

Gas Samplers

Compact, user-friendly devices for physically correct gas volume measurements in accordance with the VDI guidelines



Sampling of gases and air pollutants

DESAGA Gas Samplers are used for precise/accurate volume determination of gaseous material for emission and immission measurements, for tracing workplace pollutants, maximum workplace concentration checks and for examining process gases.

Users include waste incineration and sewage treatment plants, power plants, the chemical industry and automotive manufacturers, as well as technical inspection authorities, factory inspectors and environment agencies. DESAGA Gas Samplers are used wherever gases and gaseous components are of interest: in industry, research, laboratory monitoring, and material testing.

The design of the DESAGA Gas Samplers ensures dependable and physically correct measurement of the sample volume. A microprocessor controls and monitors the sampling process. At the sampling point, the gas flows into the collectors e.g. comprised of several wash bottles connected in a series. The negative pressure required to induce the gas flow is produced by an integral gas-tight diaphragm pump. The required pumping power heats the gas and changes its volume. Therefore, the gas then flows through a gas cooler to restore it to ambient temperature before reaching the volume determination module. The conversion to standard volume can be performed automatically as the gas temperature and ambient pressure are also measured.

The volume determination module operates in accordance with the proven bellows principle of dry gas meters. The gas emerges out of the volume determination module at the same air pressure as the initial sampling point. As the pressure drop in the volume determination module is negligible, no pressure correction of the gas volume with respect to the measuring conditions is required.

The DESAGA Gas Samplers incorporate all the components that are required for easy and reproducible operation:

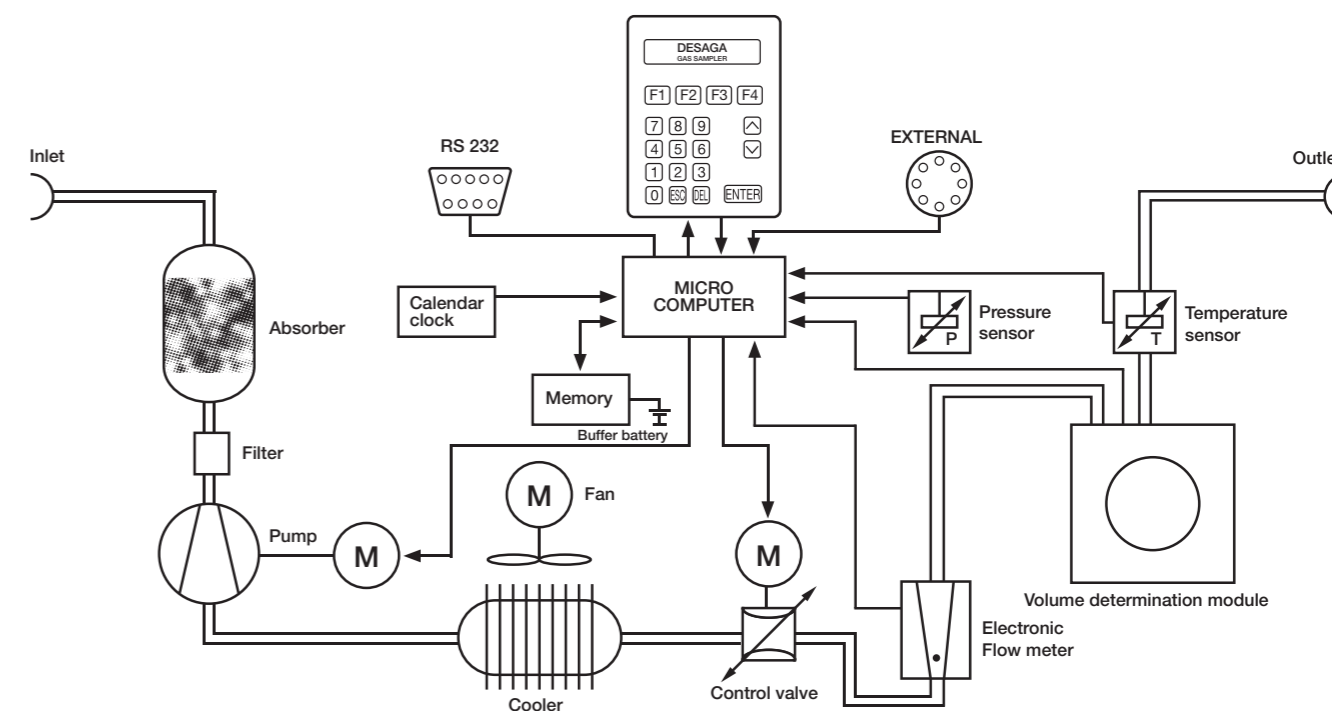
- Absorber with glass frit filter for protection of the pump and volume determination module against corrosive gas components
- Sample feed pump
- Flow sensor and control valve for accurate flow regulation
- Cooler and fan for temperature conditioning of the gas sample to ambient temperature
- Volume determination module with electronic sensing
- Temperature sensor (platinum resistance)
- Alphanumeric display of all parameters
- Back-up battery for saving measurement reports
- Processor for controlling and monitoring all functions
- Remote control
- RS 232 interface

