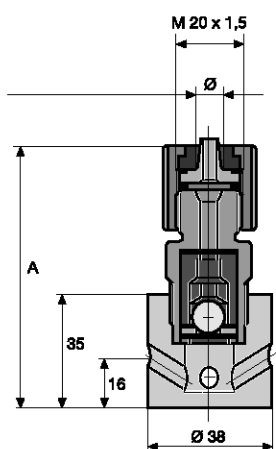
P_AC_0207_SW

Connector	oØ x iØ mm	A mm	fig.	Order no.
6/4 for hose	6 x 4	84	pk_1_038	924557
8/5 for hose	8 x 5	84	pk_1_038	924562
12/9 for hose	12 x 9	87	pk_1_038	924564
10/4 for hose	10 x 4	87	pk_1_038	1002917
12/6 for hose	12 x 6	87	pk_1_038	924563
6/4 for hose	6 x 4	57	pk_1_037	914505
G 3/4 - DN 10 for hose	20 x 15 and 24 x 16	93	P_AC_0206_SW	809464

1.8 Mechanical-Hydraulic Accessories

PVT Foot valve

PVDF housing, PTFE seals.

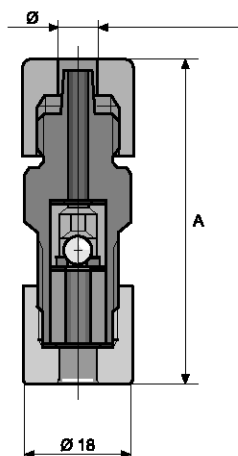


pk_1_040

Connector	oØ x iØ mm	A mm	fig.	Order no.
6/4 for hose	6 x 4	79	pk_1_040	1024705
8/5 for hose	8 x 5	79	pk_1_040	1024706
12/9 for hose	12 x 9	82	pk_1_040	1024707
DN 10 for hose	24 x 16	92	P_AC_0206_SW	1029471

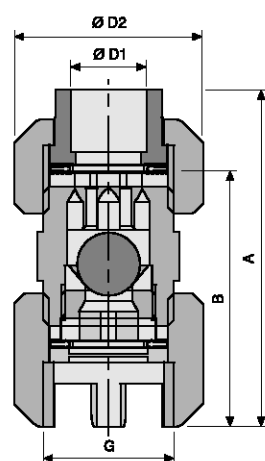
TT1 Foot valve

PTFE housing and seals, for connections 6/4, 8/5, 12/6, 12/9 with ceramic weight.



pk_1_039

Connector	oØ x iØ mm	A mm	fig.	Order no.
6/4 for hose	6 x 4	79	pk_1_040	809455
8/5 for hose	8 x 5	79	pk_1_040	809471
12/9 for hose	12 x 9	82	pk_1_040	809473
12/6 for hose	12 x 6	82	pk_1_040	809472
6/4 for hose	6 x 4	52	pk_1_039	914349
G 3/4 - DN 10	fusion coupler d16	93	P_AC_0202_SW	809466

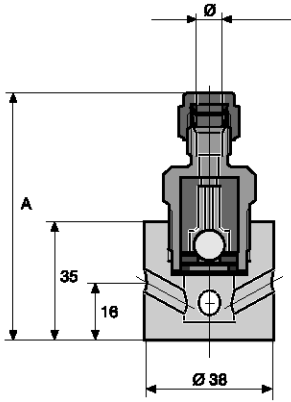


P_AC_0202_SW

1.8 Mechanical-Hydraulic Accessories

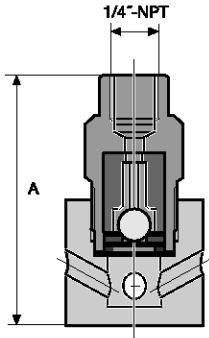
SS1 Foot valve

Stainless steel 1.4404 housing, PTFE seals. A support sleeve is required for hose connections 6/4, 8/5, 12/9.

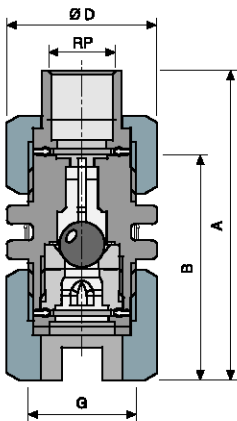


P_AC_0229_SW1

Connector	oØ x iØ mm	A mm	fig.	Order no.
6/4 for pipe 6 x 5 mm / hose	6 x 4	74	P_AC_0229_SW1	924568
8/5 for pipe 8 x 7 mm / hose	8 x 5	74	P_AC_0229_SW1	809474
12/9 for pipe 12 x 10 mm / hose	12 x 9	77	P_AC_0229_SW1	809475
1/4" NPT for SS2		70	pk_1_031_SW1	924567
G 3/4 - DN 10 with socket Rp 3/8		67	P_AC_0204_SW	809467



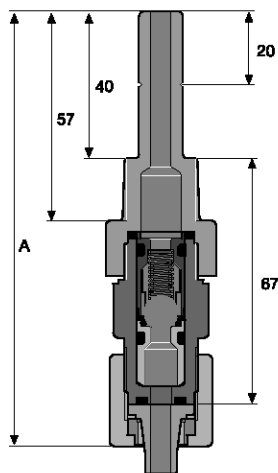
pk_1_031_SW1



P_AC_0204_SW

1.8 Mechanical-Hydraulic Accessories

1.8.2 Injection Valves



pk_1_105

For connection of discharge line to point of injection. Discharge valve with ball check. Spring loaded PP, PVC, PVDF and stainless steel versions, with Hastelloy C spring, 0.5 bar response pressure (for R 1/4 stainless steel 1.4571 spring, response pressure approx. 1 bar). Installation in any position.

Vertical installation from below for TT version without spring. Valve spring can be retrofitted. Materials as pump liquid ends.

Important: Injection valves and discharge lances are not intended as completely sealed units!

PPE Injection valves

PP/PVDF housing, EPDM seals with non-return ball, spring-loaded with Hastelloy C spring, prepressure approx. 0.5 bar with extended screwed socket.

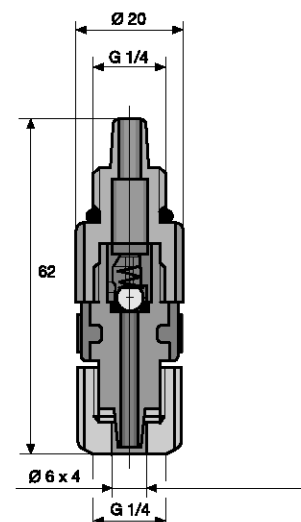
Applications when using appropriate intake lines

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar

Connection	oØ x iØ mm	A mm	fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	119	pk_1_105	924681
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	119	pk_1_105	809476
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	119	pk_1_105	809478
10/4 - R 1/2 for PVC hose	10 x 4	119	pk_1_105	1002920
12/6 - R 1/2 for PVC hose	12 x 6	119	pk_1_105	809477
6/4 - G 1/4 for PE/PTFE pipe*	6 x 4	62	pk_1_042	914184
G 3/4 - DN 10 for PVC hose	24 x 16	83	pk_2_029	809461

* stainless steel 1.4571 valve spring, priming pressure approx. 1 bar.



pk_1_042

PPB Injection valves

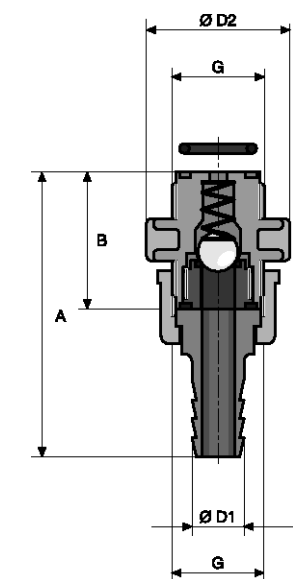
PP/PVDF housing, FPM seals with spring-loaded non-return ball, prepressure approx. 0.5 bar.

Applications when using appropriate intake lines

25 °C - max. operating pressure 16 bar

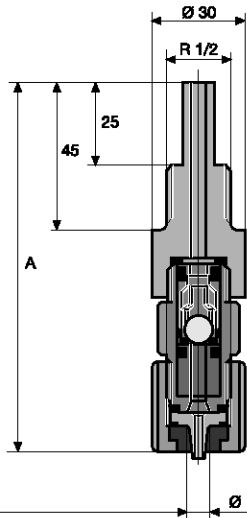
45 °C - max. operating pressure 9 bar

Connection	oØ x iØ mm	A mm	fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	119	pk_1_105	924682
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	119	pk_1_105	924687
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	119	pk_1_105	924688
10/4 - R 1/2 for PVC hose	10 x 4	119	pk_1_105	1002921
12/6 - R 1/2 for PVC hose	12 x 6	119	pk_1_105	924689
G 3/4 - DN 10 for PVC hose	24 x 16	83	pk_2_029	790191



pk_2_029

1.8 Mechanical-Hydraulic Accessories



pk_1_046

PP/PTFE Injection valves

For prevention of chemical deposition. PP body, PTFE mounting insert, EPDM seals with ball check, and Hastelloy C spring approx. 0.5 bar priming pressure. (fig. pk_1_046)

Applications when using appropriate intake lines

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar

Connection	oØ x iØ mm	A mm	fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	103	pk_1_046	924588
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	103	pk_1_046	924589
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	106	pk_1_046	924590
10/4 - R 1/2 for PVC hose	10 x 4	106	pk_1_046	1002923
12/6 - R 1/2 for PVC hose	12 x 6	106	pk_1_046	924591

PVC/PTFE Injection valves

PVC body, PTFE mounting insert, FPM-B seals, spring loaded ball check with Hastelloy C spring, approx. 0.5 bar priming pressure.

Applications when using appropriate intake lines

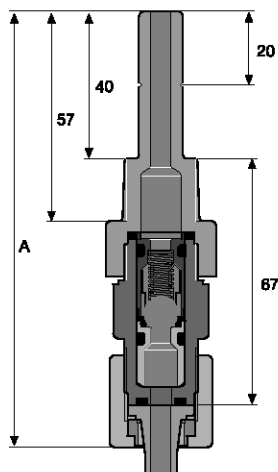
25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 7 bar

Connector	oØ x iØ mm	fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	pk_1_046	809450
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	pk_1_046	809451
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	pk_1_046	809452
10/4 - R 1/2 for PVC hose	10 x 4	pk_1_046	1002924
12/6 - R 1/2 for PVC hose	12 x 6	pk_1_046	809453

1.8 Mechanical-Hydraulic Accessories

PCB Injection valves



pk_1_105

Housing made of PVC/PVDF, gaskets made of FPM with non-return ball spring-loaded with Hastelloy C spring, pre-pressure approx. 0.5 bar, with extended screwed socket. Type 8/4 up to 25 bar.

Applications when using appropriate intake lines

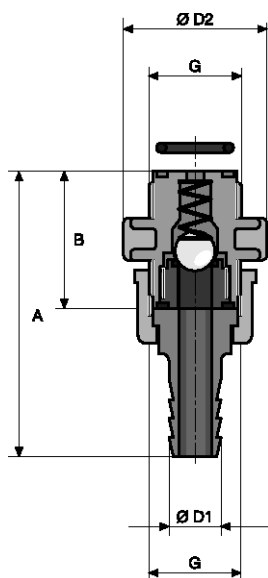
25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 7 bar

Connection	oØ x iØ mm	A mm	fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	119	pk_1_105	924680
8/4 - R 1/2 for PTFE line	8 x 4	119	pk_1_105	1034621
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	119	pk_1_105	924592
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	119	pk_1_105	924594
10/4 - R 1/2 for PVC hose	10 x 4	119	pk_1_105	1002919
12/6 - R 1/2 for PVC hose	12 x 6	119	pk_1_105	924593
6/4 - G 1/4 for PE/PTFE pipe*	6 x 4	62	-	914559
G 3/4 - DN 10 for PVC hose	24 x 16	83	pk_2_029	809460

* Spring made of 1.4571, approx. 1 bar prepressure.

PVT Injection valves



pk_2_029

Housing PVDF, gaskets PTFE, with non-return ball, spring-loaded with Hast. C spring, approx. 0.5 bar pre-pressure, with extended screwed socket. Type 6/3 up to 20 bar, 8/4 up to 25 bar.

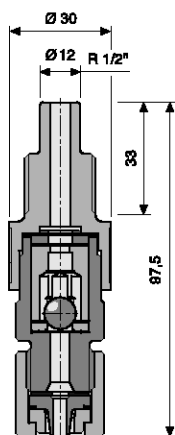
Applications when using appropriate intake lines

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 12 bar

Connection	oØ x iØ mm	A mm	fig.	Order no.
6/3 - R 1/2 for PTFE pipe	6 x 3	119	pk_1_105	1024713
6/4 - R 1/2 for PTFE pipe	6 x 4	119	pk_1_105	1024708
8/4 - R 1/2 for PTFE line	8 x 4	119	pk_1_105	1034619
8/5 - R 1/2 for PTFE pipe	8 x 5	119	pk_1_105	1024710
12/9 - R 1/2 for PTFE pipe	12 x 9	119	pk_1_105	1024711
10/4 - R 1/2 for PVC hose	10 x 4	119	pk_1_105	1024709
12/6 - R 1/2 for PVC hose	12 x 6	119	pk_1_105	1024712
G 3/4 - DN 10 with pressure hose nozzle d16 - DN 10.	24 x 16	84	pk_2_029	1029476

TT1 Injection valves



P_AC_0184_SW

Vertical installation from below. With ball check, without spring. Valve spring (Order No. 469404) can be retrofitted. Body and seals PTFE.

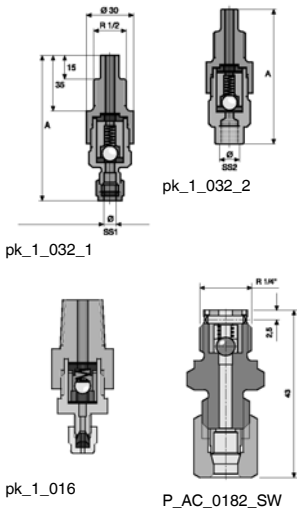
Applications when using appropriate intake lines

25 °C - max. operating pressure 10 bar

90 °C - max. operating pressure 5 bar

Connection	oØ x iØ mm	A mm	fig.	Order no.
6/4 - R 1/2 for PE/PTFE pipe	6 x 4	98	P_AC_0184_SW	809488
8/5 - R 1/2 for PE/PTFE pipe	8 x 5	98	P_AC_0184_SW	809479
12/9 - R 1/2 for PE/PTFE pipe	12 x 9	101	P_AC_0184_SW	809481
12/6 - R 1/2 for PVC hose	12 x 6	101	P_AC_0184_SW	809480
6/4 - R 1/4 for PE/PTFE pipe	6 x 4	65	-	914347
G 3/4 - DN 10 with fusion coupler d16	-	-	pk_2_030	809462

1.8 Mechanical-Hydraulic Accessories



SS1 Injection valve

Stainless steel 1.4404 body and PTFE seals with spring loaded ball check. Spring made of Hastelloy C. with approx. 0.5 bar priming pressure, for 1.4571 R 1/4 spring, approx. 1 bar priming pressure. Ferrule is required for connection with PE/PTFE pipe.

Applications when using appropriate intake lines

25 °C - max. operating pressure 30 bar

45 °C - max. operating pressure 30 bar

Connection	oØ x iØ mm	A mm	fig.	Order no.
6 mm - R 1/2 for pipe	6 x 5	93	pk_1_032_1	809489
8 mm - R 1/2 for pipe	8 x 7	93	pk_1_032_1	809482
12 mm - R 1/2 for pipe	12 x 10	96	pk_1_032_1	809483
1/4" NPT - R 1/2 for pipe	R 1/4" NPT	89	pk_1_032_2	924597
6 mm - R 1/4 for pipe	6	43	P_AC_0182_SW	914588
1/16" - R 1/4 for pipe	1,58 u. 1,5	-	pk_1_016	803251
1/8" - R 1/4 for pipe	3,18 u. 3,2	-	pk_1_016	803252
G 3/4 - DN 10, sleeve	Rp 3/8	-	pk_2_030 (sect. 2.5.2)	809463

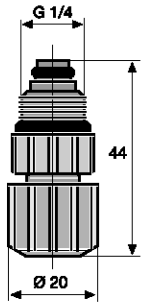
PPB Injection valves, O-ring loaded

PP body, (FPM) FPM seals. Priming pressure approx. 0.5 bar.

Applications when using appropriate intake lines

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar



Connector	oØ x iØ mm	fig.	Order no.
6/4 - G 1/4	6 x 4	pk_1_043	914754
6/4 - G 1/4	6 x 4	pk_1_044	741193

pk_1_043

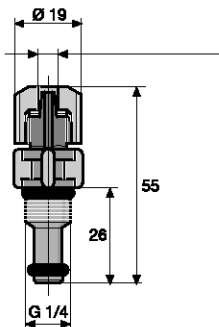
PCB Injection valves O-ring loaded

PVC body, FPM (FPM) seals, priming pressure approx. 0.5 bar.

Applications when using appropriate intake lines

25 °C - max. operating pressure 16 bar

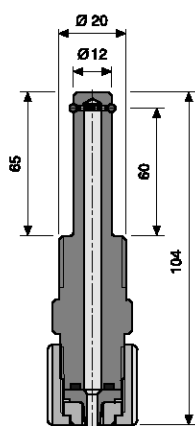
45 °C - max. operating pressure 7 bar



Connector	oØ x iØ mm	fig.	Order no.
6/4 - G 1/4	6 x 4	pk_1_043	914558
6/4 - G 1/4	6 x 4	pk_1_044	915091

pk_1_044

1.8 Mechanical-Hydraulic Accessories



P_AC_0183_SW

PTFE Injection valves O-ring loaded

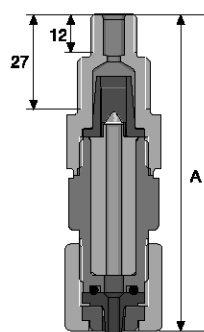
PTFE housing, FPM seals.

Applications when using appropriate intake lines

25 °C - max. operating pressure 10 bar

45 °C - max. operating pressure 6 bar

Connection	oØ x iØ mm	A mm	fig.	Order no.
6/4 – for PE/PTFE line	6 x 4	104	P_AC_0183_SW	809484
8/5 – for PE/PTFE line	8 x 5	104	P_AC_0183_SW	809485
10/4 – for PE/PTFE line	10 x 4	104	P_AC_0183_SW	1002925
12/6 – for PVC hose	12 x 6	104	P_AC_0183_SW	809487
12/9 – for PE/PTFE line	12 x 9	104	P_AC_0183_SW	809486



pk_1_070

Lip seal dosing valve PCB

Body PVC, seals FPM, inlet pressure approx. 0.05 bar. For dosing sodium hypochlorite and in conjunction with the peristaltic pump DF2a..

Applications when using appropriate intake lines

25 °C - max. operating pressure 2 bar

45 °C - max. operating pressure 2 bar

Connection	oØ x iØ mm	A mm	fig.	Order no.
6/4 - R 1/2 - 1/4 for PE/PTFE pipe	6 x 4	90	Fig. 3	1019953
10/4 - R 1/2 - 1/4 for PE/PTFE pipe	10 x 4	90	Fig. 3	1024697



pk_1_049

Dosing Connector For Warm Water Up To 200 °C

Consists of stainless steel 1.4404 discharge valve, 1 m stainless steel 1.4571 discharge line and threaded connector with reinforcing sleeve for connection of PE/PTFE pipe to stainless steel pipe.

