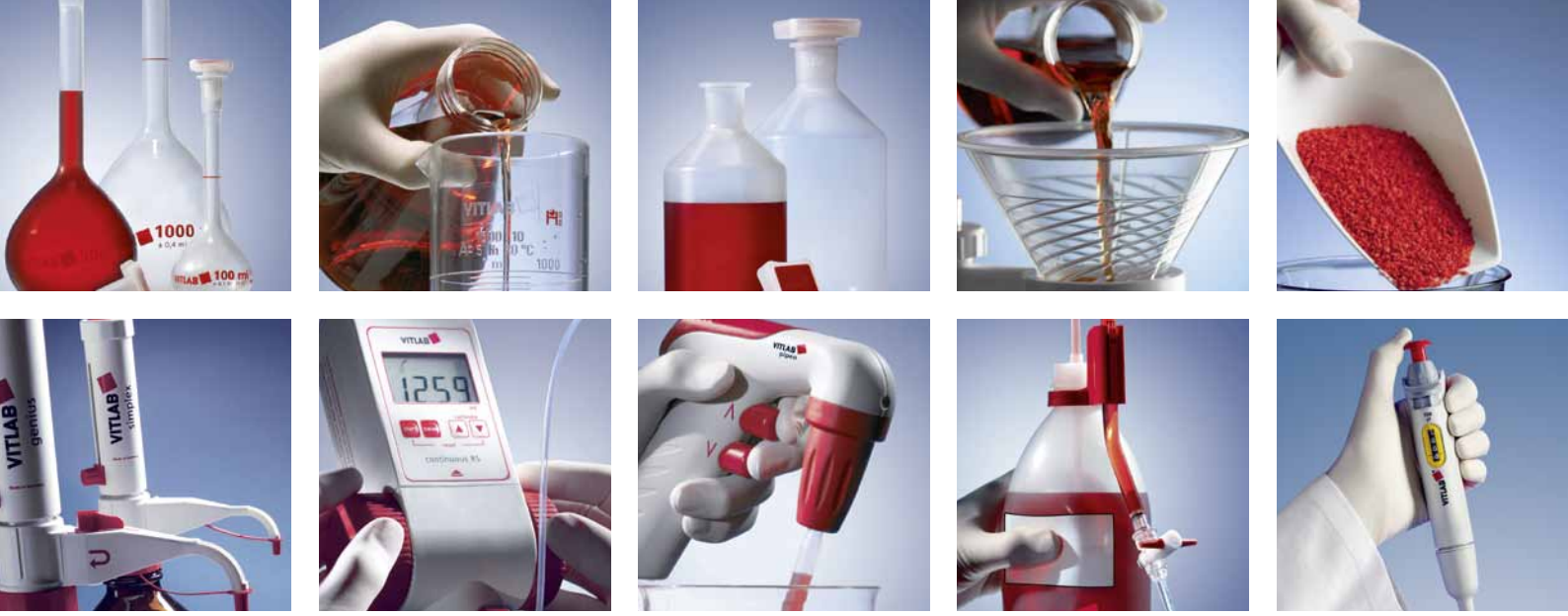

Competence in Labware

Labware range

VITLAB®
Competence in Labware

Welcome!

VITLAB has over 100 years of tradition. The company VITRI GmbH & Co. KG was established in 1908 in Mühltal, and the laboratory division was spun off in 1989 as VITLAB. Today, VITLAB is one of the leading manufacturers of liquid handling instruments and performance plastic laboratory products for one-time or long-term use. We develop and manufacture these laboratory products at our own production facility.

Our extensive range of products provides optimal support in your laboratory work in a wide variety of application ranges. Regardless of whether your work involves volume measurement, sampling or storage: VITLAB products will facilitate it while continuing to ensure that you achieve perfect results.

We hope that this new catalogue will serve as a valuable resource to aid in your lab work. We would be glad to respond to your enquiries, and look forward to receiving suggestions and ideas from our users.

This catalogue describes our products and provides all essential information. You will find detailed data regarding the various plastics clearly presented in the chapter entitled "General and Technical Information". To simplify your search, our product range has been categorised into the following areas of application: volume measurement, saving and storing, bottling and decanting, preparation, separation, and concentration.

Under "Volume Measurement", for example, you will find our complete product line for liquid handling, including dispensing, pipetting, and titration, as well as a wide variety of classical volumetric instruments such as volumetric flasks, measuring cylinders, and associated accessories.