The DESAGA Gas Samplers can be operated in unattended automated mode or with remote control for gas sample volumes up to 9999 litres. The Power Pack GB 12 is essential for power supply failure back-up during lengthy sampling. The battery pack also enables mains-independent operation for up to 10 hours in any industrial or outdoor environment.

Depending on the gas flow resistance of the probes, filters and separators, gas sample flow rates ranging from 6 to 720 l/h can be achieved when operating these units. This covers the range specified in numerous VDI guidelines and in various national and international regulations.

The wide range of available accessories allows adaptation for any application. DESAGA wash bottles are ideal to accommodate the solvents in the laboratory, to guarantee trouble-free sampling, and protect the samples during transportation in the DESAGA transport box.

Gas flow diagram / VDI guidelines



List of the key VDI guidelines on pollutant measurements with gas samplers

VDI 2449	Definition of terminology	VDI 2589	Chlorohydrocarbon
VDI 2451	Sulphur dioxide	VDI 3462	Wood treatment and wood processing
VDI 2452	Fluorine and inorganic gaseous fluorine compounds	VDI 3480	Hydrogen chlorides
VDI 2453	Nitrogen monoxide and dioxide	VDI 3481	Determination of organically bound carbon in exhaust gas
VDI 2454	Hydrogen sulphide	VDI 3482	Measurement of gaseous Immissions
VDI 2455	Carbon monoxide	VDI 3484	Measurement of aldehydes
VDI 2456	Nitrogen monoxide and dioxide	VDI 3485	Measurement of phenols
VDI 2457	Determination of organic compounds	VDI 3486	Hydrogen sulphide
VDI 2458	Chlorine	VDI 3487	Carbon sulphide
VDI 2461	Ammonia	VDI 3488	Chlorine
VDI 2462	Sulphur dioxide	VDI 3495	Carbon
VDI 2463	Suspended particles in air	VDI 3496	Sulphuric acid
VDI 2467	Primary and secondary amines	VDI 3863	Acrylonitrile
VDI 2468	Ozone and peroxide	VDI 3865	Halogenated hydrocarbons in soil
VDI 2470	Fluorine		

DESAGA devices comply with the VDI guidelines and are used by the responsible institutions.

DESAGA Gas Sampler GS 312

The universal Gas Sampler GS 312 is a fully-automatic device for physically correct gas volume measurements in accordance with the VDI guidelines.

The GS 312 contains all of the important components and functions for accurate and reproducible measurement results:

- Clearly structured operating menu
- Microprocessor control and monitoring of sampling
- Electronic flow sensor and control valve for accurate flow regulation from 0.2 to 12 l/min
- Gas temperature measurement via PT 100 resistance thermometer with an accuracy of $\pm 0.2^\circ\text{C}$
- Measurement of the ambient pressure for direct conversion to standard volume
- Data memory for up to 20 measurements
- Measurement report for date, time, sample number, volume duration, temperature in the gas meter and error messages
- Manual, timed, and remote control
- RS 232 interface

A measurement can be started manually or built-in remote control socket, or automatically at a preselected start time.