Max. operating pressure 30 bar

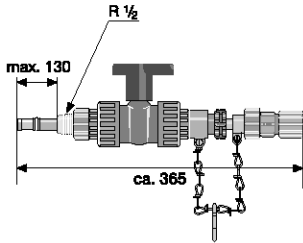
Connection	fig.	Order no.
Warm water 6 mm - G 1/4	pk_1_049	913166
Warm water 6 mm - G 1/2	pk_1_049	913167
Warm water 8 mm - G 1/2	pk_1_049	913177
Warm water 12 mm - G 1/2	pk_1_049	913188

1.8 Mechanical-Hydraulic Accessories

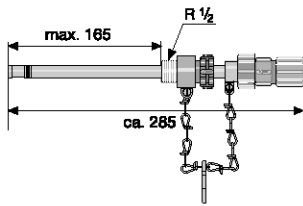
1.8.3 Injection Lances, Non-Return Valves

PPE injection lance

For immersion depths of 20 - 165 mm, in large diameter pipe to prevent chemical deposition at the point of injection. Consisting of spring-loaded metering valve, Hastelloy C spring, ceramic ball, adjustable immersion rod and hose valve. With connectors for all hose sizes used with solenoid metering pumps: 6/4, 8/5, 12/9, 10/4 and 12/6.



pk_1_007



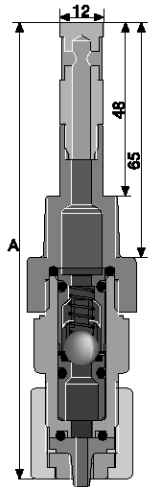
pk_1_062

Type	Gasket material	Max. pressure at 25 °C bar	fig.	Order no.
PPE without shut-off cock valve	EPDM/silicone	6	pk_1_007	1021530
PPE with shut-off cock valve	EPDM/silicone	6	pk_1_062	1021531
PCB without shut-off cock valve	FPM/silicone*	6	pk_1_007	1021528
PCB with shut-off cock valve	FPM/silicone*	6	pk_1_062	1021529

* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.

Short injection lance

Metering lance with universal connection kit, thereby enabling the connection of different hose sizes from 6/4 to 12/9. Hastelloy C spring, ceramic ball and silicone hose. Material of screwed socket: PVDF.



P_AC_0020_SW

Type	Material, valve body	Max. pressure at 25 °C bar	Seal material	A mm	fig.	Order no.
PPE	PP	16	EPDM	126	pk_1_106	1028383
PCB	PVC	16	FPM-B	126	pk_1_106	1028363
PVT	PVDF	16	PTFE	126	pk_1_106	1028081

PVDF non-return valve for hose installation

With connection kit on both sides for fitting in hose line.

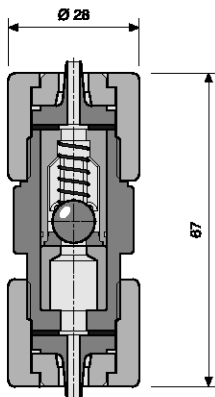
With non-return ball, spring-loaded with Hastelloy C spring, prepressure approx. 0.5 bar.

PVDF housing, PTFE seals.

Different hose sizes from 6/4 to 12/9 can be joined by using different connection kits.

25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 12 bar



P_AC_0181_SW

Connection	oØ x iØ mm	A mm	fig.	Order no.
6/4 for PE/PTFE line	6 x 4	67	P_AC_0181_SW	1030463
8/5 for PE/PTFE line	8 x 5	67	P_AC_0181_SW	1030975
10/4 for PE/PTFE line	10 x 4	67	P_AC_0181_SW	1030977
12/6 for PVC hose	12 x 6	67	P_AC_0181_SW	1030978
12/9 for PE/PTFE line	12 x 9	67	P_AC_0181_SW	1030976

1.8 Mechanical-Hydraulic Accessories

1.8.4 Back Pressure Valves/Relief Valves

Back pressure valves are used to generate a constant back pressure for precise dosing and/or to protect against overdosing, or for dosing accuracy with an open discharge or a positive pressure on the suction side. They are also used in conjunction with pulsation dampeners to produce pulsation-free or low-pulsation dosing. With fluctuating back pressure and dosing into a vacuum, we recommend the back pressure valves Type DHV-RM.

(Pressure Relief Valves/Overflow Valves see on page → 2-32)

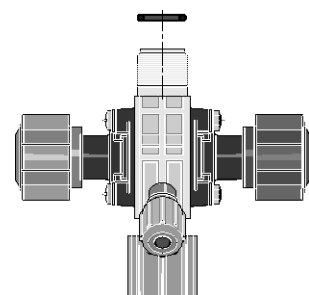
The back pressure valves described here are designed for the full range of applications. Please consult the relevant section for each version.

Important: Back pressure valves are not intended as completely sealed units. When using with dangerous chemicals, all relevant safety measures must be observed.

Relief valves are installed in by-pass pipework, to protect pumps, pipework and housings from excess pressure as a result of operational error or blockage in the main pipework.

If a problem arises, the valve alters the direction of fluids, feeding back into the storage tank.

Multifunction valve type MFV-DK, PVDF



pk_1_053

Multifunction Valve for assembly directly onto the liquid end of the pump. Has the following functions:

- Back pressure valve, opening pressure approx. 1.5 bar, with open discharge or positive pressure on the suction side (black rotary knob)
- Relief valve, opening pressure approx. 6, 10 or 16 bar (red rotary knob)
- Admission aid in existing back pressure, no need to de-pressurise pipes
- Pressure relief, e.g. prior to servicing

The ProMinent® Multifunction Valve is simple to operate using smooth action rotary knobs, which return to the initial position on release. This ensures safe operation even under difficult access conditions. The ProMinent® Multifunction Valve is made from PVDF and can be used with virtually all chemicals.

Warning: Back pressure valves are not intended as completely sealed units!

Caution: The bypass line must always be connected.

Valve body PVDF
 Diaphragm PTFE- coated
 Seal FPM and EPDM (enclosed)

Hoses see page → 1-53.

Type	Relief opening pressure*	Connection	Bypass connector	Order no.
Size I	16 bar	6/12	6/4	792011
Size I	10 bar	6/12	6/4	791715
Size I	6 bar	6/12	6/4	1005745
Size II	10 bar	6/12	12/9	792203
Size II	6 bar	6/12	12/9	740427
Size III	10 bar	DN 10	12/9	792215

* The relief opening pressure given above is the pressure at which the valve begins to open. The pressure can be up to 50 % higher until the valve is fully open depending on the type of pump.

Area of application of multifunctional valve

- Size I ALPc 1001, 1002, 1004, 1008, 0708
 Beta®, gamma/ L type 1000, 1601, 1602, 1605, 1005, 1008, 0708, 0413, 0220
 delta® Type 1608, 1612
- Size II ALPc 0419, 0230
 Beta®, gamma/ L type 1605, 1008, 0713, 0420, 0232
 delta® type 1020, 0730
- Size III delta® type 0450, 0280

For material PP, PV, NP, TT.

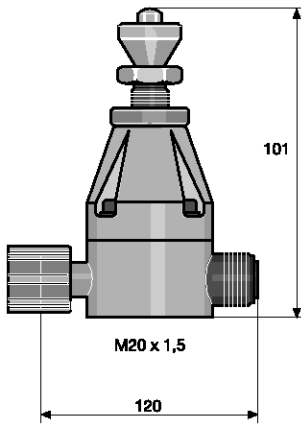
1.8 Mechanical-Hydraulic Accessories

Back pressure valve type DHV-S-DK, adjustable between 1-10 bar

Adjustable back pressure valve for mounting direct on the dosing head, to generate a constant back pressure. For precise dosing with an open discharge and with positive pressure on the suction side.

Warning: Back pressure valves are not intended as completely sealed units!

Application range: Metering pumps alpha, Beta®, gamma/ L, Pneumados b, EXtronic® and delta®



pk_1_129

Type	Adjustable pressure	Connection	Material	Order no.
DHV-S-DK	1 – 10 bar	6 - 12 mm	PP/EPDM	302320
DHV-S-DK	1 – 10 bar	6 - 12 mm	PC/FPM*	302321
DHV-S-DK	1 – 10 bar	6 - 12 mm	TT/PTFE	302322
DHV-S-DK	1 – 10 bar	6 mm	SS	1003793
DHV-S-DK	1 – 10 bar	8 mm	SS	1003795
DHV-S-DK	1 – 10 bar	12 mm	SS	1003797

* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.

Back pressure valve/relief valve type DHV-S-DL, adjustable between 1-10 bar

Adjustable back pressure valve for mounting direct on the dosing head, to generate a constant back pressure. For precise dosing with an open discharge and with positive pressure on the suction side.

They are also used in connection with pulsation dampers for low-pulsation metering.

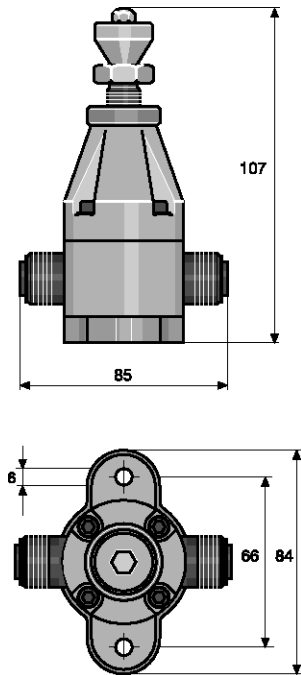
For use with pulsation dampener under back pressure, or long pipe, use type DHV-RM.

See section 2.5: Back pressure valves

Warning: Back pressure valves are not intended as completely sealed units!

Application range: Metering pumps alpha, Beta®, gamma/ L, Pneumados b, EXtronic® and delta®

(Pressure Relief Valves/Overflow Valves see on page → 2-32)

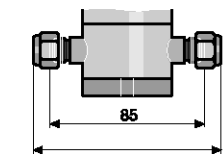


Type	Adjustable pressure	Connection	Material	Order no.
DHV-S-DL	1 – 10 bar	6 - 12	PP	302323
DHV-S-DL	1 – 10 bar	6 - 12	PC/FPM*	302324
DHV-S-DL	1 – 10 bar	6 - 12	TT	302325
DHV-S-DL	1 – 10 bar	6	SS	302326
DHV-S-DL	1 – 10 bar	8	SS	302327
DHV-S-DL	1 – 10 bar	12	SS	302328

For the connection, 2 connecting kits in the required hose size are to be ordered separately.

* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.

(Connection Kits see page → 1-74)

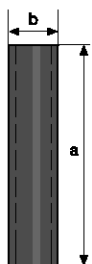


pk_1_054

Pipe nipples

For the direct connection of the pressure maintenance valve DHV-S-DL in stainless steel (SS) to the liquid end.

Type	A mm	B mm	fig.	Order no.
1.4571 pipe nipple	6	40	pk_1_017	818537
-	8	40	pk_1_017	818538
-	12	40	pk_1_017	818539



pk_1_017

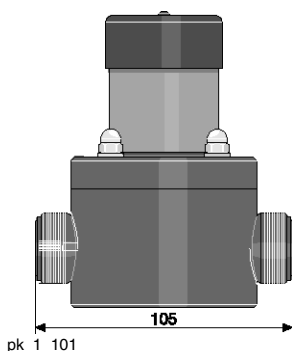
1.8 Mechanical-Hydraulic Accessories

Back pressure valve Type BPV-DM

Adjustable back pressure valve for mounting in the dosing line, to generate a constant back pressure and/or for precise dosing with an open discharge as well as positive pressure on the suction side.

Warning: back pressure valves are not tight shut-off isolation devices! The installation notes in the operating instructions must be strictly observed!

Applications: metering pumps alpha, Beta®, gamma/ L, EXtronic®, Pneumados b and delta®



Type	Adjustable pressure	Connection	Material	Order no.
BPV-DM	1 – 10 bar	6 - 12	PP/EPDM	1009884
BPV-DM	1 – 10 bar	6 - 12	PP/FPMB	1009886
BPV-DM	1 – 10 bar	6 - 12	PVC/EPDM	1009885
BPV-DM	1 – 10 bar	6 - 12	PVC/FPMB	1026450

* For the connection, 2 No. connection kits in the required hose size must be ordered in addition.

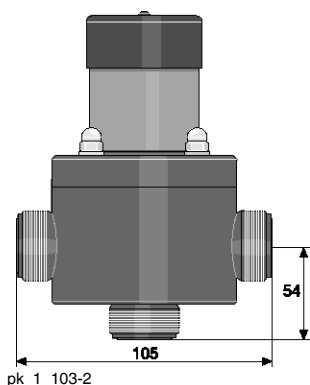
(Connection Kits see page → 1-74)

Relief valve Type BPV-SM

Adjustable relief valve for mounting in the dosing line to protect against excess pressure. With additional relief line connection in the base of the valve body – no tee required for installation.

Warning: back pressure valves are not tight shut-off isolation devices! The installation notes in the operating instructions must be strictly observed!

Applications: metering pumps alpha, Beta®, gamma/ L, EXtronic®, Pneumados b and delta®



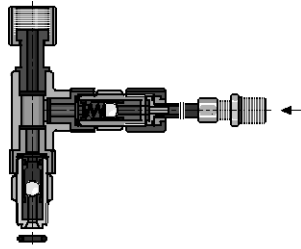
Type	Adjustable pressure	Connection	Material	Order no.
BPV-SM	1 – 10 bar	6 - 12	PPE	1009887
BPV-SM	1 – 10 bar	6 - 12	PPB	1009889
BPV-SM	1 – 10 bar	6 - 12	PCE	1009888
BPV-SM	1 – 10 bar	6 - 12	PCB	1026445

* For the connection, 3 No. connection kits in the required hose size must be ordered in addition.

(Connection Kits see page → 1-74)

1.8 Mechanical-Hydraulic Accessories

1.8.5 Fittings



pk_1_056

Flushing Assembly

For flushing and cleaning liquid ends, discharge line and injection valve.

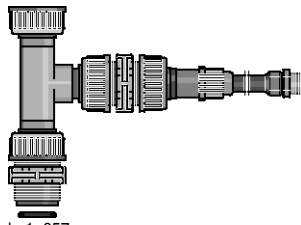
Manual or timer relay controlled versions. Assembly, including retrofitting, onto suction connector of metering pump. Supplied with 2 m flushing pipe and connector nipple R 3/8.

Automatic flushing assembly for flushing the pump head fully automatically is possible on request.

PPE Flushing Assembly

PP material, EPDM seal.

	fig.	Order no.
For connections 6/4, 8/5, 12/6, 12/9	pk_1_056	809909
For G 3/4 -DN 10 connector	pk_1_057	809917
For G 1 -DN 15 connector	pk_1_057	809919



pk_1_057

PCB Flushing Assembly

Material: PVC, FPM seals

	fig.	Order no.
for connection 6/4, 8/5, 12/6, 12/9*	pk_1_056	809925
for connection G 3/4 - DN 10*	pk_1_057	809926
for connection G 1 - DN 15*	pk_1_057	803960

* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.

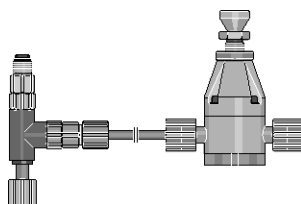
Relief Valve Assembly

Consists of back pressure valve, adjustable between 1.5 and 10 bar, DL type complete with connector parts, for assembly directly onto liquid end.

Connector sizes 6-12 mm according to pressure connector on metering pump.

Relief Valve Assembly PPE:

Material: PP, EPDM seals.

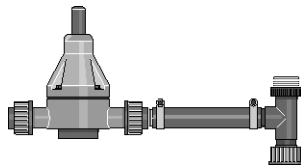


pk_1_058

	fig.	Order no.
For connections 6/4, 8/5, 12/6, 12/9	pk_1_058	809990
G 3/4 - DN 10 connector	pk_1_059	809991
G 1 - DN 15 connector	pk_1_059	809992

Relief Valve Assembly PCB:

Material: PVC, FPM seals.



pk_1_059

	fig.	Order no.
for connection 6/4, 8/5, 12/6, 12/9*	pk_1_058	809989
for connection G 3/4 - DN 10*	pk_1_059	809993
for connection G 1 - DN 15*	pk_1_059	914745

* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.

1.8 Mechanical-Hydraulic Accessories

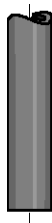
1.8.6 Hoses, Pipes

Suction and discharge line

for metering pumps and accessories. We recommend using the original lines to ensure the mechanical connection in case of clamping ring fittings as well as compressive strength and chemical resistance.

On request, food grade version is possible.

Suction line, soft PVC

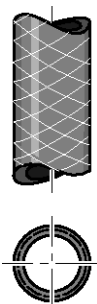


pk_1_013

Material	Length	oØ x iØ	Permissible operating pressure	Order no.	
	m	mm			bar
PVC flexible	5	6 x 4	0,5*	1004520	
	5	8 x 5	0,5*	1004521	
	5	12 x 9	0,5*	1004522	
	10	6 x 4	0,5*	1004523	
	10	8 x 5	0,5*	1004524	
	10	12 x 9	0,5*	1004525	
	25	6 x 4	0,5*	1004526	
	25	8 x 5	0,5*	1004527	
	25	12 x 9	0,5*	1004528	
	50	6 x 4	0,5*	1004529	
	50	8 x 5	0,5*	1004530	
	50	12 x 9	0,5*	1004531	
	Sold in meters		19 x 15	0,5*	037020

* Admissible operating pressure at 20 °C in accordance with DIN EN ISO 7751, subject to chemical resistance and correct assembly.

Suction and discharge line, soft PVC with woven fabric core



pk_1_060

Material	Length	oØ x iØ	Permissible operating pressure	Order no.	
	m	mm			bar
Fabric reinforced flexible PVC	5	10 x 4	18*	1004533	
	5	12 x 6	17*	1004538	
	10	10 x 4	18*	1004534	
	10	12 x 6	17*	1004539	
	25	10 x 4	18*	1004535	
	25	12 x 6	17*	1004540	
	50	10 x 4	18*	1004536	
	50	12 x 6	17*	1004541	
	Sold in meters		24 x 16	16*	037040
	Sold in meters		27 x 19	16*	037041

* permissible operating pressure at 20°C in accordance with DIN EN ISO 7751, 1/4 of the bursting pressure subject to chemical resistance and correct assembly.

For socket welded and PVC cemented rigid PP and PVDF pipe, pipes and fittings with a pressure rating of PN 16 or PN 10 bar are to be used.

Caution:

The resistance of soft PVC hoses is not identical with that of hard PVC. Please observe the resistance for PVC soft as well as the cleaning instructions when using the equipment for foodstuff applications (see homepage).

1.8 Mechanical-Hydraulic Accessories

Suction and discharge, PE

Material	Length		Permissible operating pressure	Order no.
	m	oØ x iØ mm		
Polyethylene	5	6 x 4	10*	1004492
	5	8 x 5	10*	1004493
	5	12 x 9	7*	1004504
	10	6 x 4	10*	1004505
	10	8 x 5	10*	1004506
	10	12 x 9	7*	1004507
	25	6 x 4	10*	1004508
	25	8 x 5	10*	1004509
	25	12 x 9	7*	1004510
	50	6 x 4	10*	1004511
	50	8 x 5	10*	1004512
	50	12 x 9	7*	1004513

* Admissible operating pressure at 20 °C in accordance with DIN EN ISO 7751, subject to chemical resistance and correct assembly

Suction and discharge lines, PTFE

Material	Length		Permissible operating pressure	Order no.
	m	oØ x iØ mm		
PTFE	Sold in meters	1.75 x 1.15	12*	037414
	Sold in meters	3.2 x 2.4	8*	037415
	Sold in meters	6 x 3	20*	1021353
	Sold in meters	6 x 4	15*	037426
	Sold in meters	8 x 4	25*	1033166
	Sold in meters	8 x 5	17*	037427
	Sold in meters	12 x 9	11*	037428
	Sold in meters	19 x 16	6*	037430

* Admissible operating pressure at 20 °C in accordance with DIN EN ISO 7751, subject to chemical resistance and correct assembly

Stainless steel pipes

Material	Length		Permissible operating pressure	Order no.
	m	oØ x iØ mm		
Stainless steel pipe 1.4435	Sold in meters	1.58 x 0.9	400*	1020384
	–	3.175 x 1.5	400*	1020385
	Sold in meters	6 x 5	175*	015738
	Sold in meters	6 x 4	185*	015739
	Sold in meters	8 x 7	160*	015740
	Sold by meter	12 x 10	200*	015743

* Admissible operating pressure at 20 °C in accordance with DIN EN ISO 7751, subject to chemical resistance and correct assembly

1.8 Mechanical-Hydraulic Accessories

1.8.7 Pressure Accumulator

PP Pressure accumulator

Caution: An overflow valve must always be installed when using pressure accumulators.