In addition to the range of products that appears in our catalogue, we also produce plastic products according to customer specification. For example, bottles and beakers required for special tasks can be commissioned with a specified geometry and thickness. Optionally, the products can be printed with an individualised scale or with customised labelling. Labware for promotional use can be designed and printed with a company name and logo. We can even accommodate requests for individualised packaging formats, materials, and designs. Further information is available in the VITLAB® Promotional chapter.

Many possibilities can be realised – don't hesitate to ask what we can do for you!

VITLAB
Your reliable p

Certified quality

Independent inspections and routine internal audits guarantee the effectiveness of VITLAB's quality management system throughout the entire company, from development to shipment. As a result, the phrase 'Made by VITLAB' has become synonymous with quality.

Over 98% of our product line is made in Germany. Supplemental procedures such as tempering and volume testing are conducted in our own facilities, which guarantees the highest possible product quality and measurement accuracy. Our continuous improvement paradigm supports our goal of 0% failure.

The VITLAB Quality Management System has been continuously certified since January 1994, currently according to DIN EN ISO 9001:2008. Active stewardship of the environment is an equally strong pillar of our business philosophy. VITLAB has been certified according to DIN EN ISO 14001 since May, 1999.

artner

Prompt deliveries
Competent customer service

The highly efficient logistics in the Großostheim production facility facilitate the shortest possible delivery times for all products listed in the catalogue. For the standard articles, we strive for an availability of over 94%.

Due to its intensive partnerships with distributors in over 70 countries, VITLAB can offer sound on-site advice, individual support, and quick answers to your questions. Our qualified product training sessions provide comprehensive technical and application-oriented information on using our products. Should problems arise, our expert repair service keeps downtime as short as possible.

VITLAB products can be ordered from specialist dealers worldwide. Our authorised sales partners can be found on the internet at:

www.vitlab.de

Or contact us directly.

For your information

Your contact Customer Service

Our Customer Service staff is at your service to provide you with competent advice and answers to all your queries and questions concerning offers, orders and deliveries. Our Product Management and Sales Team are at your disposal – also "on site" – with any technical information or assistance that you might require for your application.

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Please understand that technical specifications, catalogue numbers and designs may change after this catalogue is published. The illustrations used are for representation only, and the details may vary from the description. All measurements, with the exception of exact tolerances, should be understood as approximate values. Please keep in mind that the actual testing and measuring results can be influenced by a variety of factors that are beyond our control. Therefore, you should carefully check the transferability of the data applying it to a particular application.

The packaging units (PU) correspond to the minimum order quantities. All up-to-date information is also available on the internet at www.vitlab.de.

If you need additional information, please call us.

Table of contents

Clear product statements

Our aim is to provide you with a clear and comprehensive presentation of all relevant product information. For quick reference, we use the following symbols:

DIN ISO-compliant Class A volumetric instruments

CC, conformity-attested products according to DIN ISO, with certificate

Food-safe products according to EC Directive No. 10/2011

Products with high protection for light-sensitive substances

Products individually packaged in PE bags, labelled with the article number, description and EAN code

Products that can be autoclaved at 121 °C (2 bar) according to DIN EN 285. Note restrictions!

CE mark according to EU Guideline 2004/108/EC, 93/68/EEC; 73/23/EEC, and 93/68/EEC

CE-IVD mark according to EU Guideline 98/79/EC

Perfection in Liquid Handling

HIGHEST RELIABILITY IN DISPENSING

VITLAB®
Competence in Labware

VITLAB® Dispenser line: genius, simplex, and TA

VITLAB bottle-top dispensers are available for a broad spectrum of applications in the dispensing of exact volumes. VITLAB® genius and simplex can be used for practically any task, while VITLAB® TA dispensers have been specially developed for use in trace analysis and with highly concentrated media. As they are produced from materials with extremely high chemical resistance, VITLAB bottle-top dispensers are very robust and reliable.

	VITLAB® genius/simplex	VITLAB® TA
Applications	Salt solutions, acids, alkalis, and many organic solvents	Specially for use in trace analysis for dispensing high-purity and highly concentrated acids and alkalis, as well as hydrogen peroxide, bromine and HF
Components in contact with media	Borosilicate glass, FEP, ETFE, PFA, PTFE, platinum-iridium, PVDF (screw cap).	Various fluoroplastics (e.g., ETFE, FEP, PFA, PTFE), Al_2O_3-sapphire, platinum-iridium or tantalum (depending on the model)
Operating limits	Temperature: +15 °C to +40 °C Steam pressure: max. 500 mbar Viscosity: max. 500 mm^2/s Density: max. 2.2 g/cm^3	Temperature: +15 °C to +40 °C Steam pressure: max. 600 mbar Viscosity: max. 500 mm^2/s Density: max. 3.8 g/cm^3

General guide for dispenser selection (for the classification of dispenser media, see the next page).