In addition, a large volume, easy-to-exchange absorber vessel protects the components of the unit against damaging substances and moisture (one filling with 300 ml of silica gel will reliably absorb the water vapour contained in 1000 l of gas at 20°C). Corrosion-proof glass frits are used as dust filters.

The gas module is brought to ambient temperature within a few minutes with the aid of a powerful fan, a large-area gas cooler and a well-designed air duct system.

The Gas Sampler GS 312 only requires a 12 V power supply with a maximum current of 2 A. The 12 V Power Adapter GN 100 – 240/12 is included in the package. The Power Pack GB 12 (item no. 90.170.180) is available as a separate accessory.

The unit is compact and easy to carry – perfect for mobile field use. The robust steel case provides protection and is weather proof.



DESAGA Gas Sampler GS 212

The Gas Sampler GS 212 is the standard model. It is equipped with the key components and functions of the GS 312 and suitable for universal use. The flow rate of the GS 212 is manually adjusted via a fine control valve and via flow meter.



DESAGA Gas Sampler GS 301

The Gas Sampler GS 301 is specially designed for working with sample tubes. It consists of a basic unit with easily convertible sample changers for a wide range of different tube lengths and diameters. These changers can already be loaded in the laboratory with up to 10 detector tubes. The measurement parameters and starting specifications can be individually programmed for each tube, whereby it is also possible to start subsequent measurements at intervals.

- VDI-compliant design guarantees reliable and physically correct measurements
- Clearly structured operating menu for individual programming
- Microprocessor control and monitoring of sampling
- Thermal mass flow meter with control valve from 0.1 to 1.5 NI/min
- Data memory for up to 10 measurements
- Measurement report for date, time, sample number, volume, flow, duration, tube position, measurement program number and fault messages
- Remote control
- RS 232 interface
- Power supply via power adapter or with optional power pack



	GS 212	GS 312	GS 301
Preselectable			
Flow rate	0.2-12 l/min, mechanically controlled	0.2-12 l/min, electronically controlled	0.1-1.5 NI/min, electronically controlled
Volume	1-9999 l	1-9999 l	0.1-9999,9 l
Duration	1-999 min or 10-9999 min	1-999 min or 10-9999 min	1 min - 99 h
Start time	0.00 a.m. - 11.59 p.m.	0.00 a.m. - 11.59 p.m.	0.00 a.m. - 11.59 p.m.
Access code:	Selectable	Selectable	Selectable
Operating/standard/WEL litres	No	Selectable	Yes
Measured values			
Flow rate	No	0.2 - 12 l/min ± 0.5 l/min	0.1 - 1.5 NI/min
Volume	0.1 - 9999.0 l ± 2%	0.1 - 9999.0 l ± 2%	0.1 - 9999.0 l ± 2%
Duration	1:00 - 999:00 min or 10:00 - 9990:00 min	1:00 - 999:00 min or 10:00 - 9990:00 min	1:00 - 99:00 min
Ambient temperature	No	No	No
Gas temperature	-10.0 bis + 80.0 °C ± 0,2 °C	-10.0 bis + 80.0 °C ± 0,2 °C	No
Ambient pressure	No	500 - 1100 hPa ± 2 hPa	No
Pressure difference	No	No	No
Report			
Report memory	Date, time, volume, duration, 6-digit sample number, error message (if applicable)	Date, time, volume, flow rate, duration, air pressure, 6-digit sample number, error message (if applicable)	Date, time, volume, flow rate, duration, 4-digit sample number, tube position, error message (if applicable)
Report memory	20 measurements	20 measurements	10 measurements
Data output	Display or serial printer via RS 232	Display or serial printer via RS 232	Display or serial printer via RS 232
Remote control	Yes	Yes	Yes
Absorber vessel	350 ml	350 ml	No
Volume determination module	Bellows gas meter	Bellows gas meter	Thermal mass flow meter
Cooler and fan	Yes	Yes	No
Enclosure	Sheet steel case	Sheet steel case	Plastic
Operation time counter	No	No	Yes
Dimensions (W x D x H)	410 x 220 x 330 mm	410 x 220 x 330 mm	212 x 255 x 167 mm
Weight	10 kg	13 kg	4.5 kg
Power supply	12 V max. 2 A or power adapter	12 V max. 2 A or power adapter	12 V or power adapter
Operating range	20-80% rel. humidity, 0 to +50°C	20-80% rel. humidity, 0 to +50°C	20-80% rel. humidity, 0 to +50°C