Operating range

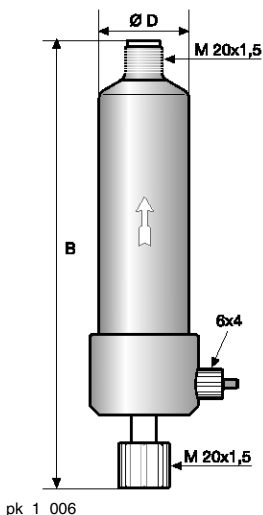
20 °C - max. operating pressure 10 bar

40 °C - max. operating pressure 6 bar

	Volume l	Permissible stroke volume ml	Connection	fig.	Order no.
Size 0*	0,15	1,0	M 20 x 1,5	pk_1_006	1021157
Size I	0,35	2,5	DN 8	pk_1_065	243218
Size II	1,00	5,0	d 16–DN 10	pk_1_065	243219
Size II	1,00	5,0	d 20–DN 15	pk_1_065	243220

* With vent valve. Installed directly at pressure connection.

	Connection	A	B	Ø D
Size 0	M 20 x 1,5	-	225	49
Size I	DN 8	150	170	75
Size II	DN 10	192	220	110
Size II	DN 15	200	220	110



PVC Pressure accumulator

Caution: An overflow valve must always be installed when using pressure accumulators.

Operating range

20 °C - max. operating pressure 10 bar

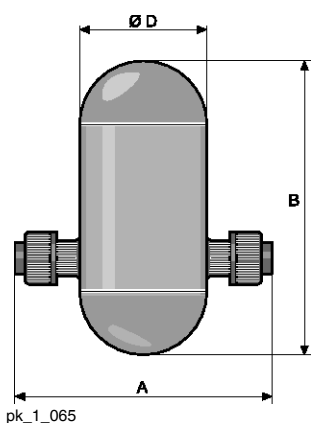
40 °C - max. operating pressure 6 bar

	Volume l	Permissible stro- ke volume ml	Connection	fig.	Order no.
Size 0**	0,15	1,0	M 20 x 1,5	pk_1_006	1021120*
Size I	0,35	2,5	DN 8	pk_1_065	243203*
Size II	1,00	5,0	d 16–DN 10	pk_1_065	243204*
Size II	1,00	5,0	d 20–DN 15	pk_1_065	243205*

* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.

** With bleed valve. Installation directly at the pressure port.

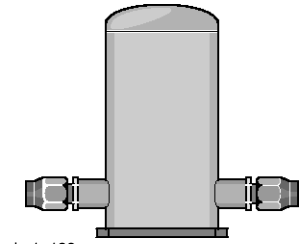
	Connection	A	B	Ø D
Size 0	M 20 x 1,5	-	225	49
Size I	DN 8	150	170	75
Size II	DN 10	192	220	110
Size II	DN 15	200	220	110



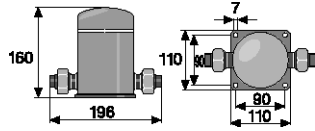
1.8 Mechanical-Hydraulic Accessories

Stainless steel accumulator

Max. operating pressure 10 bar.



pk_1_128



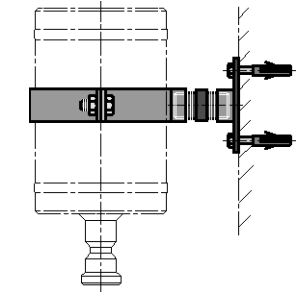
pk_1_063

	Volume l	Permissible stroke volume ml	Connection	fig.	Order no.
Size 0	0,15	2,5	for pipe oØ 6	pk_1_128	914510
Size I	0,35	2,5	for pipe oØ 8	pk_1_128	914511
Size I	1,00	2,5	for pipe oØ 12	pk_1_128	914512
Size II*	1,00	5,0	G 3/8-DN 10	pk_1_063	914756

* Threaded sleeve insert G 3/8.

Wall mounting for accumulator

For PP and PVC versions, consisting of clamping ring, mounting plate and connecting nipple.



pk_1_061

			Order no.
For size I accumulator - 0.35 l	0,35 l	Ø 75	818501
For size II accumulator - 1l	1 l	Ø 110	818502

1.8 Mechanical-Hydraulic Accessories

1.8.8 Pulsation Dampeners (In-line)

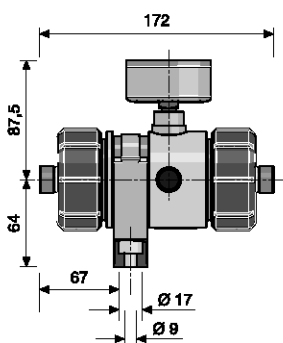
The pulsation dampener is used to produce minimal pulsation dosing and to reduce flow resistance in long discharge lines.

The cushion of gas located between the hose and the housing is compressed by a thrust stroke from the dosing pump, allowing a quantity of feed chemical to pass along the discharge line. On the next suction stroke, the excess pressure created by the cushion of gas forces the chemicals through the pipe. The gas is now released from pressure, and returns to its original volume.

Important: The pulsation dampeners must be protected by an overflow valve.

In-line Dampener PP

Operating conditions
 5 - 30 °C - max. operating pressure 10 bar
 40 °C - max. operating pressure 8 bar
 60 °C - max. operating pressure 4 bar



P_AC_0180_SW

	Volume	Dampener diaphragm	Seal material	Connection	Order no.
PPE in-line dampener	0,05	CSM*	EPDM	M 20 x 1.5	1026768
PPB in-line dampener	0,05	FPM	FPM	M 20 x 1.6	1026771
PPE in-line dampener	0,05	CSM*	EPDM	G 3/4 - DN 10	1026769
PPB in-line dampener	0,05	FPM	FPM	G 3/4 - DN 10	1026772

* chlorosulfonated polyethylene

PVC In-line dampener

Operating conditions
 5 - 20 °C - max. operating pressure 10 bar
 40 °C - max. operating pressure 6 bar
 60 °C - max. operating pressure 2 bar

	Volume	Dampener diaphragm	Seal material	Connection	Order no.
PCE in-line dampener	0,05	CSM*	EPDM	M 20 x 1.5	1026774
PCB in-line dampener	0,05	FPM	FPM	M 20 x 1.6	1026777
PCE in-line dampener	0,05	CSM*	EPDM	G 3/4 - DN 10	1026775
PCB in-line dampener	0,05	FPM	FPM	G 3/4 - DN 10	1026778

* chlorosulfonated polyethylene

Threaded end plug

Threaded end plugs to close off the outlet side of the damper together with T-piece installation.

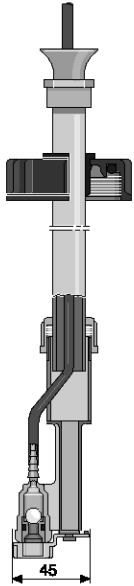
Material	Connection	Order no.
PP	M 20 x 1,5	1030200
PP	G 3/4 - DN 10	1001352
PVC	M 20 x 1,5	1030458
PVC	G 3/4 - DN 10	1001349

1.8 Mechanical-Hydraulic Accessories

1.8.9 Suction Lances, Suction Kit without Level Switch

Variable suction lance without level switch

680 mm long for connection to disposable container of 5 - 60 litres, consisting of foot valve, retaining tube, vertically adjustable screw cap and 2 m intake hose.



pk_1_067

PPE

Material, retaining tube and foot valve PP
Seal material EPDM
Hose Material PE

Material	Hose o Ø x i Ø mm		fig.	Order no.
PPE	6 x 4	For 50 mm container opening	pk_1_067	790539
PPE	8 x 5	For 50 mm container opening	pk_1_067	790540
PPE	12 x 9	For 50 mm container opening	pk_1_067	790541

PCB

Material, retaining tube and foot valve PVC
Seal material FPM
Hose Material soft PVC

Material	Hose o Ø x i Ø mm		fig.	Order no.
PCB	6 x 4	For 50 mm container opening	pk_1_067	790536
PCB	8 x 5	For 50 mm container opening	pk_1_067	790537
PCB	12 x 9	For 50 mm container opening	pk_1_067	790538



pk_1_066

Screw cap

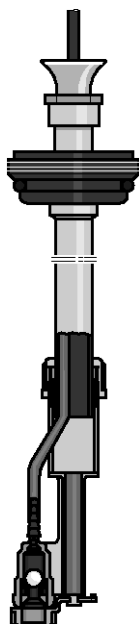
For tanks with opening Ø 44, customers need to order the Ø 44 screw cap as a spare part to replace Ø 50 screw cap.

	Order no.
Ø 44 screw cap	811626

1.8 Mechanical-Hydraulic Accessories

Variable suction lance for 200 litre drum without level switch

1000 mm long for connection to 200 litre drum, with foot valve, retaining tube, vertically adjustable screw plug and 3 m intake hose.



pk_1_125

PPE

Material, retaining tube and foot valve PP
Seal material EPDM
Hose Material PE

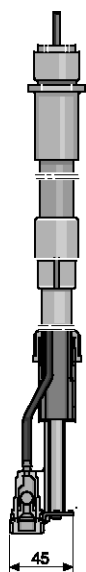
Material	Hose o \varnothing x i \varnothing mm		fig.	Order no.
PPE	6 x 4	For 2" container opening DIN S 70 x 6	pk_1_125	790545
PPE	8 x 5	For 2" container opening DIN S 70 x 6	pk_1_125	790546
PPE	12 x 9	For 2" container opening DIN S 70 x 6	pk_1_125	790547

PCB

Material, retaining tube and foot valve PVC
Seal material FPM
Hose Material soft PVC

Material	Hose o \varnothing x i \varnothing mm		fig.	Order no.
PCB	6 x 4	For 2" container opening DIN S 70 x 6	pk_1_125	790542
PCB	8 x 5	For 2" container opening DIN S 70 x 6	pk_1_125	790543
PCB	12 x 9	For 2" container opening DIN S 70 x 6	pk_1_125	790544

1.8 Mechanical-Hydraulic Accessories



pk_1_069

Variable suction kit without level switch

For ProMinent® solenoid pumps consisting of foot valve, adjustable retaining tube with screw connection and 2 m intake line.

	Length of retaining tube	
Size I	385 - 550 mm	for 35-60 litre container
Size II	660 - 1040 mm	for 100-500 litre container
Size III	1200 - 1350 mm	for 1000 litre container

PPE

Material, retaining tube and foot valve	PP
Seal material	EPDM
Hose Material	PE

Material	Hose o Ø x i Ø mm	For container	fig.	Order no.
PP I	6 x 4	35, 60 l	pk_1_069	790333
PP I	8 x 5	35, 60 l	pk_1_069	790334
PP I	12 x 9	35, 60 l	pk_1_069	790335
PP II	6 x 4	100, 140, 250, 500 l	pk_1_069	790336
PP II	8 x 5	100, 140, 250, 500 l	pk_1_069	790337
PP II	12 x 9	100, 140, 250, 500 l	pk_1_069	790338
PP III	6 x 4	1000 l	pk_1_069	790453
PP III	8 x 5	1000 l	pk_1_069	790454
PP III	12 x 9	1000 l	pk_1_069	790455

PCB

Material, retaining tube and foot valve	PVC
Seal material	FPM
Hose Material	soft PVC

Material	Hose o Ø x i Ø mm	For container	fig.	Order no.
PVC I	6 x 4	35, 60 l	pk_1_069	790327
PVC I	8 x 5	35, 60 l	pk_1_069	790328
PVC I	12 x 9	35, 60 l	pk_1_069	790329
PVC II	6 x 4	100, 140, 250, 500 l	pk_1_069	790330
PVC II	8 x 5	100, 140, 250, 500 l	pk_1_069	790331
PVC II	12 x 9	100, 140, 250, 500 l	pk_1_069	790332
PVC III	6 x 4	1000 l	pk_1_069	790450
PVC III	8 x 5	1000 l	pk_1_069	790451
PVC III	12 x 9	1000 l	pk_1_069	790452

See Page → 2-36 for suction kits with larger nominal diameters

1.8 Mechanical-Hydraulic Accessories

1.8.10 Suction Lances, Suction Assembly With Single Stage Float Switch

Variable suction lance with one-stage level switch and flat connector

680 mm for connection to 5-60 litre one way tank, consists of PP foot valve, support pipe and float switch with flat connector, height adjustable Ø 50 screw cap and 2 m PE suction hose. For D_4a dosing pump ranges.

Switching mode: 1 x N/O for low liquid levels

PPE

Material, retaining tube and foot valve PP
 Seal material EPDM
 Hose Material PE

Material	Hose o Ø x i Ø mm		fig.	Order no.
PP	6 x 4	PP for Ø 50 tank opening, suction hose	pk_1_072	790378
PP	8 x 5	PP for Ø 50 tank opening, suction hose	pk_1_072	790379
PP	12 x 9	PP for Ø 50 tank opening, suction hose	pk_1_072	790380

PCB

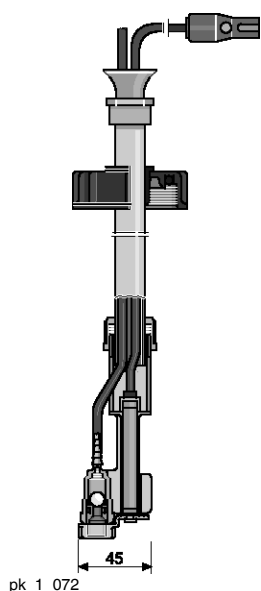
Material, retaining tube and foot valve PVC
 Seal material FPM
 Hose Material soft PVC

Material	Hose o Ø x i Ø mm		fig.	Order no.
PVC	6 x 4	PVC for Ø 50 tank opening, suction hose	pk_1_072	790375
PVC	8 x 5	PVC for Ø 50 tank opening, suction hose	pk_1_072	790376
PVC	12 x 9	PVC for Ø 50 tank opening, suction hose	pk_1_072	790377

Screw cap

For tanks with opening Ø 44, customers need to order the Ø 44 screw cap as a spare part to replace Ø 50 screw cap.

	Order no.
Ø 44 screw cap	811626

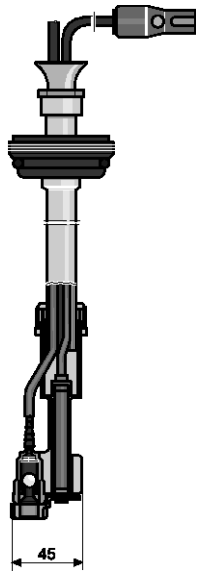


pk_1_072



pk_1_066

1.8 Mechanical-Hydraulic Accessories



pk_1_071

PP Adjustable suction lance for 200 litre drum with single stage float switch

1000 mm for connection to 200 litre one way tank, consists of PP foot valve, support pipe and float switch with flat connector, height adjustable screw cap and 3 m PE suction hose. For D_4a dosing pump ranges.

Switching mode: 1 x N/C for low liquid levels

PPE

Material, retaining tube and foot valve PP
 Seal material EPDM
 Hose Material PE

Material	Hose o Ø x i Ø mm		fig.	Order no.
PP	6 x 4	PP for tank opening 2" DIN S 70 x 6, suction hose	pk_1_071	790384
PP	8 x 5	PP for tank opening 2" DIN S 70 x 6, suction hose	pk_1_071	790385
PP	12 x 9	PP for tank opening 2" DIN S 70 x 6, suction hose	pk_1_071	790386

PCB

Material, retaining tube and foot valve PVC
 Seal material FPM
 Hose Material soft PVC

Material	Hose o Ø x i Ø mm		fig.	Order no.
PVC	6 x 4	PVC for tank opening 2" DIN S 70 x 6, suction hose	pk_1_071	790381
PVC	8 x 5	PVC for tank opening 2" DIN S 70 x 6, suction hose	pk_1_071	790382
PVC	12 x 9	PVC for tank opening 2" DIN S 70 x 6, suction hose	pk_1_071	790383

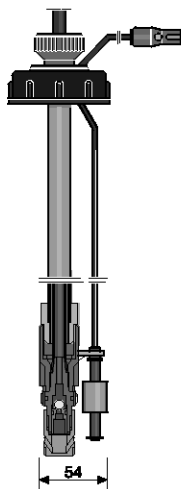
Suction lance for 60 litre canister, fixed length, gas-tight, with one-stage level switch

560 mm for connection to 60 litre tank with tank height 600 mm and Ø 55 tank opening. Designed with de-aerating/aerating valve. Consisting of foot valve and retaining tube, level switch with flat connector, 2 m intake hose. For D_4a dosing pump ranges.

Switching mode: 1 x N/O for low liquid levels

PPE

Material, retaining tube and foot valve PP
 Seal material EPDM
 Hose Material PE



P_AC_0048_SW

Material	Hose o Ø x i Ø mm		fig.	Order no.
PP	6 x 4	PP for Ø 55 with suction hose	pk_1_074	801954
PP	8 x 5	PP for Ø 55 with suction hose	pk_1_074	801955
PP	12 x 9	PP for Ø 55 with suction hose	pk_1_074	801956

1.8 Mechanical-Hydraulic Accessories

PCB

Material, retaining tube and foot valve PVC
 Seal material FPM
 Hose Material soft PVC

Material	Hose o Ø x i Ø mm		fig.	Order no.
PVC	6 x 4	PVC for Ø 55 with suction hose	pk_1_074	801853*
PVC	8 x 5	PVC for Ø 55 with suction hose	pk_1_074	801854*
PVC	12 x 9	PVC for Ø 55 with suction hose	pk_1_074	801855*

* Caution: The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.

Variable suction kit with one-stage level switch and flat connector

Consisting of foot valve, retaining tube and screw connection, one-stage level switch with flat connector, intake hose. For D_4a dosing pump ranges.