Salt solutions	Acids and alkalis	Solvents	High-purity and highly concentrated acids and alkalis	Hydrofluoric acid (HF), bromine, hydrogen peroxide
VITLAB® genius/simplex		VITLAB® genius/simplex		
			VITLAB® TA	

Recommended usage ranges for VITLAB® genius and VITLAB® simplex:

	Medium		Medium		Medium
O	Acetaldehyde	O	Acetic acid	O	Urea
O	Acetone	O	Chloronaphthalene	I	Hydrochloric acid, 37%
O	Acetonitrile	I	Chromic acid	O	Lactic acid
O	Acetylacetone	I	Chromic-sulphuric acid	I	Magnesium chloride
O	Acrylic acid	I	Copper sulphate	I	Mercury chloride
O	Acrylonitrile	O	Cresol	O	Methanol
O	Adipic acid	O	Cumene (isopropylbenzene)	O	Methoxybenzene
O	Allyl alcohol	O	Cyclohexanone	O	Methyl butyl ether
I	Aluminium chloride	O	Decane	O	Methyl formate
O	Amino acids	O	1-Decanol	O	Methyl propyl ketone
I	Ammonia solution	O	Di(ethylene glycol)	O	Mineral oil (motor oil)
I	Ammonium chloride	O	Dibenzyl ether	O	Monochloroacetic acid, 50%
I	Ammonium fluoride	O	Dichlorobenzene	I	Nitric acid, 60%
I	Ammonium hydroxide	O	Dichloroethane	O	Nitrobenzene
I	Ammonium sulphate	O	Dichloromethane	O	Octane
O	Amyl acetate	O	Diethanolamine	O	Oleic acid
O	Amyl alcohol (pentanol)	O	Diethyl ether	O	Oxalic acid
O	Amyl chloride (chloropentane)	O	Diethylamine	I	Perchloric acid
O	Aniline	O	1,2 Diethylbenzene	O	Petroleum
I	Barium chloride	O	Dimethyl sulphoxide (DMSO)	O	Phenol
O	Benzaldehyde	O	Dimethylaniline	O	Phenylethanol
O	Benzene	O	Dimethylformamide (DMF)	O	Phenylhydrazine
O	Benzoyl chloride	O	1,4 Dioxane	I	Phosphoric acid, 85%
O	Benzyl alcohol	O	Diphenyl ether	I	Phosphoric acid, 85% + sulphuric acid, 98%,1:1
O	Benzyl chloride	O	Ethanol	O	Piperidine
O	Benzylamine	O	Ethanolamine	O	Propanol
I	Boric acid	O	Ethyl acetate	O	Propionic acid
O	Bromobenzene	O	Formaldehyde	O	Propylene glycol (propanediol)
O	Bromonaphthalene	O	Formamide	O	Propylene oxide
O	Butanediol	O	Glacial acetic acid	O	Pyridine
O	1-Butanol	O	Glycerine	O	Salicylaldehyde
O	n-Butyl acetate	O	Glycol (ethylene glycol)	O	Salicylic acid
O	Butyl methyl ether	O	Glycolic acid, 50%	O	Silver acetate
O	Butylamine	O	Heating oil (Diesel oil)	I	Silver nitrate
O	Butyric acid	O	Hexane	O	Sodium acetate
I	Calcium carbonate	O	Hexanoic acid	I	Sodium chloride
I	Calcium chloride	O	Hexanol	I	Sodium dichromate
I	Calcium hydroxide	I	Hydroiodic acid	I	Sodium fluoride
I	Calcium hypochlorite	I	Iodine / potassium iodide solution	I	Sodium hydroxide, 30%
O	Chloroacetaldehyde	O	Isoamyl alcohol	I	Sodium hypochlorite
O	Chloroacetic acid	O	Isobutanol	I	Sulphuric acid, 98%
O	Chloroacetone	O	Isopropanol (2-propanol)	O	Tartaric acid
O	Chlorobenzene	O	Isopropyl ether	O	Tetramethylammonium hydroxide
O	Chlorobutane	O	Methyl ethyl ketone	O	Toluene
O	Formic acid	I	Potassium chloride	O	Turpentine
O	Gasoline	I	Potassium dichromate	O	Xylene
O	Methyl benzoate	I	Potassium hydroxide	I	Zinc chloride
O	Pyruvic acid	I	Potassium permanganate	I	Zinc sulphate

The above data have been carefully checked and reflect the current state of knowledge. Always follow the instructions for use that accompany the instrument as well as the reagent manufacturer's instruction manual. In addition to the chemicals listed above, solutions of a wide variety of organic or inorganic salts (e.g., biological buffers), biological detergents, and cell culture media can be dispensed. Should you require information on chemicals not listed, please do not hesitate to contact us. Last updated: 03/12.