Ordering information

Order number	Description
90.170.300	Gas Sampler GS 312, 12 V, incl. Power Adapter GN 100-240/12 V
90.170.310	Gas Sampler GS 212, without power adapter
90.170.350	Gas Sampler GS 301, 12 V, incl. Power Adapter GN 100-240/12 V, without sample changer
90.170.185	Power Adapter GN 100-240/12 V
92.170.352	Sample changer type B/G for GS 301, for tubes 7 x 125 mm
92.170.353	Sample changer type N for GS 301, for tubes 6 x 70 mm
92.170.354	Sample changer type ADT for GS 301, for tubes 6 x 89 mm
92.170.355	Sample changer type GE for GS 301, for tubes 6 x 178 mm
92.170.356	Sample changer type W for GS 301, for wash bottles
170191	Absorber Vessel GS 212/312

DESAGA Power Pack GB 12

The Power Pack GB 12 enables you to take undisturbed measurements in any industrial or outdoor environment independently of the mains supply. For buffering operation this unit is connected between the mains supply and the Gas Sampler for fail-safe automatic unattended operation. It is an essential requirement to ensure that lengthy sampling applications are protected against mains failure.

The Power Pack GB 12 is equipped with a leakproof 12 V rechargeable lead-acid battery. It has a capacity of 12 Ampere hours, providing an operation time of around 10 hours for the Gas Samplers GS 312 and GS 212 (based on average pumping power). The battery life can be checked at any time via an analog display by pushing a button. A complete discharge does not shorten the service life of the battery, but does require approximately 8 hours to recharge from the mains supply. The built-in charger unit makes for easy handling and ensures constant readiness for operation. An LED display indicates the end of the charging time. The charging current is controlled by a voltage that depends on the charge state of the unit, so there is no risk of overcharging.

Technical Data GB 12

Output voltage:	12 V
Capacity:	12 Ah
Charging current:	1000 mA
Output sockets:	for 4 mm diameter plugs
Input fuse:	0.4 A (slow-blow)
Output fuse:	6.3 A (slow-blow)
Charging time:	8 h (after a full discharge)
Dimensions (W x D x H):	325 x 220 x 330 mm
Weight:	12 kg
Power supply:	230 V, 50-60 Hz, 0.2 A

Ordering information

Order number	Description
90.170.180	Power Pack GB 12, 230 V / 12 V



DESAGA Thermal Printer

The Thermal Printer 230/6 with power adapter and connecting cable is used to print out measurement records. It is connected to the serial port (RS 232) of the Gas Sampler. The compact and handy design enables simple operation on-site. The Thermal Printer can be powered by the mains or via the built-in rechargeable battery. The internal battery is automatically recharged when the unit is powered from the mains via the power adapter. A single charge is enough to print around 1500 lines.

Technical Data for the thermal printer

Printing system:	Movable thermal head
Max. no. of characters per line:	27
Printing width:	46 mm
Printing speed:	Approx. 0.8 lines per second
Dimensions (W x D x H):	135 x 130 x 64 mm
Weight:	350 g
Power supply:	4.8 V (600 mAh, Ni-Cd battery)

Ordering information

Order number	Description
90.189.720	Thermal printer with power adapter 230 / 6 V and connecting cable
90.188.055	Roll of paper (x5)



DESAGA Wash Bottles and Wash Inserts made of Borosilicate Glass DURAN®

The DESAGA wash bottles make it easy to prepare the samples in the laboratory, guarantee trouble-free sampling and protect the samples during transportation. All parts are connected with ISO glass threads and secured with screw closures or screw connecting caps with PTFE seals. This avoids the risk of sticking or accidental release that is possible with ground glass joints.