Switching mode: 1 x N/O for low liquid levels

	Adjustable length			
Size I	385 - 550 mm	for tank	35 to	60 litre
Size II	660 - 1040 mm	for tank	100 to	500 litre
Size III	1200 - 1350 mm	for tank		1000 litre

PPE

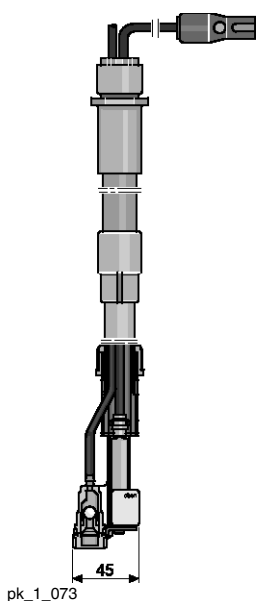
Material, retaining tube and foot valve PP
 Seal material EPDM
 Hose Material PE

Material	Hose o Ø x i Ø mm	For container	fig.	Order no.
PP I	6 x 4	35, 60 l	pk_1_073	790353
PP I	8 x 5	35, 60 l	pk_1_073	790354
PP I	12 x 9	35, 60 l	pk_1_073	790355
PP II	6 x 4	100, 140, 250, 500 l	pk_1_073	790356
PP II	8 x 5	100, 140, 250, 500 l	pk_1_073	790357
PP II	12 x 9	100, 140, 250, 500 l	pk_1_073	790358
PP III	6 x 4	1000 l	pk_1_073	790459
PP III	8 x 5	1000 l	pk_1_073	790460
PP III	12 x 9	1000 l	pk_1_073	790461

PCB

Material, retaining tube and foot valve PVC
 Seal material FPM
 Hose Material soft PVC

Material	Hose o Ø x i Ø mm	For container	fig.	Order no.
PVC I	6 x 4	35, 60 l	pk_1_073	790347
PVC I	8 x 5	35, 60 l	pk_1_073	790348
PVC I	12 x 9	35, 60 l	pk_1_073	790349
PVC II	6 x 4	100, 140, 250, 500 l	pk_1_073	790350
PVC II	8 x 5	100, 140, 250, 500 l	pk_1_073	790351
PVC II	12 x 9	100, 140, 250, 500 l	pk_1_073	790352
PVC III	6 x 4	1000 l	pk_1_073	790456
PVC III	8 x 5	1000 l	pk_1_073	790457
PVC III	12 x 9	1000 l	pk_1_073	790458



1.8 Mechanical-Hydraulic Accessories

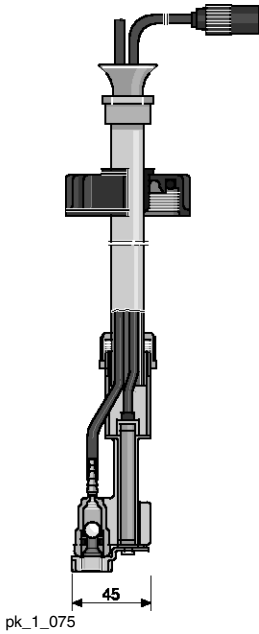
1.8.11 Suction Lances, Suction Assembly With Two Stage Float Switch

Variable suction lance with two-stage level switch

680 mm long for connection to disposable container of 5 - 60 litres, consisting of foot valve, level switch with round plug and retaining tube, vertically adjustable screw cap and 2 m intake hose.

For Beta® and gamma metering pump ranges.

Switching mode: 2 x N/C for low liquid levels



PPE

Material, retaining tube and foot valve PP
Seal material EPDM
Hose Material PE

Material	Hose o Ø x i Ø mm		fig.	Order no.
PP	6 x 4	PP for Ø 50 tank opening, suction hose	pk_1_075	802277
PP	8 x 5	PP for Ø 50 tank opening, suction hose	pk_1_075	802278
PP	12 x 9	PP for Ø 50 tank opening, suction hose	pk_1_075	790372

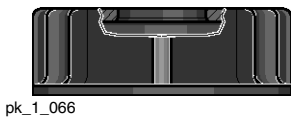
PCB

Material, retaining tube and foot valve PVC
Seal material FPM
Hose Material soft PVC

Material	Hose o Ø x i Ø mm		fig.	Order no.
PVC	6 x 4	PVC for Ø 50 tank opening, suction hose	pk_1_075	802077
PVC	8 x 5	PVC for Ø 50 tank opening, suction hose	pk_1_075	802078
PVC	12 x 9	PVC for Ø 50 tank opening, suction hose	pk_1_075	790371

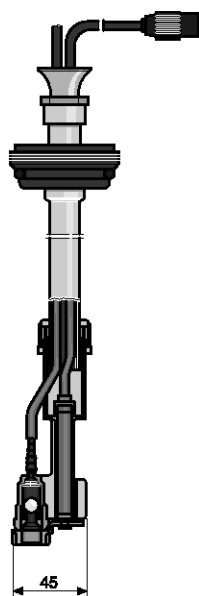
Screw cap

For tanks with opening Ø 44, customers need to order the Ø 44 screw cap as a spare part to replace Ø 50 screw cap.



	Order no.
Ø 44 screw cap	811626

1.8 Mechanical-Hydraulic Accessories



pk_1_076

Variable suction lance for 200 litre drum with two-stage level switch

1000 mm long for connection to 200 litre drum, with foot valve, level switch with round plug and retaining tube, vertically adjustable screw plug and 3 m intake hose. For Beta® and gamma metering pump ranges.

Switching mode: 2 x N/C for low liquid levels

PPE

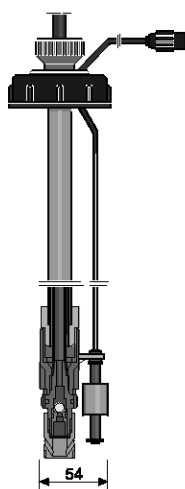
Material, retaining tube and foot valve PP
 Seal material EPDM
 Hose Material PE

Material	Hose o Ø x i Ø mm		fig.	Order no.
PP	6 x 4	PP for tank opening 2" DIN S 70 x 6, suction hose	pk_1_076	802279
PP	8 x 5	PP for tank opening 2" DIN S 70 x 6, suction hose	pk_1_076	802280
PP	12 x 9	PP for tank opening 2" DIN S 70 x 6, suction hose	pk_1_076	790374

PCB

Material, retaining tube and foot valve PVC
 Seal material FPM
 Hose Material soft PVC

Material	Hose o Ø x i Ø mm		fig.	Order no.
PVC	6 x 4	PVC for tank opening 2" DIN S 70 x 6, suction hose	pk_1_076	802079
PVC	8 x 5	PVC for tank opening 2" DIN S 70 x 6, suction hose	pk_1_076	802080
PVC	12 x 9	PVC for tank opening 2" DIN S 70 x 6, suction hose	pk_1_076	790373



P_AC_0052_SW

Suction lance for 60 litre canister, fixed length, gas-tight, with two-stage level switch

560 mm long for connection to 60 litre canister, height 600 mm and 55 mm Ø opening. With breather valve. Consisting of foot valve and retaining tube, level switch with round plug and 2 m intake hose. For Beta® and gamma metering pump ranges.

Switching mode: 2 x N/C for low liquid levels

PPE

Material, retaining tube and foot valve PP
 Seal material EPDM
 Hose Material PE

Material	Hose o Ø x i Ø mm		fig.	Order no.
PP	6 x 4	PP for Ø 55 with suction hose	pk_1_078	802285
PP	8 x 5	PP for Ø 55 with suction hose	pk_1_078	802286
PP	12 x 9	PP for Ø 55 with suction hose	pk_1_078	802287

1.8 Mechanical-Hydraulic Accessories

PCB

Material, retaining tube and foot valve PVC

Seal material FPM

Hose Material soft PVC

Material	Hose o \varnothing x i \varnothing mm		fig.	Order no.
PVC	6 x 4	PVC for \varnothing 55 with suction hose	pk_1_078	802081*
PVC	8 x 5	PVC for \varnothing 55 with suction hose	pk_1_078	802082*
PVC	12 x 9	PVC for \varnothing 55 with suction hose	pk_1_078	802083*

* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.

1.8 Mechanical-Hydraulic Accessories

PP Adjustable suction assembly with two stage float switch and round plug

For ProMinent® gamma/ 4a, gamma/ 5a consisting of foot valve, retaining tube and screw connection, two-stage level switch with 3-pin round plug, intake line.

For Beta® and gamma metering pump ranges.

Switching mode: 2 x N/C for low liquid levels

Adjustable Length

Size I	385 - 550 mm	for tank	35 to	60 litre
Size II	660 - 1040 mm	for tank	100 to	500 litre
Size III	1200 - 1350 mm	for tank		1000 litre

PPE

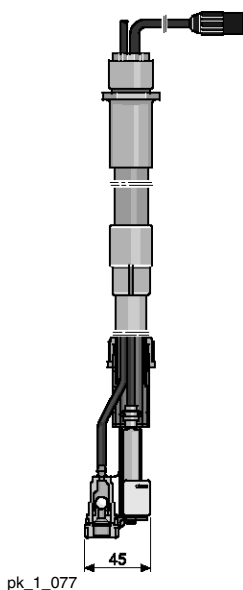
Material, retaining tube and foot valve	PP
Seal material	EPDM
Hose Material	PE

Material	Hose o Ø x i Ø mm	For container	fig.	Order no.
PP I	6 x 4	35, 60 l	pk_1_077	790365
PP I	8 x 5	35, 60 l	pk_1_077	790366
PP I	12 x 9	35, 60 l	pk_1_077	790367
PP II	6 x 4	100, 140, 250, 500 l	pk_1_077	790368
PP II	8 x 5	100, 140, 250, 500 l	pk_1_077	790369
PP II	12 x 9	100, 140, 250, 500 l	pk_1_077	790370
PP III	6 x 4	1000 l	pk_1_077	790465
PP III	8 x 5	1000 l	pk_1_077	790466
PP III	12 x 9	1000 l	pk_1_077	790467

PCB

Material, retaining tube and foot valve	PVC
Seal material	FPM
Hose Material	soft PVC

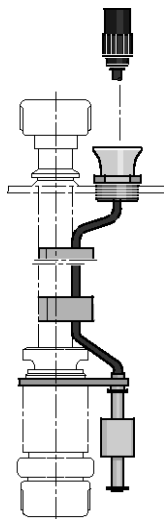
Material	Hose o Ø x i Ø mm	For container	fig.	Order no.
PVC I	6 x 4	35, 60 l	pk_1_077	790359
PVC I	8 x 5	35, 60 l	pk_1_077	790360
PVC I	12 x 9	35, 60 l	pk_1_077	790361
PVC II	6 x 4	100, 140, 250, 500 l	pk_1_077	790362
PVC II	8 x 5	100, 140, 250, 500 l	pk_1_077	790363
PVC II	12 x 9	100, 140, 250, 500 l	pk_1_077	790364
PVC III	6 x 4	1000 l	pk_1_077	790462
PVC III	8 x 5	1000 l	pk_1_077	790463
PVC III	12 x 9	1000 l	pk_1_077	790464



pk_1_077

1.8 Mechanical-Hydraulic Accessories

1.8.12 Float Switches



pk_1_079

Level switch kit compl. PVDF two-phase with round plug

The level switch kit can be ordered together with the suction fittings DN 10/DN 15. Connection is made by the customer. For metering pump series Beta®, gamma and gamma/ L.

Switching mode: for level shortage 2 x NC
 Materials: level switch PVFD
 Float PE expanded
 Cable 3 m, PE

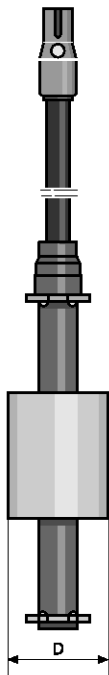
Connection	Type	Order no.
DN 10/15	with 3P round plug	1034879

Single stage float switch

for minimum indication with simultaneous deactivation of the metering pump. With flat coupling for direct connection to ProMinent® metering pump D_4a.

Technical data:
 max. switching voltage 100 V,
 switching current 0.5 A,
 switching capacity 5 W/5 VA,
 temperature range -10°C to 65°C, IP rating IP 67.
 Switching mode: for level shortage 1 x NO.

Material:
 body PVDF, float PE expanded, cable PE.



pk_1_080

	Lead length	Order no.
PVDF/PE with flat coupling	2 m	1031588
PVDF/PE with flat coupling	5 m	1031590

Material:
 body PVDF, float PVDF, cable PE.

	Lead length	Order no.
PVDF with flat connector	2 m	1034695
PVDF with flat connector	5 m	1034696

1.8 Mechanical-Hydraulic Accessories

Two stage float switch

for level monitoring in the storage tank, two-phase with pre-alarm alarm signalling and deactivation of the metering pump after a further level decrease of 30 mm.

With 3P round plug for direct connection to Beta® and gamma.

With 3 litz wires, e.g. in connection with relay control, order no. 914768.

Technical data:

max. switching voltage 100V, switching current 0.5 A, switching capacity 5 W/5 VA,

temperature range -10°C to 65°C, IP rating IP 67.

Switching mode: for level shortage 2 x NC.

Material:

body PVDF, float PE expanded, cable PE.

	Lead length	Order no.
PVDF/PE with 3P round plug	2 m	1031604
PVDF/PE with 3P round plug	5 m	1031606
PVDF/PE with 3 litz wires	2 m	1031607
PVDF/PE with 3 litz wires	5 m	1031609

Material:

body PVDF, float PVDF, cable PE.

	Lead length	Order no.
PVDF with 3-pin round plug	2 m	1034697
PVDF with 3-pin round plug	5 m	1034698
PVDF with 3 leads	2 m	1034699
PVDF with 3 leads	5 m	1034700

Cable assignment on 3-wire cable:

Colour	Function
black	Ground
blue	Minimum pre-warning
brown	Minimum end switch-off

Connecting Straps

Connecting straps for upper float switch with foot valve 6, 8 and 12 mm.

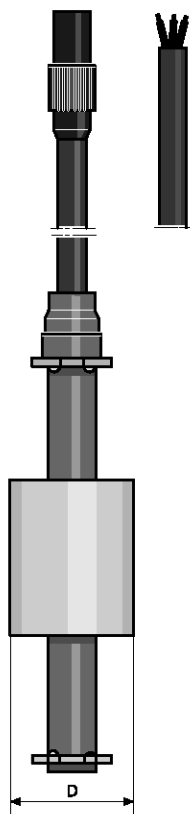
	Order no.
PP	800692
PVC	800573

Ceramic weight for vertical fixing of float switch

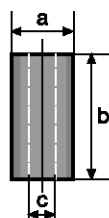
	Ø A mm	B mm	Ø C mm	Weight g	Type	Order no.
Size 1	25	50	10	60	For round and latch plug	1019244
Size 2	39	32	*	65	For round plug/flat connector	404004
Size 3	40	50	24	70	For round plug/flat connector	1030189

* Slot 13 x 27 mm

With the two stage float switch with round plug, the weight is pushed up when float is attached.



pk_1_081



pk_1_082

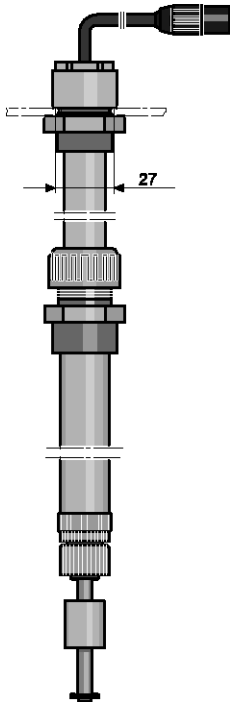
1.8 Mechanical-Hydraulic Accessories

Level switch PVDF/PE with retaining pipe hard PVC

For use in chemicals which would attack the float switch PE cable and/or for stable mounting in conjunction with electronic stirrers, FPM seal.

Adjustable Length

Size I 350 - 550 mm for 35 and 60 litre tank
 Size II 660 - 1160 mm for 100 to 1000 litre tank



pk_1_084

Size	Float switch	Order no.
Size I	- two-stage with round plug	802010
Size II	- two-stage with round plug	802011
Size I	- one-stage with flat connector	801727
Size II	- one-stage with flat connector	801728

Switching mode:

2-stage: 2 x N/C for low liquid levels

1-stage: 1 x N/O for low liquid levels



pk_1_126

Extension lead, 3-core

	fig.	Order no.
For 2-stage float switch with round plug and coupler, length, 3 m	pk_1_126	1005559

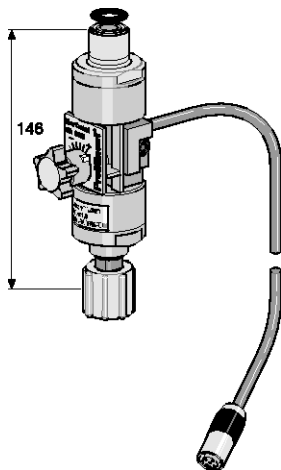
1.8 Mechanical-Hydraulic Accessories

1.8.13 Dosing Monitor, Control Cable

Flow Control adjustable flow monitor

Suitable for gamma/ L series in material versions PP, PC, NP and TT. Supplied with connection cable for assembly directly to liquid end.

Monitors individual strokes according to the float and orifice principle. The partial quantity of chemical flowing past the float is adapted to the preset stroke volume via the adjusting screw so that an alarm is actuated if the flow falls below 20 %. The user can select the number of incomplete strokes permitted (between 1 and 127) in accordance with the actual process requirements.



pk_1_086_2

Materials

Housing: PVDF
 Float: PTFE-coated
 Seals: FPM/EPDM

Flow Control	For pump type	Material	Order no.
Size I	1601, 1602	PVDF/EPDM	1009229
	1601, 1602	PVDF/FPM	1009335
Size II	1005, 1605, 0708, 1008, 0413, 0713, 0220, 0420, 0232	PVDF/EPDM	1009336
	1005, 1605, 0708, 1008, 0413, 0713, 0220, 0420, 0232	PVDF/FPM	1009338

Pay attention to the minimum values for the stroke length.

Pump type	Medium operating pressure	Stroke length (scale division)	Max. permissible operating pressure	Stroke length (scale division)
1601	8 bar	> 30 %	16 bar	> 40 %
1602	8 bar	> 30 %	16 bar	> 40 %
1005	5 bar	> 30 %	10 bar	> 50 %
0708	4 bar	> 30 %	7 bar	> 40 %
1605	8 bar	> 30 %	16 bar	> 50 %
1008	5 bar	> 30 %	10 bar	> 40 %
0413	2 bar	> 30 %	4 bar	> 30 %
0713	4 bar	> 30 %	7 bar	> 30 %
0220	1 bar	> 30 %	2 bar	> 30 %
0420	2 bar	> 30 %	4 bar	> 30 %
0232	1 bar	> 30 %	2 bar	> 30 %

Universal control cable



pk_1_085

For control of metering pump via contact - external pacing, standard signal - analogue control and for voltage free ON/OFF - switch function.

For Beta®, gamma, mikro g/ 5 and Vario with 5-pin plastic round plug and 5-core open ended cable.

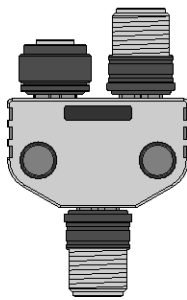
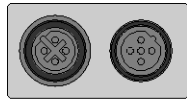
	Lead length	Order no.
5 core universal cable, 5 pin round plug	2 m	1001300
5 core universal cable, 5 pin round plug	5 m	1001301
5 core universal cable, 5 pin round plug	10 m	1001302

1.8 Mechanical-Hydraulic Accessories

External control cable

For external control of Beta®, gamma, mikro g/ 5 and Vario via contacts only. With 5 pin round plug, internally bridged, and 2-core lead with open end.

	Lead length	Order no.
2 core external cable, 5 pin round plug	2 m	707702
2 core external cable, 5 pin round plug	5 m	707703
2 core external cable, 5 pin round plug	10 m	707707



P_AC_0230_SW

PROFIBUS® adapter, enclosure rating IP 65

		fig.	Order no.
PROFIBUS® Y-adapter	M 12 x 1	P_AC_0230_SW	1036621
PROFIBUS® termination resistance, plug-in	M 12 x 1	–	1036622

USB adaptor

To connect a laptop to dosing pumps in the gamma and Sigma series.

The USB adaptor can be used to transfer timer programmes created using ProTime software to the pump. You will find the ProTime software on our home page.

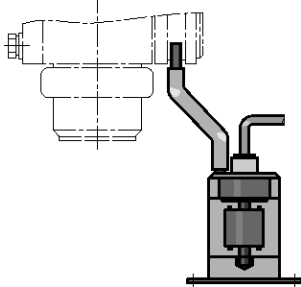
	Order no.
USB adaptor	1021544

1.8 Mechanical-Hydraulic Accessories

1.8.14

Safety Plant

Diaphragm failure detector



pk_1_087

Trips alarm and switches off metering pump when diaphragm is ruptured. Consists of PVC/PE float switch, Acrylic housing, connector nozzles and connecting hose. Voltage free making contact, max. contact current 60 V AC, 300 mA, 18 W.