I Inorganic media

O Organic media

VITLAB® genius

VITLAB® genius bottle-top dispensers are a family of instruments with proven precision that offer many advantages in routine liquid-handling operations. VITLAB® genius instruments are suitable for a wide variety of applications, and can be used in practically any operation, since the materials that come into in contact with media (PTFE, PFA, FEP, borosilicate glass and platinum-iridium) are resistant to most acids, bases, and solvents. Reagent loss while ventilating is avoided with the patented (EP 542 241) recirculation valve. The simple-to-use calibration function helps meet all the requirements for test equipment monitoring without downtime.

VITLAB® genius is equipped with a positive displacement piston and a fluoroplastic (PFA) sealing lip on the cylinder wall. The latter acts like a windscreen wiper to prevent crystal build-up on the cylinder wall from readily crystallisable media. The glass cylinder is also coated with a plastic material that reduces the risk of splashes should breakage occur. The telescopic filling tube can be adjusted smoothly to different bottle heights.

The VITLAB® genius is completely autoclavable at 121 °C (2 bar) according to DIN EN 285, and is certified compliant with DIN 12600.

Included in delivery:
VITLAB® genius with 3 threaded adapters made from PP.
Nominal volumes of 2.5 - 10 ml (screw coupling GL 32) with adapters GL 28, S 40 and GL 45.
Nominal volumes of 25 - 100 ml (screw coupling GL 45) with adapters GL 32, GL 38 and S 40.
Telescopic filling tube (200 - 350 mm), mounting tool, instruction manual, and quality certificate stating all test values.

Volume ml	Graduation ml	A* ≤ ± %	CV* ≤ %	PU	Cat. No.
0.25 - 2.5	0.05	0.6	0.1	1	1605503
0.5 - 5.0	0.10	0.5	0.1	1	1605504
1.0 - 10.0	0.20	0.5	0.1	1	1605505
2.5 - 25.0	0.50	0.5	0.1	1	1605506
5.0 - 50.0	1.00	0.5	0.1	1	1605507
10.0 - 100.0	2.00	0.5	0.1	1	1605508

* Accuracy and coefficient of variation according to DIN EN ISO 8655-5

Accessories
can be found on page 14.

VITLAB® simplex

Drawing quantities of liquids from large supply bottles is a daily routine in the lab.
This manual task must be carried out quickly, accurately, reproducibly, simply and safely.

VITLAB® simplex bottle-top dispensers are a family of instruments with proven precision that offer many advantages in routine liquid-handling operations. The positive displacement piston in this instrument is equipped with a fluoroplastic (PFA) sealing lip on the cylinder wall. This acts like a windscreen wiper to prevent crystal build-up on the cylinder wall from readily crystallisable media.
The glass cylinder is also coated with a plastic material that reduces the risk of splashes should breakage occur. The telescopic filling tube can be adjusted smoothly to the height of the bottle.

Since the materials in contact with the media (PTFE, PFA, FEP, borosilicate glass and platinum-iridium) are resistant to most acids, bases, and solvents, VITLAB® simplex bottle-top dispensers can be used in practically any operation.

The VITLAB® simplex is completely autoclavable at 121 °C (2 bar) according to DIN EN 285, and is certified compliant with DIN 12600.

Included in delivery:
VITLAB® simplex with 3 threaded adapters made from PP.
Nominal volumes of 2.5 - 10 ml (screw coupling GL 32) with adapters GL 28, S 40 and GL 45.
Nominal volumes of 25 - 100 ml (screw coupling GL 45) with adapters GL 32, GL 38 and S 40.
Telescopic filling tube (200 - 350 mm), mounting tool, instruction manual, and quality certificate stating all test values.

Volume ml	Graduation ml	A* ≤ ± %	CV* ≤ %	PU	Cat. No.
VITLAB® simplex					
0.25 - 2.5	0.05	0.6	0.1	1	1601503
0.5 - 5.0	0.10	0.5	0.1	1	1601504
1.0 - 10.0	0.20	0.5	0.1	1	1601505
2.5 - 25.0	0.50	0.5	0.1	1	1601506
5.0 - 50.0	1.00	0.5	0.1	1	1601507
10.0 - 100.0	2.00	0.5	0.1	1	1601508
VITLAB® simplex fix					
1.0	-	0.6	0.1	1	1602502
5.0	-	0.5	0.1	1	1602504
10.0	-	0.5	0.1	1	1602505

* Accuracy and coefficient of variation according to DIN EN ISO 8655-5

Accessories
can be found on page 14.