With 4 wash bottles sizes of 30, 100, 250 and 500 ml volume and three types of wash inserts, plus an aerosol separator and an Impinger insert, users can assemble the perfect combination for any task. Racks and transport boxes are available for every wash bottle size.

The shape of the washing area achieves intensive contact between the phases and ensures labor-saving, efficient work. All parts are mutually interchangeable and compatible with metric PTFE, glass and metal supply lines. This makes it easy to set up cascaded combinations of these wash bottles with each other and with other devices.

The 30 ml wash bottle is particularly useful for accumulating small quantities followed by gas chromatography evaluations. The 100 ml wash bottle is adequate for spectrophotometric and titrimetric evaluations.

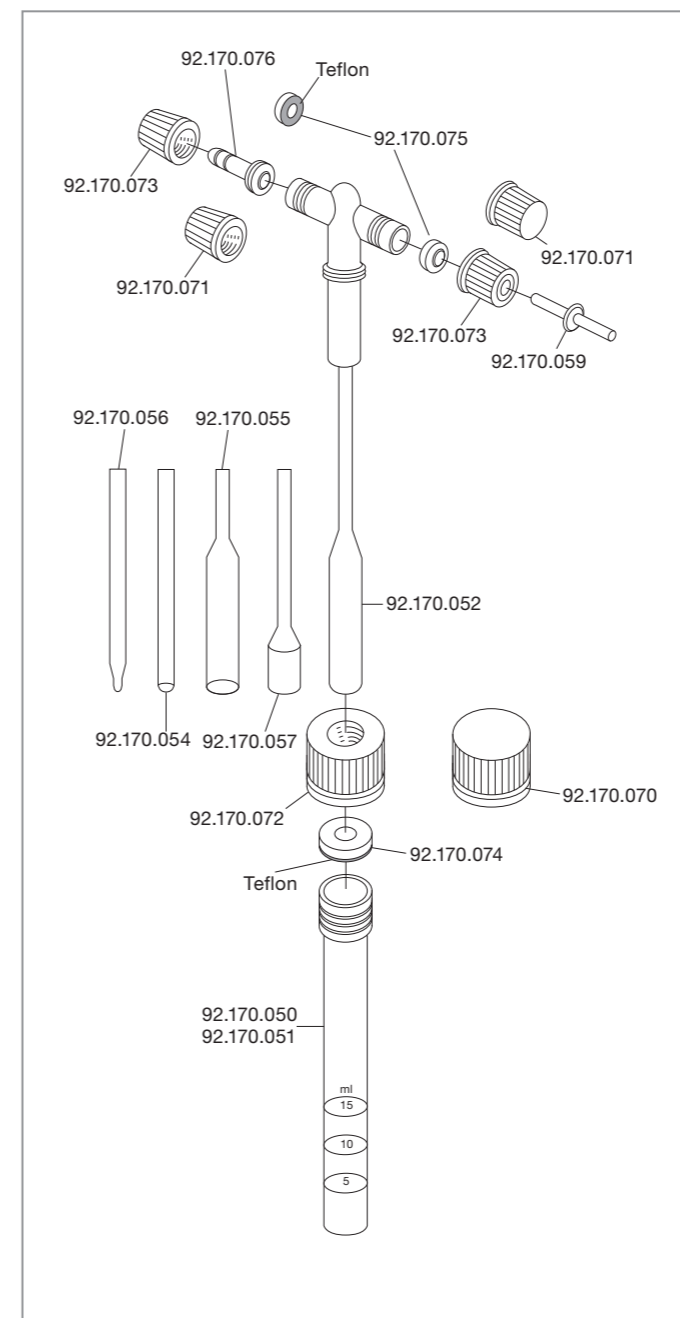
For long-term measurements or heavily loaded gas streams we recommend the use of 250 or 500 ml wash bottles.

The wash bottles can be filled and already connected together in the laboratory. At the sampling location, the sealing caps are screwed on and the connections are made to the Gas Samplers. It is then just as straightforward to screw the caps back on again after sampling so that the secured samples can be sent in the transport box for analysis.