Fits all types, from Beta® and gamma.

Retrofitting possible

	Order no.
Diaphragm failure detector	803640

For evaluation of alarm contact from float switch we recommend the wall mounted relay controller in plastic housing with 2 change over relays, order number 914768.

Siren



pk_1_088

HUW 55, 230 V, 50-60 Hz, 165 x 60 x 65, 85 phon, indoor
(e.g. in connection with fault signalling relay or relay control)

	Order no.
Horn HUW 55	705002

Indicator lamp

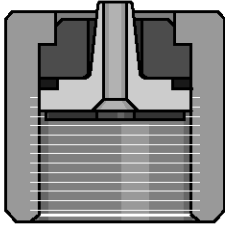
Red for wall mounting 230 V, 50-60 Hz (e.g. in connection with fault signalling relay, relay control or clock generator relay)

	Order no.
Indicator lamp, red	914780

1.8 Mechanical-Hydraulic Accessories

1.8.15

Connection Kits



pk_1_089

Connector set for attachment of variously sized hoses to suction and discharge connectors on alpha, Beta®, gamma, mikro g/ 5, CONCEPT, Pneumados liquid ends and accessories. Consist of hose sleeves, clamping rings, union nuts and seals for one/two connectors.

Single Connector Set

Material		oØ x iØ mm	Order no.
PP/EPDM (PPE)	for hose	6 x 4	817160
PP/EPDM (PPE)	for hose	8 x 5	817161
PP/EPDM (PPE)	for hose	12 x 9	817162
PP/EPDM (PPE)	for hose	10 x 4	1002587
PP/EPDM (PPE)	for hose	12 x 6	817163
PP/FPM (PPB)	for hose	6 x 4	817173
PP/FPM (PPB)	for hose	8 x 5	817174
PP/FPM (PPB)	for hose	12 x 9	817175
PP/FPM (PPB)	for hose	10 x 4	1002588
PP/FPM (PPB)	for hose	12 x 6	817176
PVC/EPDM (PCE)	for hose	6 x 4	791161
PVC/EPDM (PCE)	for hose	8 x 5	792058
PVC/EPDM (PCE)	for hose	12 x 9	790577
PVC/EPDM (PCE)	for hose	10 x 4	1002590
PVC/EPDM (PCE)	for hose	12 x 6	792062
PVC/FPM (PCB)	for hose	6 x 4	817065
PVC/FPM (PCB)	for hose	8 x 5	817066
PVC/FPM (PCB)	for hose	12 x 9	817067
PVC/FPM (PCB)	for hose	10 x 4	1002589
PVC/FPM (PCB)	for hose	12 x 6	817068
PVDF (PVT)	for hose	6 x 3	1024583
PVDF (PVT)	for hose	6 x 4	1024619
PVDF (PVT)	for hose	8 x 4	1033148
PVDF (PVT)	for hose	8 x 5	1024620
PVDF (PVT)	for hose	12 x 9	1024618
PVDF (PVT)	for hose	10 x 4	1024585
PVDF (PVT)	for hose	12 x 6	1024617
PTFE (TTT)	for hose	6 x 4	817205
PTFE (TTT)	for hose	8 x 5	817206
PTFE (TTT)	for hose	12 x 9	817207
PTFE (TTT)	for hose	12 x 6	817208

Double Connector Set

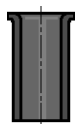
Material		oØ x iØ mm	Order no.
PP/EPDM (PPE)	for hose	6 x 4	817150
PP/EPDM (PPE)	for hose	8 x 5	817153
PP/EPDM (PPE)	for hose	12 x 9	817151
PP/EPDM (PPE)	for hose	12 x 6	817152
PP/FPM (PPB)	for hose	6 x 4	817166
PP/FPM (PPB)	for hose	8 x 5	817167
PP/FPM (PPB)	for hose	12 x 9	817168
PP/FPM (PPB)	for hose	12 x 6	817169
PVC/EPDM (PCE)	for hose	6 x 4	817060
PVC/EPDM (PCE)	for hose	8 x 5	817048
PVC/EPDM (PCE)	for hose	12 x 9	817049
PVC/EPDM (PCE)	for hose	12 x 6	791040
PVC/FPM (PCB)	for hose	6 x 4	817050
PVC/FPM (PCB)	for hose	8 x 5	817053

1.8 Mechanical-Hydraulic Accessories

Material		oØ x iØ mm	Order no.
PVC/FPM (PCB)	for hose	12 x 9	817051
PVC/FPM (PCB)	for hose	12 x 6	817052
PVDF (PVT)	for hose	6 x 4	1023246
PVDF (PVT)	for hose	8 x 5	1023247
PVDF (PVT)	for hose	12 x 9	1023248
PVDF (PVT)	for hose	12 x 6	1024586
PTFE (TTT)	for hose	6 x 4	817201
PTFE (TTT)	for hose	8 x 5	817204
PTFE (TTT)	for hose	12 x 9	817202
PTFE (TTT)	for hose	12 x 6	817203

Stainless steel support insert 1.4571

For connection of PE or PTFE pipe to stainless steel connectors using Swagelock and Serto systems.

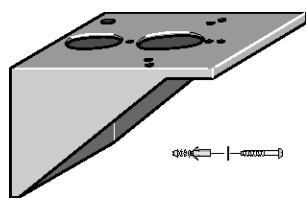


pk_1_090

	oØ x iØ mm	Order no.
for hose	6 x 4	359365
for hose	8 x 5	359366
for hose	12 x 9	359368
for hose	8 x 6	359362
for hose	12 x 10	359363

1.8.16

Wall Brackets for Metering Pumps



pk_1_092

PPE Wall Mounting Bracket

With fixtures, to hold one metering pump, size Beta®/ 4, Beta®/ 5, gamma/ L, G/ 4, G/ 5, EXtronic® and alpha.

The Beta®/ 4, gamma/ L, and G/ 4 can be mounted either parallel to the wall or at an angle.

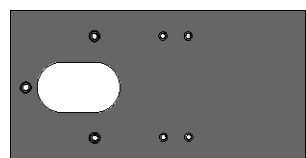
Dimensions L x W x H: 208 x 120 x 140 mm

Material Glass fibre reinforced plastic PPE

	fig.	Order no.
Sizes BT4, BT5, gamma/ L, G/ 4, G/ 5, CONCEPT, D_4a (fig.)	pk_1_092	810164

Adapter plate PP

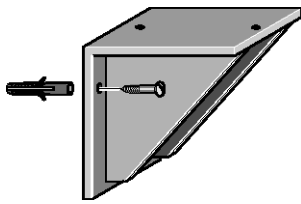
With fixtures, for vertical wall-mounting of Beta® or gamma pumps with self-degassing liquid ends. Used with PPE wall bracket.



pk_1_121

	fig.	Order no.
For BT4, BT5, gamma/ L	pk_1_121	1003030

1.8 Mechanical-Hydraulic Accessories



pk_2_036

Wall bracket PP

PP wall mounting, holds pump parallel to the wall, includes fixings.

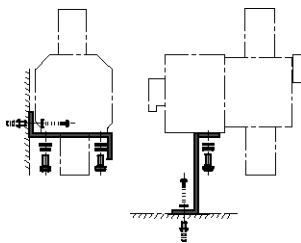
Dimensions L x W x H: 230 x 220 x 220 mm

	fig.	Order no.
for delta®	pk_2_036	1001906

Aluminium Wall Mounting Bracket

Plastic coated. For parallel pump mounting.

	Order no.
size G/ 5, EXtronic®	810163

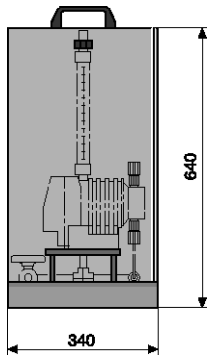


pk_1_095

Wall/Floor bracket for Pneumados

To take Pneumados metering pump. Floor or wall mounted, made in coated aluminium. Includes fittings.

	fig.	Order no.
Dimensions: L x W x H 92 x 80 x 30	pk_1_095	790605



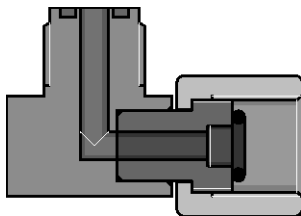
pk_1_093

Portable plastic pump stand

To take metering pumps size: G/ 4 or G/ 5. The pump stand is available in either PP or black PE. It will take a fixed pipe and is fitted with a bund for feed chemicals which may leak as a result of damage to the suction line, or a rupture of the diaphragm.

Supplied with carrying handle. Does not include pump or pipework.

	fig.	Order no.
Light grey PP	pk_1_093	1000180
Black PE	pk_1_093	1000181



pk_1_083

Right-angled PVC threaded connector

For mounting multi-function valve onto Beta® or gamma/ L models, self-degassing liquid end version.

	Material	fig.	Order no.
PCE Version	PVC/EPDM*	pk_1_083	1003472
PCB Version	PVC/FPM*	pk_1_083	1003318

* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.

1.8 Mechanical-Hydraulic Accessories

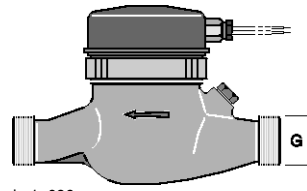
1.8.17 Contact Water Meters For Use In Potable Water, And Accessories

DIN Version contact water meter

PN 10 bar, indicating, type series MNR-K, operating temp. 40 °C,
 contact load max. 100 mA, 24 V, NG - nominal size.

Q_{max} = maximum load, Q_d = permanent load

Q_n = nominal load (1/2 Q_d according to calibration regulations)



pk_1_096

$Q_{max} / Q_d / Q_n$	Threaded Con- nector Width	Connector Thread	Length wit- hout Thread	Pulse Interval	Order no.
NG - m ³ /h	R DN/mm	G	mm	I	
5/5/2.5	3/4 - DN 20	1	190	0,05	304467
5/5/2.5	3/4 - DN 20	1	190	0,10	304432
5/5/2.5	3/4 - DN 20	1	190	0,25	304455
5/5/2.5	3/4 - DN 20	1	190	0,30	304428
5/5/2.5	3/4 - DN 20	1	190	0,50	304431
5/5/2.5	3/4 - DN 20	1	190	1,00*	304434
5/5/2.5	3/4 - DN 20	1	190	1,50*	304433
5/5/2.5	3/4 - DN 20	1	190	2,50	304458
5/5/2.5	3/4 - DN 20	1	190	10,00	304453
5/5/2.5	3/4 - DN 20	1	190	100,00	304444
12/12/6	1 - DN 25	1 1/4	260	0,25	1004550
12/12/6	1 - DN 25	1 1/4	260	0,50	1004548
12/12/6	1 - DN 25	1 1/4	260	1,00*	1004544
12/12/6	1 - DN 25	1 1/4	260	1,50*	1004549
12/12/6	1 - DN 25	1 1/4	260	2,00*	1004546
12/12/6	1 - DN 25	1 1/4	260	10,00*	1004547
12/12/6	1 - DN 25	1 1/4	260	100,00	1004545
20/20/10	1 1/2 - DN 40	2	300	2,00*	1004551
20/20/10	1 1/2 - DN 40	2	300	3,00	1004552
20/20/10	1 1/2 - DN 40	2	300	4,00	1004553
20/20/10	1 1/2 - DN 40	2	300	10,00	1004554
20/20/10	1 1/2 - DN 40	2	300	100,00	1004555
30/30/15	2 - DN 50	2 1/2	270	3,00	1020551
30/30/15	2 - DN 50	2 1/2	270	4,00*	1020552
30/30/15	DN 50	Flange	270	6,00*	1020553
30/30/15	2 - DN 50	2 1/2	270	10,00	1020550
30/30/15	DN 50	Flange	270	100,00	304450

*Standard storage tank

1.8 Mechanical-Hydraulic Accessories

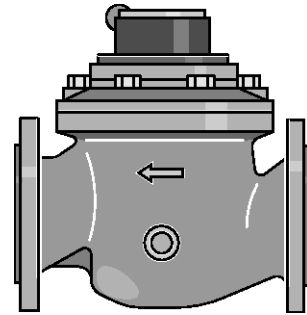
DIN Version contact water meter

Readable, series WS-K, operating temp. 40 °C, contact load max. 30 mA, 30 V, DIN 2501 flange, PN 16 bar.

Q_{max} = Maximum load

Q_d = Continuous load

Q_n = Nominal load



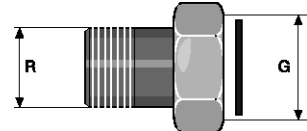
pk_1_097

$Q_{max} / Q_d / Q_n$	Connector width	Response flow rate	Length	Pulse Interval	Order no.
NG - m ³ /h	DN/mm	l/h	mm	l	
110/55/40	DN 80	275	300	10,00*	1004560
110/55/40	DN 80	275	300	25,00	1004558
110/55/40	DN 80	275	300	100,00	1004559
180/90/60	DN 100	300	360	10,00	1004567
180/90/60	DN 100	300	360	25,00*	1004556
180/90/60	DN 100	300	360	50,00	1004557
350/200/150	DN 150	800	500	50,00*	1004568

*Standard storage tank

Union assembly set with seal

For threaded water meter, brass.

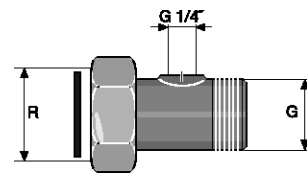


pk_1_098

		Order no.
R 3/4	G 1	359029
R 1	G 1 1/4	801322
R 1 1/4	G 1 1/2 - (turboDOS®)	359034
R 1 1/2	G 2	359037
R 2	G 2 1/2	359039

Union assembly set with seal

For threaded water meter with G 1/4 connector for discharge valve, brass.



pk_1_099

		Order no.
R 3/4	G 1 - 1/4	359030
R 1	G 1 1/4 - 1/4	359032
R 1 1/2	G 2 - 1/4	359038
R 2	G 2 1/2 - 1/4	801321

1.8 Mechanical-Hydraulic Accessories

O-ring loaded injection valve

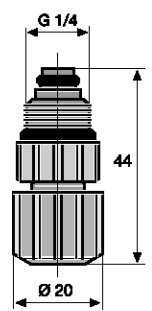
For use with threaded water meter union.

Fig. pk_1_099 for threaded connector as R 1 - DN 25

Applications when taking appropriate intake lines

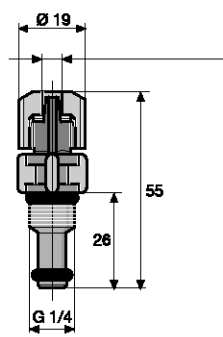
25 °C - max. operating pressure 16 bar

45 °C - max. operating pressure 9 bar



pk_1_043

Connector		Material	oØ x iØ mm	fig.	Order no.
6/4 - G 1/4	Short for hose	PP/FPM	6 x 4	pk_1_043	914754
6/4 - G 1/4	Long for hose	PP/FPM	6 x 4	pk_1_044	741193
6/4 - G 1/4	Short for hose	PVC/FPM	6 x 4	pk_1_043	914558
6/4 - G 1/4	Long for hose	PVC/FPM	6 x 4	pk_1_044	915091



pk_1_044

1.9 Mechanical/Hydraulic Special Accessories

1.9.1 Spare Parts Kits

Spare parts kits for ProMinent® metering pumps which have been modified or that are no longer available.

Type E, D and C by April 1990

Type B by end of 1990

Spare parts kits gamma/ 4 and gamma/ 5

Supplied for PP and NP versions:

- 1 pump diaphragm
- 1 suction valve compl.
- 1 discharge valve compl.
- 2 valve balls
- 1 seal set
- 1 connector set

Supplied for NS3 and PS3 versions:

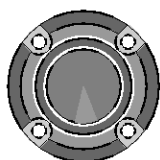
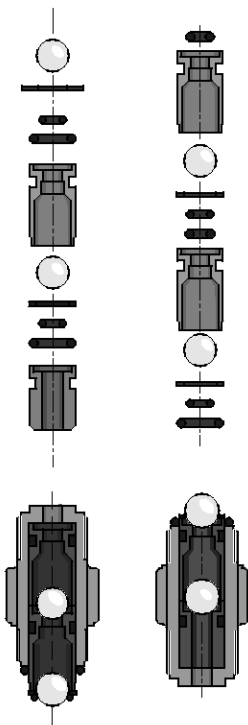
- 1 pump diaphragm
- 1 suction valve compl.
- 1 connector parts set
- 1 discharge valve compl.
- 1 bleed valve set
- 1 connector set

Supplied for TT-PTFE versions:

- 1 pump diaphragm
- 1 suction valve compl.
- 1 discharge valve compl.
- 2 valve balls
- 2 ball seat discs
- 1 seal set
- 1 connector set

Supplied for SS stainless steel versions:

- 1 pump diaphragm
- 4 valve balls
- 4 ball seat discs
- 1 seal set
- 1 connector set



pk_1_008

Spare parts kits gamma/ 4

Pump type	Material	Order no. version a	Order no. version b
gamma/ 4 1000, 1001	NP1	910715	–
	PP1	910716	–
	TT	910776	910776
	SS/SK	910777	910777
	PP3	–	740356
	NP2	–	740355
	NP3	–	740354
gamma/ 4 1601, 1602	PP1	–	740357
	NP1	910719	–
	PP1	910720	–
	NS3/PS3	792033	792033
	TT	910778	910778
	SS/SK	910779	910779
	PP3	–	740360
	NP2	–	740359
NP3	–	740358	
PP1	–	740361	

1.9 Mechanical/Hydraulic Special Accessories

Pump type	Material	Order no. version a	Order no. version b
gamma/ 4 1201, 1203	NP1	910723	–
	PP1	910724	–
	NS3/PS3	792034	792034
	TT	910780	910780
	SS/SK	910781	910781
	PP3	–	740364
	NP2	–	740363
	NP3	–	740362
	PP1	–	740380
gamma/ 4 0803, 0806	NP1	910727	–
	PP1	910728	–
	NS3/PS3	792035	792035
	TT	910782	910782
	SS	910783	910783
	PP3	–	740383
	NP2	–	740382
	NP3	–	740381
	PP1	–	740384
gamma/ 4 1002, 1003	NP1	910731	–
	PP1	910732	–
	NS3/PS3	792036	792036
	TT	910784	910784
	SS	910785	910785
	HV/PP 4 (Type 1002)	910743	910743
	PP3	–	740387
	NP2	–	740386
	NP3	–	740385
gamma/ 4 0308, 0313	PP1	–	740388
	NP1	910735	–
	PP1	910736	–
	TT	910786	910786
	SS	910787	910787
	PP2	–	740480
	NP2	–	740391
	PP1	–	740497
	NP1	–	740498
gamma/ 4 0215, 0223	PP1	910955	–
	NP1	910953	–
	TT	910788	910788
	SS	910789	910789
	PP1	910740	–
	NP1	910739	–
	PP2	–	740481
	NP2	–	740392
	PP1	–	740499
NP1	–	740500	

Spare parts kits gamma/ 5

Pump type	Material	Order no. version a	Order no. version b
gamma/ 5 1602	SS	910947	910947
	NP1	910945	–
	NP2	–	740386
	NP3	–	740385
gamma/ 5 1605	SS	910951	910951
	NP1	910949	–
	NP2	–	740391
	NP1	–	740498
NP1	910953	–	

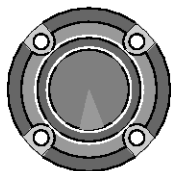
1.9 Mechanical/Hydraulic Special Accessories