DESAGA Wash Bottles and Wash Inserts – Detailed View

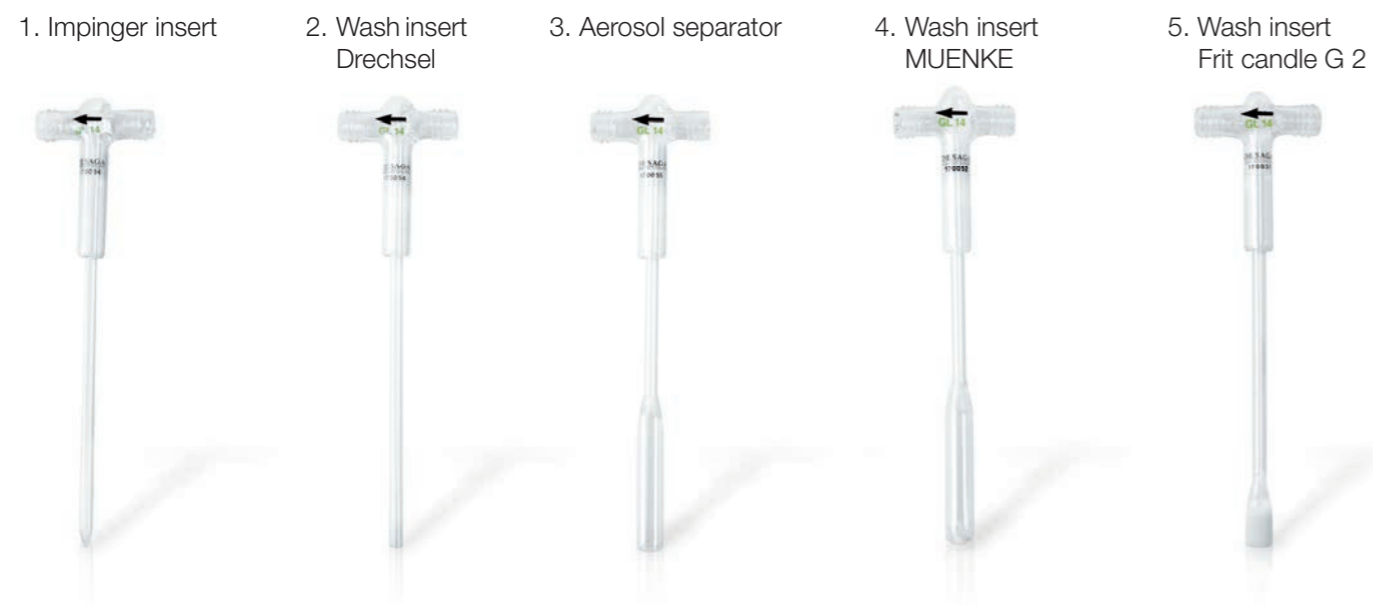
System description of wash bottles and wash inserts



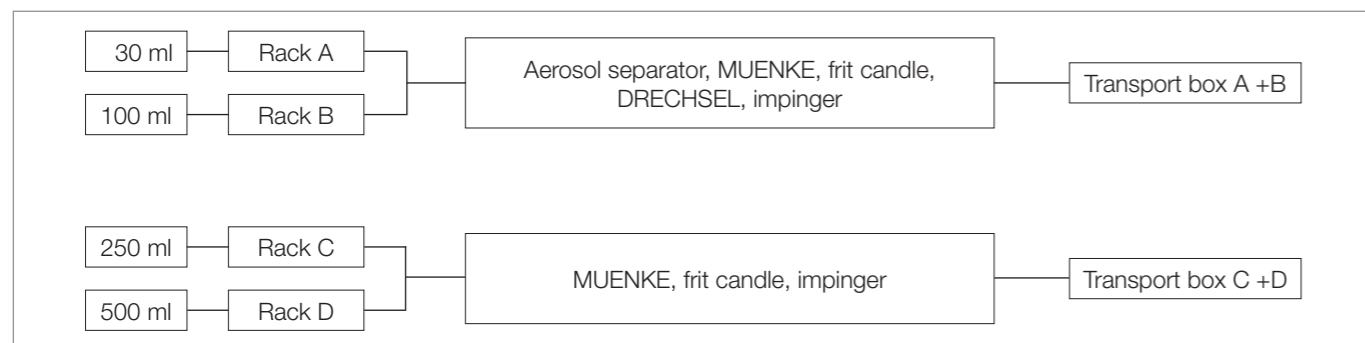
Wash bottle with wash insert (MÜENKE), complete