Pump type	Material	Order no. version a	Order no. version b
gamma/ 5 1006	HV/PP4 (Type 1006)	910939	910939
	SS	910959	910959
	TT	910957	910957
	PP1	910955	–
	NP1	910953	–
	PP2	–	740480
	NP2	–	740391
	PP1	–	740497
	NP1	–	740498
	gamma/ 5 1310	SS	910963
HV/PP4 (Type 1310)		910941	910941
NP1		910961	–
NP2		–	740397
gamma/ 5 0613	NP1	–	740505
	PP2	–	740506
	SS	910971	910971
gamma/ 5 0813	TT	910969	910969
	PP1	910967	–
	NP1	910965	–
	NP2	–	740397
	PP1	910967	740504
	NP1	–	740505
	TT	910977	910977
	SS	910979	910979
gamma/ 5 0417	HV/PP4	910943	910943
	PP1	910975	–
	NP1	910973	–
	PP2	–	740503
	NP2	–	740393
	PP1	–	740501
	NP1	–	740502
	TT	910985	910985
	SS	910987	910987
	PP1	910983	–
gamma/ 5 0423-DN 10	NP1	910981	–
	PP2	–	740503
	NP2	–	740393
	PP1	–	740501
	NP1	–	740502
	TT	910993	910993
	SS	910995	910995
	PP1	910991	–
Spare parts kits gamma/ 5	NP1	910989	–
	PP2	–	740509
	NP2	–	740398
	PP1	–	740507
	NP1	–	740508
	TT	910931	910931
	SS	910933	910933
	NP1	910935	–
Spare parts kits gamma/ 5	PP1	910937	–
	PP2	–	740509
	NP2	–	740398
	NP1	–	740508
	PP1	–	740507

1.9 Mechanical/Hydraulic Special Accessories

PTFE Pump diaphragms

ProMinent® DEVELOPAN® pump diaphragms in EPDM with woven inner layer, integrally vulcanised steel core and PTFE Teflon coating on the side in contact with the dosing chemical.



pk_1_008

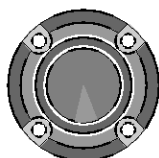
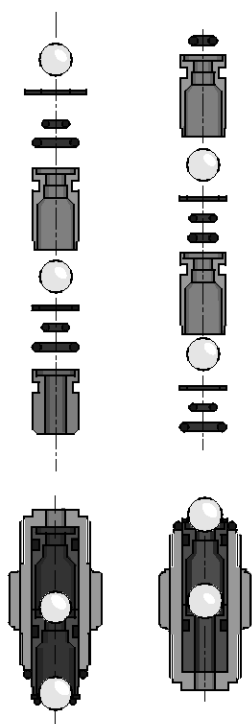
Pump type	Order no.
9.20, gamma/ 4 1000,1001	811452
9.21, gamma/ 4 1601,1602	811453
9.22, gamma/ 4 1201,1203	811454
9.23, gamma/ 4 0703, 0706	811455
9.33, gamma/ 4 1002, 1003	811456
9.44, gamma/ 4 0308, 0313, gamma/ 5 1605, gamma/ 5 1006	1002511
9.46, gamma/ 5 0215, 0223, gamma/ 5 1310, gamma/ 5 0613	811458
9.55, gamma/ 5 0813, gamma/ 5 0417	811459
9.66, gamma/ 5 0423, gamma/ 5 0230	811460

Spare parts kits CONCEPT

Kits for PP and NP material versions:

- 1 pump diaphragm
- 1 suction valve compl.
- 1 discharge valve compl.
- 2 valve balls
- 1 seal set
- 1 connector set

CONCEPT spare parts kits are identical to gamma/ 4.



pk_1_008

Pump type	Material	Order no. version a	Order no. version b
Type 1601	PP1	-	740361
	NP6	-	740551
	NS3/PS3	792033	792033
	PP1	910720	-
	NP1	910719	-
	PP1	-	740361
Type 1201	NP6	-	740551
	NS3/PS3	792034	792034
	NP1	910723	-
	PP1	910724	-
	NP6	-	740552
Type 0703/0803	PP1	-	740380
	NS3/PS3	792035	792035
	NP1	910727	-
	NP6	-	740553
	PP1	-	740384
Type 1002	NS3/PS3	792036	792036
	NP1	910731	-
	NP6	-	740554
	PP1	-	740388
	PP1	910732	-
Type 0306/0308	NP1	910735	-
	NP6	-	740555
	PP1	-	740497
	NP1	910740	-
	NP1	910739	-
Type 0212/0215	NP6	-	740556
	PP1	-	740499
	PP1	-	-
	PP1	-	-

1.9 Mechanical/Hydraulic Special Accessories

1.9.2 Pump Diaphragms



pk_1_008

PTFE Pump diaphragms

ProMinent® DEVELOPAN® pump diaphragms in EPDM with woven inner layer, large surface area, integrally vulcanised steel core and PTFE Teflon coating on the side in contact with chemicals.

Description for pump type	Order no.
9.21, CONCEPT 1601	811453
9.22, CONCEPT 1201	811454
9.23, CONCEPT 0703/0803	811455
9.33, CONCEPT 1002	811456
9.44, CONCEPT 0306/0308	1002511
9.46, CONCEPT 0212/0215	811458

Diaphragm PTFE/FPM

ProMinent® EPDM diaphragm with woven fabric core, one PTFE and one FPM layer on side in contact with medium. Particularly suitable for metered media containing microcrystals, e.g. silicate. Suitable for Beta® and gamma/ L pumps*

Pump type	Order no.
1601	1024168
1602	1024169
1005 / 1605	1024170
0708 / 1008	1024171
0413 / 0713	1024172
0220 / 0420	1024173

* Identcode letter "S", e.g. BT4A1002PPS...

Diaphragm EPDM

ProMinent® diaphragms made of EPDM with woven inner layer.

Max. operating pressure 6 bar.

Pump type	Order no.
1000	1001444
1601	1001445
1602	1001446
1005 / 1605	1001447
0708 / 1008	1001448
0413 / 0713	1001449
0220 / 0420	1001450
0232	1001451

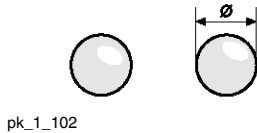
* Identcode letter "P", e.g. BT4A1002PPP...

1.9 Mechanical/Hydraulic Special Accessories

1.9.3 Custom Valve Balls/Valve Springs

For on-site retrofitting of dosing pumps and accessories, for applications where standard material is unsuitable. Supplied loose only, not fitted.

Valve balls

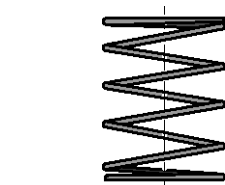


pk_1_102

Material	Ø mm		Order no.
PTFE	4,7	for valve Ø 6 mm	404255
PTFE	9,5	for valve Ø 8 and 12 mm	404258
PTFE	11,0	for valve DN 10	404260
PTFE	16,0	for valve DN 15	404259
Ceramic	4,7	for valve Ø 6 mm	404201
Ceramic	9,5	for valve Ø 8 and 12 mm	404281
Ceramic	11,0	for valve DN 10	404277
Ceramic	16,0	for valve DN 15	404275

Valve springs for liquid ends

with approx. 0.1 bar pre-pressure for spring loading of the valve balls in the liquid end. Recommended to improve the valve function and to increase the metering accuracy, in particular for viscous metering media above 50 m Pas.

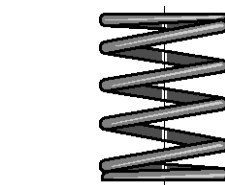


pk_1_103

Material	Prepressure bar		Order no.
1.4571	0,1	for valve 4.7	469406
1.4571	0,1	for valve 9.2	469403
1.4571	0,1	for mikro g/ 5	469437
1.4571	0,1	for mikro g/ 5	469438
1.4571	0,1	for mikro g/ 5	469439
Hast. C	0,1	for valve DN 10	469114
Hast. C	0,1	for valve DN 15	469107

Valve springs for discharge valves

Approx. 0.5/1/2 bar prepressure for increasing metering accuracy and preventing suction and siphoning effect.



pk_1_104

Material	Prepressure bar		Order no.
1.4571	1,0	for R 1/4" - Ø 6 mm connector	469401
Hast. C	0,5	for R 1/2" - Ø 6, 8 and 12 mm connector	469404
Hast. C	1,0	for R 1/2" - Ø 6, 8 and 12 mm connector	469413
Hast. C	2,0	for R 1/2" - Ø 6, 8 and 12 mm connector	469410
Hast. C	0,5	for DN 10	469115
Hast. C	1,0	for DN 10	469119
Hast. C	0,5	for DN 15	469108
Hast. C	1,0	for DN 15	469116

Valve spring made of Hastelloy C with FEP coating

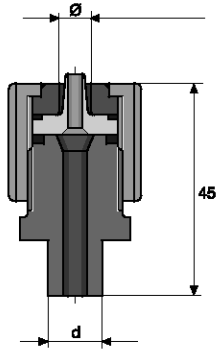
Material	Prepressure bar		Order no.
Hast. C/PVDF	0,5	for R 1/2" - Ø 6, 8 and 12 mm connector	818590
Hast. C/PVDF	1,0	for R 1/2" - Ø 6, 8 and 12 mm connector	818536
Hast. C/PVDF	0,5	for DN 10	818515
Hast. C/PVDF	0,5	for DN 15	818516

1.9 Mechanical/Hydraulic Special Accessories

1.9.4 Connector Parts/Fittings

Hose/adhesive nipple PVC*

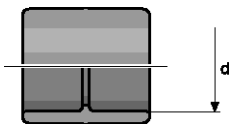
With union nut, for connection of PE tubing to rigid PVC fittings for on-site construction of connector system.



pk_1_107

	d mm		oØ x iØ mm	fig.	Order no.
Nozzle/solvent union	12	for hose	6 x 4	pk_1_107	817088
	12	for hose	8 x 5	pk_1_107	817089
	12	for hose	12 x 9	pk_1_107	817090
	12	for hose	12 x 6	pk_1_107	817091
	16	for hose	6 x 4	pk_1_107	817092
	16	for hose	8 x 5	pk_1_107	817093
	16	for hose	12 x 9	pk_1_107	817094
	16	for hose	12 x 6	pk_1_107	817095

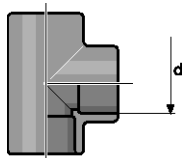
* **Caution:** The product contains adhesive joints with Tangit. Please note the resistance of the Tangit adhesive.



pk_1_109

PVC Straight solvent union

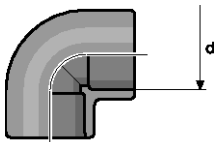
	d mm		fig.	Order no.
PVC Straight solvent union	12	DN 8	pk_1_109	356608
	16	DN 10	pk_1_109	356609
	20	DN 15	pk_1_109	356610
	25	DN 20	pk_1_109	356611



pk_1_113

PVC T-joint

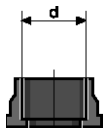
	d mm		fig.	Order no.
PVC T-joint	12	DN 8	pk_1_113	356406
	16	DN 10	pk_1_113	356407
	20	DN 15	pk_1_113	356408
	25	DN 20	pk_1_113	356409



pk_1_108

90° PVC Elbow joint

	d mm		fig.	Order no.
90° PVC Elbow joint	12	DN 8	pk_1_108	356315
	16	DN 10	pk_1_108	356316
	20	DN 15	pk_1_108	356317
	25	DN 20	pk_1_108	356318



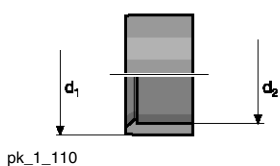
pk_1_115

PVC insert (Straight solvent union)

	d mm		fig.	Order no.
PVC insert (Straight solvent union)	12	DN 8	pk_1_115	356571
	16	DN 10	pk_1_115	356572
	20	DN 15	pk_1_115	356573
	25	DN 20	pk_1_115	356574

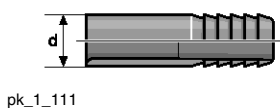
1.9 Mechanical/Hydraulic Special Accessories

PVC Short reducing union



	d1 mm	d2 mm	fig.	Order no.
PVC Short reducing union	12	8	pk_1_110	357025
	16	10	pk_1_110	357026
	20	16	pk_1_110	357027
	25	20	pk_1_110	357028

PVC Hose connection nozzle



	d mm		fig.	Order no.
PVC Hose connection nozzle	12	DN 8	pk_1_111	356655
	16	DN 10	pk_1_111	356656
	20	DN 15	pk_1_111	356657
	25	DN 20	pk_1_111	356658

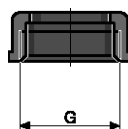
Hose nozzle with seal



Material	d mm		fig.	Order no.
PVC	16	DN 10	pk_2_046	800554
PVC	20	DN 15	pk_2_046	811407
PVC	25	DN 20	pk_2_046	811408
PP	16	DN 10	pk_2_046	800657
PP	20	DN 15	pk_2_046	800655
PP	25	DN 20	pk_2_046	800656

pk_2_046

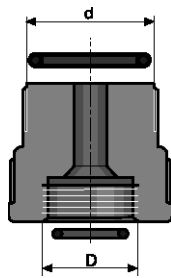
Union nuts



pk_1_116

Material	G	fig.	Order no.
PP	G 5/8 - DN 8	pk_1_116	800665
PP	G 3/4 - DN 10	pk_1_116	358613
PP	G 1 - DN 15	pk_1_116	358614
PP	G 1 1/4 - DN 20	pk_1_116	358615
PVC	G 5/8 - DN 8	pk_1_116	800565
PVC	G 3/4 - DN 10	pk_1_116	356562
PVC	G 1 - DN 15	pk_1_116	356563
PVC	G 1 1/4 - DN 20	pk_1_116	356564
PVDF	G 3/4 - DN 10	pk_1_116	358813

1.9 Mechanical/Hydraulic Special Accessories

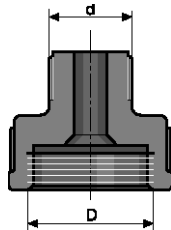


pk_1_114

Single adapter kit

For connection of system + GF+ threaded connectors to dosing pumps and accessories.

Material	Size	Internal thread D	External thread d	Order no.
PP/EPDM	For DN 8 threaded connector	M20 x 1,5	G 5/8	817164
PP/FPM	For DN 8 threaded connector	M20 x 1,5	G 5/8	740604
PVC/EPDM	For DN 8 threaded connector	M20 x 1,5	G 5/8	740583
PVC/FPM	For DN 8 threaded connector	M20 x 1,5	G 5/8	817069
PVDF/PTFE	For DN 8 threaded connector	M20 x 1,5	G 5/8	1031073
PP/EPDM	For DN 10 threaded connector	M20 x 1,5	G 3/4	817165
PP/FPM	For DN 10 threaded connector	M20 x 1,5	G 3/4	817178
PVC/EPDM	For DN 10 threaded connector	M20 x 1,5	G 3/4	740585
PVC/FPM	For DN 10 threaded connector	M20 x 1,5	G 3/4	740601
PVDF/PTFE	For DN 10 threaded connector	M20 x 1,5	G 3/4	1028409



pk_1_124

Single adapter kit

For fitting series A, B, C, E and EXtronic® accessories to current metric M20 x 1.5 connectors.

Material	Size	Internal thread D	External thread d	Order no.
PP	6-8 mm connector	M 20 x 1.5	G 1/4	811904
PVC	6-8 mm connector	M 20 x 1.5	G 1/4	811902

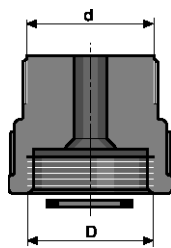
Double adapter set

Material	Quantity	Internal thread D	External thread d	Order no.
PP/EPDM	1x / 1x	M20 x 1.5 / G 5/8	G 5/8 / M20 x 1.5	817154
PVC/FPM	1x / 1x	M20 x 1.5 / G 5/8	G 5/8 / M20 x 1.5	817054

Double adapter kit

For fitting laboratory type GL connectors, manufacturers Bola or Schott.

Material	Size	Internal thread D	External thread d	Order no.
PTFE	GL 18	M20 x 1.5	GL 18	1000990

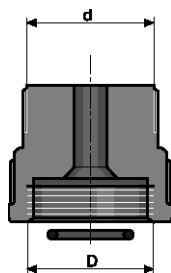


pk_1_127

Single adapter kit

For fittings of current accessories with metric M20 x 1.5 connectors to series A, B, C and E.

Material	Size	Internal thread D	External thread d	Order no.
PP/EPDM	6-8 mm connector	G 1/4	M 20 x 1.5	741088
PVC/FPM	6-8 mm connector	G 1/4	M 20 x 1.5	741087
PTFE	6-8 mm connector	G 1/4	M 20 x 1.5	741091
PP/EPDM	12 mm connector	G 3/8	M 20 x 1.5	741090
PVC/FPM	12 mm connector	G 3/8	M 20 x 1.5	741089
PTFE	12 mm connector	G 3/8	M 20 x 1.5	741092

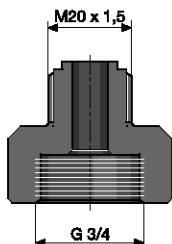


pk_1_122

1.9 Mechanical/Hydraulic Special Accessories

Adapter

Fits connector set for 12 x 9 hose.

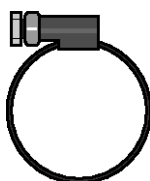


pk_1_112

Material	Internal thread D	External thread d	Order no.
PP	DN 10, G 3/4	M20 x 1.5	800815
PVC	DN 10, G 3/4	M20 x 1.5	800816
PVDF	DN 10, G 3/4	M20 x 1.5	1017406

Stainless steel threaded clip

For connection of suction and delivery tubing to pressure nozzle.



pk_1_068

	Clamping range mm	Order no.
DN 10 clamping ring	16 – 25	359703
DN 15 clamping ring	20 – 32	359705

Stainless steel straight threaded male adapter

Swagelock system, stainless steel SS 316 (1.4401) for fitting tubing to inner threaded liquid ends and valves with for SB version.



pk_1_028

	Order no.
6 mm - ISO 7 R 1/4	359526
8 mm - ISO 7 R 1/4	359527
12 mm - ISO 7 R 1/4	359528
12 mm - ISO 7 R 3/8	359520
16 mm - ISO 7 R 3/8	359521
16 mm - ISO 7 R 1/2	359529

Stainless steel clamping ring sets

For use with stainless steel threaded connectors for dosing pumps and Swagelock accessories. Both parts must be replaced at the same time. Consist of back and front clamping rings.

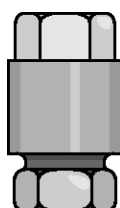


pk_1_117

	oØ mm	Order no.
Set of ring Ø 6 for line	6	104232
Set of ring Ø 8 for line	8	104236
Set of ring Ø 12 for line	12	104244

Stainless steel threaded connector

Serto system for connecting PE or PTFE discharge line to stainless steel pipe, made from stainless steel with clamping ring, but without support insert (parts in contact with chemicals stainless steel 1.4571).



pk_1_118

	Order no.
6 mm outer diameter to 6 mm outer diameter stainless steel pipe	359317
8 mm outer diameter to 8 mm outer diameter stainless steel pipe	359318
12 mm outer diameter to 12 mm outer diameter stainless steel pipe	359320

1.9 Mechanical/Hydraulic Special Accessories

1.9.5 Thermal Flow Monitors

The flow monitor consists of a probe and evaluation electronics. It operates on the principle of heat transfer in the water flow. It may be used with all solenoid and motor-driven dosing pumps with continuous flow of more than 0.5 l/h.

Evaluation electronics

When liquids are flowing the changeover relay closes (switching power 250 V/4 A). When liquids cease to flow the relay opens for a set delay period of between 3-20 sec. LEDs indicate switching status. Allows smooth adjustment of flow volume.