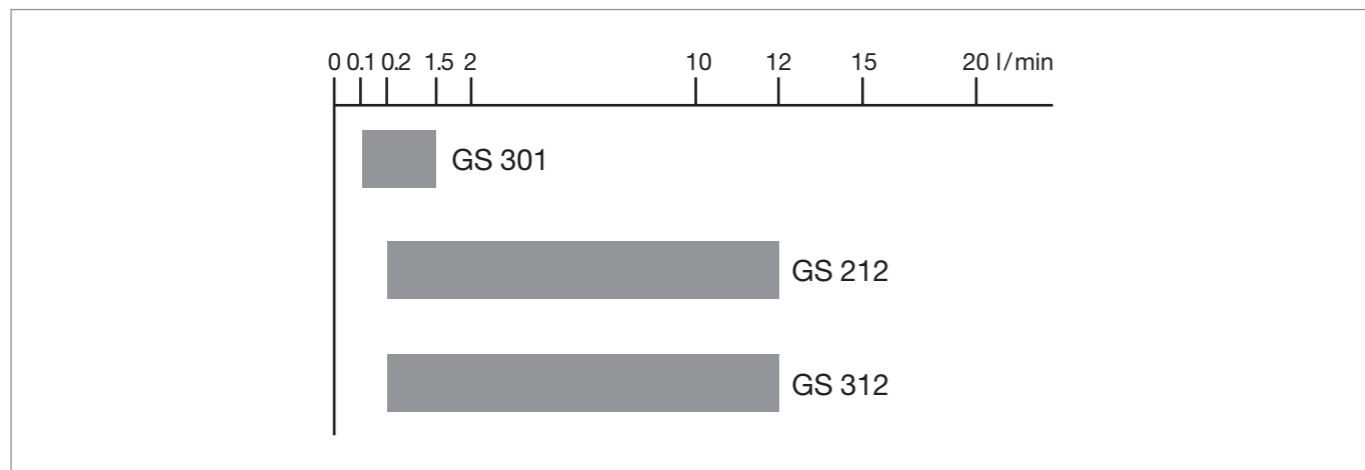
Wash Bottle Inserts



Configuration options for wash bottles and accessories



Pumping rate



For Initial Installation and as Trail Set

Order number	Description
92.170.065	Wash bottle and wash insert set
Comprising:	
92.170.080	Transport box
92.170.081	Rack A for 3x 30 ml wash bottles
92.170.082	Rack B for 3x 100 ml wash bottles
92.170.050	30 ml wash bottles, 3 pcs.
92.170.051	100 ml wash bottles, 3 pcs.
92.170.052	Wash insert, MUEENKE, 1 pc.
92.170.057	Wash insert with frit candle G2, 1 pc.
92.170.054	Wash insert, Drechsel, 2 pcs.
92.170.055	Aerosol separator, 1 pc.
92.170.056	Impinger insert, 1 pc.
19621	Tygon tube, 4.8 x 1.6 mm, 5 m
92.170.059	Connecting pipe, 10 pcs.
92.170.076	Plastic connections, straight, 10 pcs.
92.170.071	Screw sealing caps GL 14, 10 pcs.
92.170.070	Screw sealing caps GL 25, 10 pcs.
92.170.073	Screw connecting caps GL 14, 10 pcs.
92.170.072	Screw connecting caps GL 25, 10 pcs.
92.170.075	Silicone seal for GL 14, 10 pcs.
92.170.074	Silicone seal for GL 25, 10 pcs.

Wash Bottle with Wash Insert, complete

Order number	Description
92.170.1XX	Wash bottle X with X wash insert, complete
Comprising:	
92.170.XXX	1 pc. wash bottle
92.170.XXX	1 pc. X wash insert
92.170.XXX	1 pc. screw connecting cap
92.170.XXX	1 pc. silicone seal
92.170.071	2 pcs. sealing cap

X varies according to type and size

Wash Bottles and Wash Inserts, Accessories

Order number	Description
92.170.050	Wash bottle 30 ml, Graduation at 5, 10 and 15 ml, 5 pcs.
92.170.051	Wash bottle 100 ml, Graduation at 20 and 30 ml, 5 pcs.
92.170.141	Wash bottle 250 ml, Graduation at 50, 100, 150, 200 and 250 ml, 1 pc.
92.170.142	Wash bottle 500 ml, Graduation at 100, 200, 300 and 400 ml, 1 pc.
92.170.052	MUEENKE wash insert for 30 or 100 ml wash bottle, 5 pcs.
92.170.143	MUEENKE wash insert for 250 or 500 ml wash bottle, 5 pcs.
92.170.056	Impinger wash insert for 30 or 100 ml wash bottle, 5 pcs.
92.170.144	Impinger wash insert for 250 or 500 ml wash bottle, 1 pc.
92.170.057	Frit candle G2 wash insert for 30 or 100 ml wash bottle, 5 pcs.
92.170.145	Frit candle G2 wash insert for 250 or 500 ml wash bottle, 1 pc.
92.170.054	Drechsel wash insert 30/100 for 30 or 100 ml wash bottle, 5 pcs.
92.170.055	Aerosol separator 30/100 for 30 or 100 ml wash bottle, 5 pcs.
92.170.059	Connecting pipe, 6 x 45 mm, 10 pcs.
92.170.149	Flexible connection (alternative to 92.170.059), incl. 2 pcs. screw sealing caps GL14
92.170.076	Plastic connection, straight, 10 pcs.
92.170.071	Screw sealing cap GL 14, 10 pcs. *
92.170.073	Screw connecting cap GL 14, 10 pcs. *
92.170.075	Silicone seal with PTFE collar GL 14, 10 pcs. *
92.170.070	Screw sealing cap GL 25, 10 pcs. **
92.170.072	Screw connecting cap GL 25, 10 pcs. **
92.170.074	Silicone seal with PTFE collar GL 25, 10 pcs. **
92.170.148	Screw sealing cap GL 45 ***

Wash Bottles and Wash Inserts, Accessories

Order number	Description
92.170.146	Screw connecting cap GL 45 ***
92.170.147	Silicone seal with PTFE collar GL 45 ***
92.170.150	Wash bottle 30 ml, with MUEENKE wash insert, complete
92.170.151	Wash bottle 100 ml, with MUEENKE wash insert, complete
92.170.135	Wash bottle 250 ml, with MUEENKE wash insert, complete
92.170.136	Wash bottle 500 ml, with MUEENKE wash insert, complete
92.170.152	Wash bottle 30 ml, with impinger wash insert, complete
92.170.153	Wash bottle 100 ml, with impinger wash insert, complete
92.170.137	Wash bottle 250 ml, with impinger wash insert, complete
92.170.138	Wash bottle 500 ml, with impinger wash insert, complete
92.170.154	Wash bottle 30 ml, with frit candle G2 wash insert, complete
92.170.155	Wash bottle 100 ml, with frit candle G2 wash insert, complete
92.170.139	Wash bottle 250 ml, with frit candle G2 wash insert, complete
92.170.140	Wash bottle 500 ml, with frit candle G2 wash insert, complete
92.170.081	Rack A for 3x wash bottles, 30 ml
92.170.082	Rack B for 3x wash bottles, 100 ml
92.170.085	Rack C for 3x wash bottles, 250 ml
92.170.086	Rack D for 3x wash bottles, 500 ml
92.170.080	Transport box for rack A and B
92.170.079	Transport box for rack C and D

* for wash insert connection
 ** for wash bottle 30 or 100 ml
 *** for wash bottle 250 or 500 ml