Enclosure rating: Housing IP 40
Terminal boxes IP 00
Ambient temperature: 0 °C to +60 °C

Electrical connection	Order no.
230 V, 50/60 Hz	792886

Probe C

Single ceramic gauge

Outer thread: G 1/2
Temperature range: +5 °C to +60 °C medium temperature, not suitable for alkaline solutions
Supply line: Fixed connection, cable length 2 m
Max. cable length: 100 m
Enclosure rating: IP 67
Pressure rating: 7 bar

Application range: 0-60 cm/s	Order no.
	1022339

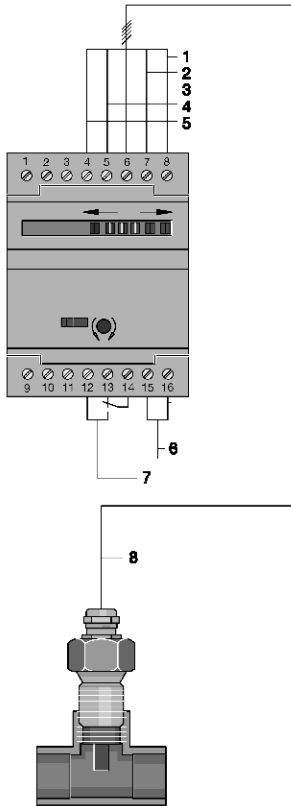
Probe S

Single section metal encapsulated gauge, stainless steel 14571

Outer thread: G 1/2
Temperature range: -25 °C to +80 °C medium temperature
Supply line: Fixed connection, cable length 2 m
Max. cable length: 100 m
Enclosure rating: IP 67
Pressure rating: 30 bar

Application range: 1 cm/s to 5 m/s	Order no.
	792888

Connector parts required (T-joint, bypass) must be ordered separately.



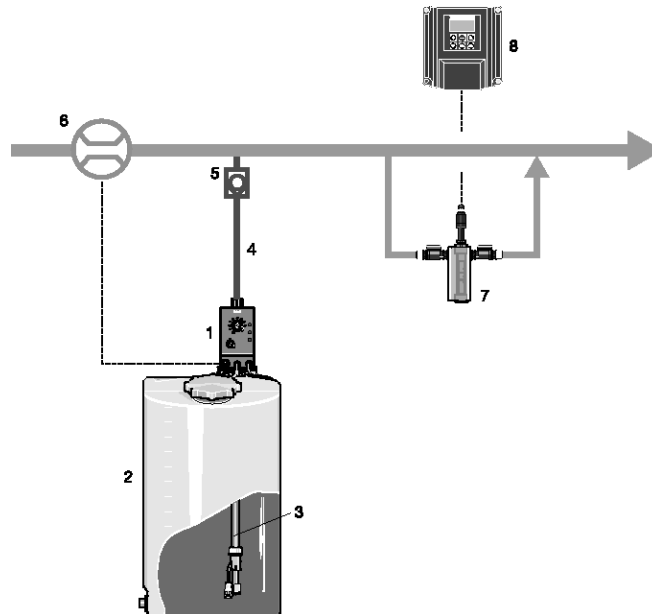
pk_1_119

- 1 grey
- 2 black
- 3 brown
- 4 blue
- 5 white
- 6 Mains voltage
- 7 Relay flow control
- 8 Connecting for sensor

1.10 Application Examples

1.10.1 Volume-proportional Metering Of Chlorine Bleach Solution In Drinking Water

Product: **Beta®**
Metered medium: **NaOCl**
Sector: **Drinking water**
Application: **Disinfection**



- 1 Beta®/ 4 with self-venting liquid end made from PMMA/PVC (Plexiglas)
- 2 Metering tank
- 3 Intake fitting for foot valve and level switch
- 4 Soft PVC metering line with woven fabric or PTFE
- 5 Metering valve
- 6 Contact water meter
- 7 Chlorine measuring probe
- 8 Control measurement

pk_1_132

Task and requirements

- Volume-proportional feed of chlorine bleach solution into the main water flow
- Monitoring of chlorine content after metering

Operating conditions

- Variable flow
- Installation in closed buildings

Application information

- The metered medium emits gas. Therefore, after a longer pump standstill period, an air (gas) bubble may have formed in the intake line causing an interruption in metering operation.
- Metering is to take place fully automatically and without malfunctions as operating personnel are not always present in the waterworks or water supply.

Solution

- Beta® solenoid-driven metering pump with self-venting liquid end
- Contact water meter in main line for pump activation
- DULCOMETER® measurement and control technology for final inspection

Benefits

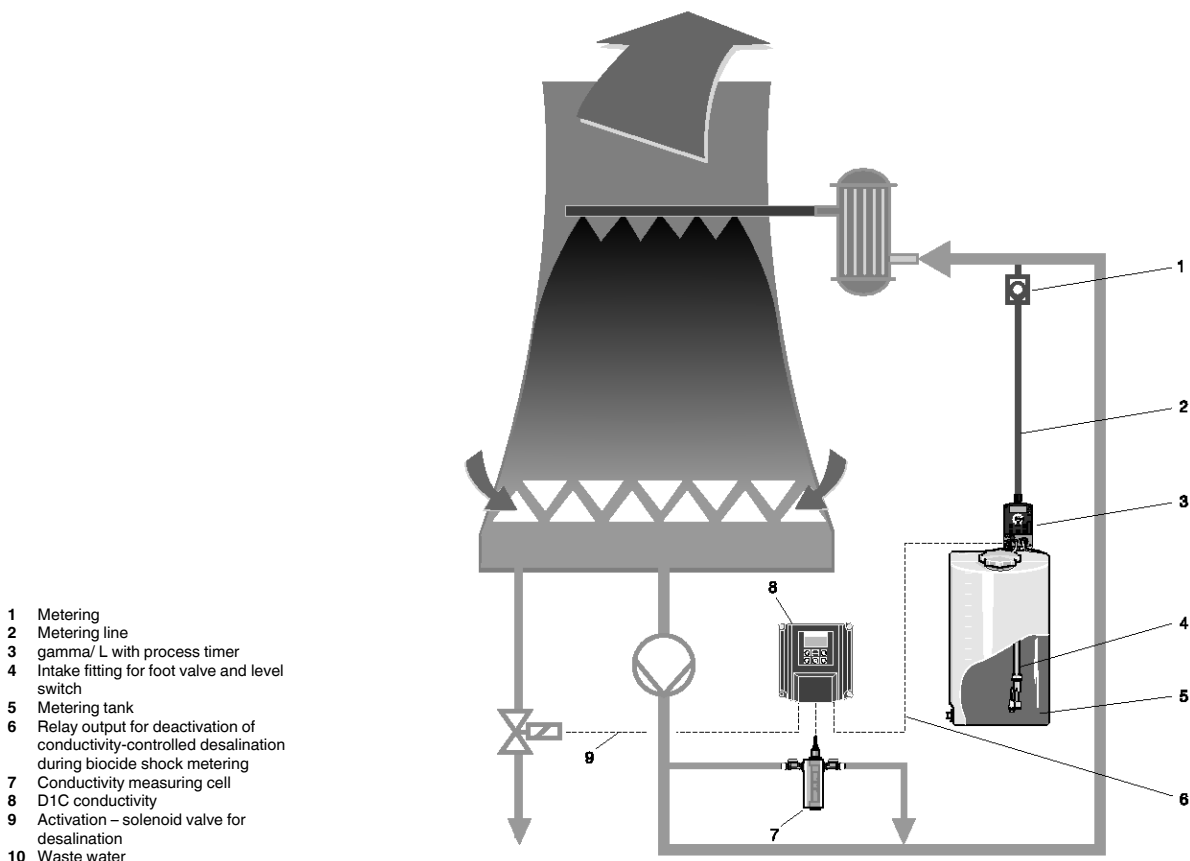
- High degree of reliability provided by self-venting liquid end
- Reliable protection against overmetering and undermetering with downstream final inspection

1.10 Application Examples

1.10.2

Shock Metering Of Biocide In Cooling Water Circuit

Product: **gamma/ L**
 Metering medium: **biocide**
 Industry: **cooling water treatment**
 Application: **disinfection**



pk_1_133

Tasks and requirements

- Increasing the biocide content e.g. at weekly intervals destroys all biology in the cooling water.
- Local increases in concentration may occur resulting in conductivity-controlled desalination. They disappear again after full distribution in the cooling water circuit.
- Conductivity-controlled desalination must therefore be deactivated during shock metering and for an appropriate time afterwards.

Operating conditions

- Aggressive chemicals (oxidising)
- Installation of the metering pump in the building

Notes on application

- Shock metering takes place at defined intervals, e.g. weekly.
- In smaller cooling circuits, the metering pump with the integrated process timer replaces the PLC.
- Irrespective of the set metering times, conductivity-controlled desalination must be deactivated via a potential-free contact.
- In some cases, desalination is performed before each shock metering cycle. This procedure must be controlled by means of a second relay contact in the pump.

1.10 Application Examples

Solution

- gamma/L with process timer and corresponding relay outputs
- The relays can be assigned to the process timer as needed and execute the necessary switching functions.
- The pump itself operates at the specified metering times.
- The metering program can be set up on a PC and can be downloaded on site to the pump.
- Metering programs can e.g. be sent by e-mail.
- Liquid end made of PVDF for high chemical resistance

Benefit

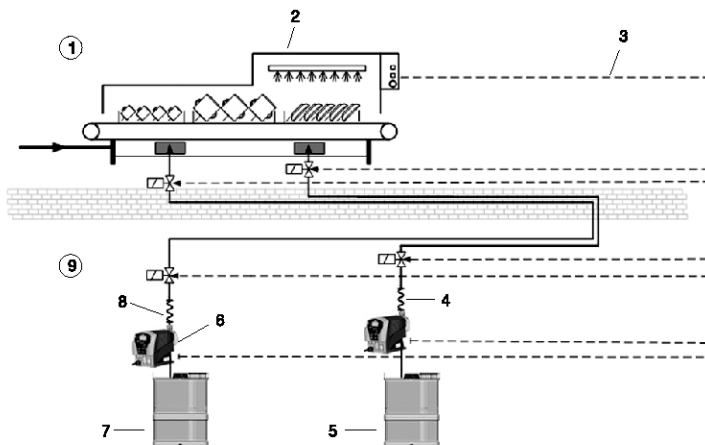
- High IP rating IP75 for the control through integration into the pump.
- Cost savings since no PLC required
- Saving of installation costs thanks to compact design
- Simple and safe setting up of programs at the PC
- Fast downloading to the pump, especially in cases where several pumps run with the same program.

1.10 Application Examples

1.10.3 Detergent Metering In An Industrial Dishwasher

Product: **delta® with optoDrive®**
 Metering medium: **dishwashing detergent**
 Industry: **catering**
 Application: **dishwashers**

- 1 Kitchen
- 2 Dishwasher
- 3 Control circuit
- 4 Flexible connection
- 5 Rinser
- 6 optoDrive® delta® metering pumps
- 7 Cleaner
- 8 Flexible connection
- 9 Basement
- 10 Water



pk_1_134

Tasks and requirements

- Metering of cleaning and rinse aid chemicals for the dishwasher from the basement to the upper floors.
- Low-pulsation chemical metering.

Operating conditions

- Stainless steel pipes of up to 100 m of length across several floors.
- Defined metering volume.
- Metering only with conveyor belt in operation.
- Continuous metering.

Notes on application

- Drive of the metering pump when conveyor belt is started via potential-free contact ON / OFF (pause function).
- Typically, a hose of approx. 0.5 m is installed between the metering pump and the rigid stainless steel pipe to prevent tensions in the piping system.
- Because cleaning agents are normally very slick which might result in chemical leaks, the hoses are to be installed properly.
- Solenoid valves (pressure-retaining valves or metering valves are no leak-proof shut-off devices) are to be used to protect against backflow at stop.
- The metering system shows an inert behaviour because of the pipe length: Delayed response (at start) and dripping (at stop) at the metering point. For this reason, solenoid valves are to be used there.

Solution

- optoDrive® solenoid pumps delta®.
- Solenoid valves.

Benefit

- Fully-automatic operation with a minimum of staff and maintenance.
- Safe metering with the integrated injection control optoGuard®.
- Favourable price-performance ratio. No additional pulsation dampening is required thanks to the low-pulsation metering characteristics of the pump.
- Customer-specific process design thanks to adaptation of the pump to the properties of the metering medium.

- **Service**
- **Sales**

You can make full use of our services even if you are not yet one of our customers. Our pre-sales services ensure that you get the optimum solution for your individual needs:

- Advice in choosing the products
- Application and process optimisation
- Project planning

However, our commitment does not end with delivery. We offer you a comprehensive after-sales service, which lasts for the entire service life of your equipment. That maximises your productivity and minimises your operating costs:

- Assembly/installation
- Commissioning
- Maintenance
- Spare parts service
- Repair
- Troubleshooting

Thanks to our worldwide presence in over 100 countries, our service is available wherever you need it.

1.1

Services

Mounting/installation

Quality starts with the correct installation of our systems. That's why we offer you a professional installation by trained service technicians.

We offer the following installation work:

- running pipelines in PE, PVC and PVDF materials
- carrying out electrical installation work
- linking the system to a PLC

If required, we also carry out conversions and plant extensions. Your advantage: plant and installation from a single source.

Commissioning: the right start for your system

Our service technicians will ensure professional system commissioning and start-up. You profit from knowing that the processes are set up correctly and the machine is running optimally from the very outset. Following successful commissioning, the service technician will provide information on the set system parameters and will train the system operators.

Maintenance: an essential requirement for consistently high reliability

Routine preventative maintenance performed by our service technicians increases operational reliability, lowers operating costs and extends the service life of your system. We offer maintenance contracts for this, individually tailored to your needs.

Repairs: on our premises or yours

Whether it's a works repair or an express job on site, you're assured of a professional repair using genuine spare parts.

Troubleshooting: If really something shouldn't work

Of course, queries on the operation of our products or systems do come up from time to time. Maybe the operation is not quite clear, or you'd like to change the process, or make other modifications, perhaps one of our products just isn't working correctly, for whatever reason at all. No problem. Our technical advisers will be pleased to help you. In most cases, your query can be answered over the telephone.

If that's not possible, our adviser will take the necessary steps to help you as quickly as possible. This can be by sending in a service technician, despatch of spare or replacement parts, or other measures, depending on the situation.

1 Service

1.2 Service Contacts

For customers from Germany:

Some services are rendered by ProMaqua GmbH.

Services	Telephone +49 6221 6489-	Fax +49 6221 6489-	eMail
Mounting/installation	-402	-400	service@promaqua.com
Commissioning	-402	-400	service@promaqua.com
Maintenance	-402	-400	service@promaqua.com
On-site repair	-402	-400	service@promaqua.com

Repairs	Telephone +49 6221 842-	Fax +49 6221 842-	
for postcode areas 0 ... 4	-328	-441	CustomerCare@prominent.de
for postcode areas 5 ... 9	-308	-441	CustomerCare@prominent.de

For customers from other countries:

Please contact your local ProMinent branch or agency.

1.3 Training

The training programme offered by the ProMinent Academy for Water Technology is targeted at customers resident in Germany. We would kindly ask customers from other countries to contact their local ProMinent branch office or agency, the website addresses of which can also be found at "Company – Locations", either for the purpose of contacting them or to obtain further information.

Our extensive range of courses provides you with the opportunity to efficiently obtain information and knowledge about our units, familiarise yourself with new units and exchange information.

The courses are split into free subject seminars and intensive courses for which a charge is made. The subject seminars offer all process managers, planners, plant engineers and plant constructors the opportunity to familiarise themselves with the full ProMinent product range across all sectors. Specialised subject seminars on the drinking water and swimming pool sectors and on legionella prevention are also offered.

The intensive seminars are intended for all users from operational, maintenance and service fields who would like to gain more in-depth practical experience with specific ProMinent units. As well as workshops on metering pumps, we also offer workshops on measuring and control equipment, Bello Zon® chlorine dioxide plants and DVGW-certified (German Gas and Water Association) Dulcodes UV systems.

All training courses are held in our Seminar Centre in Heidelberg, equipped with the very latest media equipment and two practical training rooms. We limit the numbers on each course to 15 to enable us to deal with customers' needs individually and as comprehensively as possible. We would be pleased to arrange individual seminar dates or on-site sessions for you by prior agreement for a group of 5 participants or more.

1.4 Training Contacts

Detailed information on the current training programme is available on our website (www.prominent.com) under "Service" or directly from our training department.

Address:	ProMinent Dosiertechnik GmbH ProMinent Academy for Water Technology Im Schuhmachergewann 5-11 69123 Heidelberg
Training Manager:	Dr. Klaus Fuchs
Telephone:	06221 842-318 Administrative office 06221 842-0 (Main reception)
Fax:	06221 842-453 Administrative office
E-mail:	training@prominent.com

For customers from other countries:

Please contact your local ProMinent branch office or agency.

2 Sales

2.1 The ProMinent Group

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-0
-433 Management
-617 Sales Chemical Fluid Handling
-419 Exports
-220 Purchasing
-435 Research and Development
-627 EDP/Technical/Legal
-432 Advertising
-400 Sales ProMaqua

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Turkmenistan
UAE
Uganda
Uruguay
Venezuela
Vietnam
White Russia
Zambia
Zimbabwe

Addresses of distributors are available from ProMinent Dosier Technik GmbH · Im Schuhmachergewann 5-11 · 69123 Heidelberg · Germany

2 Sales

2.2 General Terms And Conditions Of Delivery

The valid General Terms and Conditions, which can be viewed on the ProMinent homepage, become material part of the contract.

I. Scope of application

- (1) The present terms and conditions of delivery shall apply exclusively; deviating conditions or conditions contrary of the customer shall only apply provided the supplier approved of this in writing.
- (2) The present General Terms and Conditions of Delivery shall also apply to subsequent orders and to replacement parts deliveries without necessitating repeated pointing out of this fact.
- (3) Supplements and representations as well as modifications or amendments to a contract concluded in writing or by telex must be in writing.

II. Offer and order confirmation

- (1) Offers shall only be binding provided a time-limit for acceptance is stated in the offer. To be legally binding, offers shall require the written confirmation of the supplier.
- (2) The supplier reserves any titles to and copyrights in figures, drawings, calculations, and other offer documentation and similar information of physical and non-physical type - also in electronic form; these may only be disclosed to third parties on the supplier's written approval and shall be immediately returned to the supplier on request if no order is awarded to the supplier.

III. Scope of deliveries and services

- (1) The deliveries and services are determined based on the mutual written declarations. If no such declarations exist, the written order confirmation of the supplier shall be decisive. For mere sales contracts, the agreed upon delivery provisions shall be interpreted according to the INCOTERMS valid at the conclusion of the contract.
- (2) Data in brochures, catalogues or general technical documentation shall only be binding if reference is made to them in writing.
- (3) The costs for an agreed mounting and assembly, including all and any required ancillary costs such as travel expenses or costs for the transport of tools or personal luggage shall be remunerated separately by the customer, if not otherwise agreed upon.
- (4) If software is part of the delivery scope, the customer shall be granted a non-exclusive right of use in the software. The customer may copy or edit the software only in the legally permissible scope.
- (5) Partial deliveries shall be permissible, provided it is reasonable for the customer, considering the interests of both the supplier and the customer.
- (6) In case of deliveries abroad, the supplier's obligation shall be under the proviso that any necessary export licences are granted.

IV. Prices and terms of payment

- (1) All prices shall be in EURO unless otherwise stated. They shall apply to mere delivery transactions "ex works" (EXW), exclusive of packaging.
- (2) The prices do not include any turnover tax. This tax is itemised separately in the invoice in the statutory amount applicable at the date of invoicing.
- (3) The deduction of discounts shall require a special agreement in writing.
- (4) If not otherwise shown in the order confirma-

tion, the sales price shall be due for payment 30 days from invoice date without any deduction.

- (5) If the customer does not comply with the date for payment, the customer shall pay default interest in the amount of 8 percentage points above the base interest rate pursuant to §247 German Civil Code from the due date. Payment of further damages remains reserved.
- (6) If not otherwise agreed upon, the delivery of goods for deliveries abroad shall be under the proviso that an irrevocable commercial letter of credit is issued by the customer in favour of the supplier, and confirmed by a German banking institution.
- (7) In case of delayed payment, the supplier may suspend the performance of his own obligations until total payment was received, giving written notice to the customer.
- (8) The customer may only set off claims or assert a right of retention, provided these are undisputed or have become non-appealable.

V. Time-limits for deliveries or services

- (1) With regard to time-limits, the mutual written declarations or, in the absence of such declarations, the written order confirmation of the supplier shall be decisive. The time limit shall be deemed observed, provided all and any documentation to be provided by the customer are received in time, and all and any required permits, releases, in particular plans, are provided, and the agreed upon terms of payment and other obligations are met by the customer. If these prerequisites are not met in time, the time-limit shall be prolonged reasonably; this shall not apply if the supplier is responsible for the delay.
- (2) If non-observance of the time-limits is the result of force majeure, e.g. mobilization, war, riot or similar events, e.g. strike or lock-out, the agreed upon time-limits shall be prolonged reasonably.
- (3) If mounting and assembly are not part of the agreed upon services, the time-limit shall be deemed observed if the goods ready for operation were shipped or collected within the time-limit. Should the delivery be delayed for reasons for which the customer is responsible, the time-limit shall be deemed observed upon notification of readiness for shipment.
- (4) If the supplier is responsible for the non-observance of the time-limit, the customer, provided the customer suffered an actual loss, may request compensation for delay for each full week of delay of a maximum of 0.5%, however, not exceeding 5% of the price for the part of the delivery which could not be taken into relevant operation because of the delay. Claims for compensation of the customer exceeding the limits stipulated in item 5.4 shall be excluded in all cases of delayed delivery or service, also after expiry of any grace period set to the supplier. This shall not apply to the extent mandatory liability exists in cases of intent, gross negligence or personal injury; a shift of the burden of proof to the disadvantage of the customer is not given in this case.
- (5) The customer's right to withdraw after ineffectual expiry of a grace period for the supplier shall remain unaffected. The grace period, however, must be reasonable and

amount to at least four weeks.

- (6) If shipment or delivery are delayed for more than one month after notice of readiness for shipment on the customer's request, warehouse charges in the amount of 0.5% of the price of the delivery goods, however, not exceeding a total of 5%, may be charged to the customer for each month started. The parties to the contract shall remain free to furnish proof of higher or lower warehouse charges.

VI. Passage of utility and risk; insurance; packaging

- (1) The risk of deliveries and services rendered by the supplier shall pass to the customer as follows, even in case of deliveries freight paid.
 - a) for deliveries without mounting or assembly, even in case of partial deliveries, if these have been shipped or collected. Shipments shall be insured by the supplier against the usual transport risks upon wish and at the expense of the customer. If such insurance exists, the supplier shall be immediately notified about any damages to goods in transit.
 - b) for deliveries with mounting or assembly on the day of acceptance in the customer's operations or, if agreed upon, after perfect test operation.
- (2) If the shipment, delivery, start, performance of mounting or assembly, acceptance in the customer's operations or test operation is/are delayed for reasons attributable to the customer or if the customer delays acceptance for other reasons, the risk shall pass to the customer.
- (3) The shipment is in principle made in standard packagings of the supplier. The latter shall be entitled to choose special types of packaging deemed necessary in the supplier's discretion. The costs of these packagings shall be borne by the customer.

VII. Mounting and assembly

The mounting, assembly and installation of the equipment and devices of the supplier may only be performed by specialists, observing the supplier's guidelines and the applicable technical standards. If mounting and/or assembly are performed by the supplier, the following provisions shall apply, if not otherwise agreed upon in writing:

- (1) The customer shall assume and provide in time at the customer's expense:
 - a) all earthwork, construction work and other different ancillary work, including required specialists and auxiliary staff, materials and tools,
 - b) the commodities and materials such as scaffolds, cranes and elevators and other devices, fuels, lubricants, and chemicals required for assembly and commissioning,
 - c) energy and water at the site of use, including connections, heating, and illumination,
 - d) sufficiently large, suitable, dry and lockable rooms at the assembly site for storing machine parts, fixings, materials, and tools etc., and suitable working and recreation rooms for the assembly staff, including appropriate sanitary installations. For the protection of the supplier's pro-

perty and the assembly staff, the customer shall also take the measures he normally would take to protect his own property.

- e) protective clothing and protective devices which are necessary because of special circumstances at the assembly site.
- (2) Prior to the start of the assembly work, the customer shall unsolicitedly provide the required information about the position of sub-surface energy, gas, water conduits or similar installations as well as the required data on statics.
- (3) Prior to the start of mounting or assembly, the additions and objects required to start the work must be at the mounting or assembly site and all preparations prior to start of the installation must be advanced such that the mounting or assembly can be started as agreed upon and can be performed without any interruptions. Access routes and the mounting or assembly site must be flattened and clear of any objects.
- (4) Should mounting, assembly or commissioning be delayed for reasons beyond the control of the supplier, the customer shall bear the costs for waiting time and additionally required travels of the supplier or the assembly staff in an adequate amount.
- (5) If a plant cannot be installed immediately after delivery, the customer shall be responsible for a proper storage according to the supplier's guidelines.
- (6) The customer shall provide the supplier with weekly information on the duration of the working hours of the assembly staff and shall immediately confirm the completion of mounting, assembly or commissioning.
- (7) The commissioning may only be performed by technicians acknowledged by the supplier and according to the supplier's instructions. The technicians shall be entitled to refuse commissioning of the plant if the operating conditions to be provided by the customer do not guarantee a safe operation of the plant. The customer shall bear the costs of any delay in commissioning incurred to the supplier.
- (8) Should the supplier request acceptance of the deliveries and services after completion, the customer shall be obliged to do so within two weeks. Otherwise, the acceptance shall be deemed made, too, if the delivery goods and services - also after completion of an agreed test phase, if any - have been taken in use.

VIII. Warranty

- (1) Should goods delivered or services rendered by the supplier prove to be defective because they do not possess the agreed quality or because they are not suitable for the agreed or usual use, the supplier shall in its discretion either remedy the parts or services concerned or deliver or render them again at no cost within the limitation period, provided the cause of the defect already existed at the time of risk passing.
- (2) Claims for material defects become statute-barred after 12 months, for ProMinent® pump drives and DULCOMETER® controllers the period is 24 months. The time-limit shall start with passing of the risk (item 6). The above provisions shall not apply to the extent the law mandatorily prescribes longer time-limits according to §§438(1) no. 2 German Civil Code (goods for edifices), §479(1) German Civil Code (right of recourse), and §634a German Civil Code (structural defects). The warranty period may be prolonged up to 60 months in suitable cases, provided the customer concludes a maintenance

contract for the corresponding period.

- (3) The customer shall immediately give notice of defects to the supplier.
- (4) In the event of notices of defects, payments of the customer may be retained in the volume which shows a reasonable ratio to the material defects incurred. The customer may retain payments only if a notice of defect is given whose justification is beyond doubt. If the notice of defect is given wrongfully, the supplier shall be entitled to request from the customer compensation for the expenses incurred to the supplier.
- (5) At first, the supplier shall always be given the opportunity to post-perform within a reasonable time-limit. The customer shall grant the supplier the time and opportunity required to do so. Should the customer refuse this, the supplier shall be exempted from the liability for defects.
- (6) If the post-performance fails, the customer - notwithstanding possible claims for damages - may withdraw from the contract or reduce the compensation. The customer may not claim compensation for futile expenses.
- (7) Claims for defects do not exist in case of minor deviations from the agreed or assumed quality, minor impairment of usability, natural wear or damages incurred after passing of the risk because of incorrect or negligible handling, excessive use, unsuitable operating material, faulty construction work, unsuitable subsoil or because of special external influences which are not established in the contract as well as in case of non-reproducible software errors. If the customer or third parties perform improper modifications or repair work, no claims for defects will exist for these and the resulting consequences.
- (8) The supplier shall not bear the additional expenditure, in particular transport, travelling, labour and material costs, which result from the fact that the subject matter of the delivery was later transported to a different location than the customer's branch or the original place of destination, except the transport corresponds to its proper use.
- (9) In all cases, the customer shall be obliged to take any possible and reasonable steps to keep the expense for the purpose of post-performance as small as possible. The supplier shall participate in the costs for a recall campaign only if this is necessary based on the factual and legal situation. The customer shall be obliged to either return defective products or keep them ready for inspection and tests, in the supplier's discretion.
- (10) Claims for recourse of the customer against the supplier shall only exist to the extent the customer did not conclude any agreements with the customers' purchaser which exceed the statutory claims for defects. In addition, item 8.8 shall apply correspondingly to the scope of the right for recourse of the customer against the supplier.
- (11) Furthermore, item 11 (Other claims for damages) also applies to claims for damages. More extensive or other claims than stipulated in the present item 8 of the customer against the supplier and its persons employed in performing the obligations because of a material defect shall be excluded.

IX. Industrial property rights and copyright; defects of title

- (1) If not otherwise agreed upon, the supplier shall be obliged to render the delivery free of any industrial property rights and copyrights of third parties (hereinafter called: property rights) solely in the country of the place of delivery. To the extent a third party makes justified claims against the customer because of

infringement of property rights by deliveries rendered by the supplier and used according to contract, the supplier shall be liable to the customer within the time-limit stipulated in item 8.2 as follows:

- a) The supplier shall at the supplier's expense and in the supplier's discretion either obtain a right of use for the deliveries concerned, modify them such that the property right is not infringed or exchange them. Should the supplier not be able to do so under reasonable conditions, the customer shall be entitled to statutory cancellation or reduction rights. The customer may not claim compensation for futile expenses.
- b) The supplier's obligation to pay damages shall be subject to item 11.
- c) The above mentioned obligations of the supplier shall only be given provided the customer immediately informs the supplier in writing about claims asserted by third parties, refuses to acknowledge an infringement, and all and any measures of protection and settlement proceedings remain reserved to the supplier. Should the customer discontinue the use of the delivery goods for the purpose of reducing the damage or for other reasons, the customer shall be obliged to inform the third party about the fact that the discontinuance of use does not represent an acknowledgement of the property rights infringement.
- (2) Claims of the customer shall be excluded to the extent the customer is responsible for the property rights infringement.
- (3) Claims of the customer shall furthermore be excluded to the extent the property rights infringement was caused by special standards stipulated by the customer, by use not foreseeable by the supplier or by the fact that the delivery goods were modified by the customer or used in conjunction with products not delivered by the supplier.
- (4) In the event of property rights infringements, the claims of the customer stipulated in item 9.1 a) shall apply, in addition the provisions in item 8.4, item 8.5, and item 8.10 shall apply correspondingly. In case of other defects of title, the provisions of item 8 shall apply correspondingly.
- (5) More extensive or other claims than stipulated in the present item 9 of the customer against the supplier and its persons employed in performing the obligations because of a defect of title shall be excluded.

X. Impossibility; adaptation of contract

- (1) To the extent the delivery is not possible, the customer shall be entitled to claim damages, except the impossibility is attributable to the supplier. The customer's claims for damages, however, shall be limited to 10% of the part of the delivery which cannot be taken into relevant operation because of the impossibility. This limitation shall not apply to the extent mandatory liability exists in cases of intent, gross negligence or personal injury; a shift of the burden of proof to the disadvantage of the customer is not given in this case. The customer's right to withdraw from the contract shall remain unaffected.
- (2) In case of temporary impossibility, item 5 (Time-limits) shall apply.
- (3) Should unforeseeable events in the sense of item 5.2 significantly change the economic meaning or the content of the delivery or have a significant effect on the supplier's operations, the contract shall be adapted in good faith. To the extent this is not economi-

2 Sales

cally reasonable, the supplier shall be entitled to withdraw from the contract. If the supplier intends to assert this right to withdraw, the supplier, after having obtained knowledge about the scope of the event, shall immediately inform the customer to this effect. This shall also apply if a prolongation of the delivery period was agreed upon with the customer at first.

XI. Other claims for damages

- (1) Any claims for damages and reimbursement of expenses the purchaser may have due to the infringement of primary or collateral duties resulting from the relationship under the law of obligation, from unauthorized action or any other legal reasons, shall be excluded.
- (2) For all products with network connection, the risk of loss or data alteration and the risk of faulty data transmission will be passed to the customer as soon as the first network interface related to the product is crossed. For software products, the risk of loss or data alteration and the risk of faulty data transmission will be passed to the customer as soon as the software is installed. Despite careful control of the data, ProMinent does not assume any liability for data entering the system of the customer or other systems via an open network interface.
- (3) This exclusion does not apply when liability is imperative, e.g. according to the Product Liability Law (Produkthaftungsgesetz), for cases of intent, gross negligence or personal injuries, due to the warranty for the presence of a specific quality or the breach of material contractual obligations. Damage claims asserted on the basis of a breach of material contractual obligations shall be limited to foreseeable damages that are typical to the contract unless there is intent or gross negligence involved or the liability is based on physical injury or a warranty for the presence of a specific quality. No reversal of the burden of proof to the disadvantage of the purchaser is associated with the above provisions.
- (4) Unless longer limitation periods are imperatively prescribed by law, all claims for damages shall be subject to the limitation periods mentioned in sub-paragraph 8.2.

XII. Warranty and product description

- (1) Warranties shall only be effective if made in writing.
- (2) Data described in catalogues, tender documentation and other printed matter as well as general advertising statements do not represent an offer for the conclusion of a warranty agreement.

XIII. Reservation of title

- (1) The supplier reserves the title in the delivery goods (reserve goods) until the customer has made the complete payment due from the business relationship. The reservation of title shall also include the acknowledged balance, to the extent the supplier enters the claims against the customer in current account (current account reserve).
- (2) If the supplier accepts return of the delivery goods, this shall mean a withdrawal from the contract. Upon return of the goods purchased, the supplier shall be entitled to realise these goods; the realisation proceeds shall be credited to the customer's obligations - minus reasonable realisation fees. In the event the delivery goods are attached, the supplier shall be entitled to withdraw from the contract without setting a time-limit. In case of attachment or other interventions by third parties, the customer shall immediately inform the supplier in writing for the supplier

to be able to file action pursuant to §771 German Code of Civil Procedure. To the extent third parties are not able to reimburse the judicial and extrajudicial expenses of an action pursuant to §771 German Code of Civil Procedure to the supplier, the customer shall be liable for the loss incurred by the supplier

- (3) The customer shall be entitled to resell the delivery goods in the proper course of business; however, the customer already now assigns to the supplier all and any claims in the amount of the final invoice amount, including value added tax, which are due to him from the resale against his purchaser or third parties, independent of the fact whether the delivery goods were resold without or after processing. The customer shall be entitled to collect this claim also after its assignment. The supplier's power to collect the claim himself remains unaffected; the supplier, however, agrees not to collect the claim as long as the customer meets his payment obligations properly and is not delinquent. In this case, the supplier may request the customer to disclose the assigned claims and their debtors, to provide the information required for collection, to provide the relevant documentation and to inform the debtor (third party) about the assignment.
- (4) The processing and transformation of the delivery goods by the customer shall always be performed for the supplier. If the delivery goods are processed together with other objects not belonging to the supplier, the supplier shall obtain co-ownership in the new object in the proportion of the value of the delivery goods to the other processed objects at the time of processing. Otherwise, the same provisions as for reserve goods shall apply to the matter created by processing. The customer shall also assign to the supplier the claims for securing the supplier's claims which are due to the customer against a third party by joining the delivery goods with a real property.
- (5) If the delivery goods are mixed inseparately with other objects not belonging to the supplier, the supplier shall obtain coownership in the new object in the proportion of the value of the delivery goods to the other mixed objects at the time of mixing. If the mixing is done such that the matter of the customer is to be deemed a main component, the parties agree that the customer shall assign to the supplier proportional co-ownership. The customer shall keep the sole property or co-property for the supplier. The customer shall insure it in the usual scope against usual risks such as e.g. fire, theft, water, and similar. The customer shall already now assign to the supplier the customer's claims for compensation which are due to him from damages of the above mentioned type against insurers or other third parties, in the amount of the invoice value of the goods.
- (6) If the realisable value of the securities due to the supplier exceed the supplier's total claims by more than 10%, the supplier shall be obliged to release in the supplier's discretion securities on request of the customer or a third party affected by the excessive security.

XIV. Repair conditions

- (1) The ordering party (customer) agrees by means of a legally binding declaration (Declaration of Decontamination) that any devices or parts returned for repair or maintenance will be thoroughly cleaned in order to avoid any hazard to the independent contractor due to re-contamination. The devices must be sent to the supplier free of any flammable, toxic, caustic, noxious, irritant or any other substances detrimental to health. The Declaration of Decontamination must be affixed to the

outside of the packaging used to return the devices. If no Declaration of Decontamination is affixed to the delivery, ProMinent has the right to refuse acceptance of the devices.

- (2) If a cost estimate is prepared on order of the orderer, the costs incurred in this connection may be charged to the orderer, independent of the fact whether a repair order is issued subsequently or not. Because the search time for defects is working time, the time expended and to be proven shall be charged to the orderer if an order cannot be executed because:
 - a) the defect complained about could not be determined, observing the rules of technology;
 - b) the order was withdrawn while executing the order;
- (3) The warranty period for all and any workmanship (repairs) as well as for built in material shall be six months. Otherwise, the warranty rules for suppliers and services from item VIII shall apply.
- (4) The payment terms from item IV shall apply. In addition, the following retention of title shall be agreed:
 - a) To the extent the replacement parts or similar built in during repairs do not become material components, the independent contractor shall reserve retention of title in these built in parts until the settlement of all and any claims of the independent contractor from the contract.
 - b) If the orderer delays in payment or does not meet the orderer's obligations from the retention of title, the supplier shall be entitled to request the return of the object for the purpose of removing the built in parts. All and any costs of the return and the removal shall be borne by the orderer.
 - c) If the repair is performed at the orderer's premises, the orderer shall give the supplier the opportunity to perform the removal at the orderer's premises. Labour and travel costs shall be at the expense of the orderer.
- (5) The place of jurisdiction for all disputes arising from this contract shall be the place of business of the contractor, if the person ordering is a merchant. However, the contractor is also entitled to institute legal proceedings at the place of business of the person ordering.

XV. Place of jurisdiction and applicable law

- (1) The place of jurisdiction for all and any disputes arising out of the present contract shall be the supplier's headquarters, provided the customer is a merchant. The supplier, however, shall be entitled to file action at the customer's headquarters.
- (2) German law shall apply to the contractual relationships. The UN Convention on the International Sale of Goods (CISG) shall be excluded.

XVI. Severability

Should any individual provisions of the present contract be legally ineffective, the validity of the remaining provisions shall in no way be affected. This shall not apply if abiding by the contract would constitute an unreasonable hardship for the other party to the contract.

XVII. Terms and conditions for the participation in the exchange device programme

- (1) The exchange device programme applies to

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pumps without Profibus interface and without self-ventilation as well as for amperometric sensors.

- (2) The purchaser agrees with the participation in the exchange device programme that the device is assigned to ProMinent Dosiertechnik GmbH. By delivering the device, the ownership in the delivered devices shall pass on to ProMinent Dosiertechnik. In return, the

purchaser shall receive a used, similar and at least equal device.

- (3) Within the scope of each exchange process, a maximum of 5 exchange devices per customer may be ordered.
- (4) Already exchanged devices can no longer participate in the exchange device programme.

- (5) The warranty for exchange pumps shall be 6 months.

ProMinent Dosiertechnik GmbH

Valid 11/2009