Bottles for VITLAB® genius and simplex

Threaded brown glass (soda lime glass) bottles with an ethylene acrylate coating for increased safety, and a screw cap. The plastic coating significantly reduces hazardous glass splintering during breakage. The maximum working temperature for coated bottles is 80 °C. To preserve the coating, do not clean at temperatures exceeding 60 °C.

Volume	Shape	Bottle neck threads GL	PU	Cat. No.
100	round	GL 28	1	1671505
100	square	GL 32	1	1671506
250	square	GL 32	1	1671515
500	square	GL 32	1	1671520
1000	square	GL 45	1	1671500
2500	round	GL 45	1	1671510

Adapter for VITLAB® genius and simplex

For securely screwing the dispenser onto the reagent bottles with an NS neck, GL screw threading or an S buttress thread.

Description	External thread	Bottle neck threads	PU	Cat. No.
NS-adapter, PP	GL 32	NS 19/26	1	1670066
NS-adapter, PP	GL 32	NS 24/29	1	1670067
NS-adapter, PP	GL 32	NS 29/32	1	1670068
Thread adapter, PP	GL 32	GL 25	1	1670150
Thread adapter, PP	GL 32	GL 28	1	1670155
Thread adapter, PP	GL 32	GL 38	1	1670165
Thread adapter, PP	GL 32	GL 45	1	1670175
Thread adapter, PP	GL 32	S*40	1	1670170
Thread adapter, PP	GL 38	GL 32	1	1670085
Thread adapter, PP	GL 45	GL 32	1	1670180
Thread adapter, PP	GL 45	GL 38	1	1670110
Thread adapter, PP	GL 45	S*40	1	1670120

* Buttress thread

Drying tube for VITLAB® genius and simplex

PP, transparent, unfilled. Can be connected directly to the dispenser.

Description	PU	Cat. No.
Drying tube, PP, unfilled	1	1671095

Discharge tube for VITLAB® genius and simplex

Discharge tube, flexible, PTFE, 80 cm in length.

Description	PU	Cat. No.
Discharge tube for simplex / genius 2.5, 5 and 10 ml	1	1650086
Discharge tube for simplex / genius 25, 50 and 100 ml	1	1650111

Filling tubes for VITLAB® genius and simplex

Description	Length mm	PU	Cat. No.
Telescoping filling tube, FEP, ETFE, PTFE, for all sizes	200 - 350	1	1671085
Filling tube, FEP, for simplex/genius 2.5, 5 and 10 ml	220	1	1650020
Filling tube, FEP, for simplex/genius 2.5, 5 and 10 ml	335	1	1650025
Filling tube, FEP, for simplex/genius 25, 50 and 100 ml	250	1	1650030
Filling tube, FEP, for simplex/genius 25, 50 and 100 ml	335	1	1650035

VITLAB® TA

NEW

The new Dispenser VITLAB® TA is the dispensing instrument of choice for fulfilling the strictest purity requirements for trace analysis. A special cleaning procedure, well proven in practice, is employed prior to the use in trace analysis, making it possible to operate in an extremely contamination-free manner.

- The parts that are in contact with media are made of various fluoroplastics (e.g. ETFE, FEP, PFA, PTFE), Al_2O_3-sapphire, platinum-iridium or tantalum (depending on model)
- The release of trace metal content can be kept in the low ppb, and depending on application, even in the ppt range
- Exchangeable valve spring: A platinum-iridium or tantalum valve spring can be used, depending on the application
  Pt-Ir is suitable for hydrofluoric acid or sodium hydroxide
  Tantalum is suitable for dispensing hydrogen peroxide
- A field-tested cleaning process to employ before use in trace analysis is described in the instruction manual
- Outstanding chemical resistance, especially to aggressive media such as highly concentrated acids and alkalis, hydrogen peroxide, hydrofluoric acid, and bromine
- Modular structure for simply dismantling while cleaning and for replacing the dispensing cartridge

Graduation	0.2 ml
A* ≤ ±	0.5 % / 50 µl
CV* ≤	0.1 % / 10 µl

* Error limits according to DIN EN ISO 8655-5, based on nominal volume (= maximum volume) printed on the instrument if the instrument, the environment and dist. H_2O are at the same temperature (20 °C). Testing takes place according DIN EN ISO 8655-6 with a completely filled instrument and with uniform and smooth dispensing. Certified DIN 12 600 compliance.

Included in delivery:
VITLAB® TA dispenser with adjustable variable volumes, certified compliant according to DIN 12600, with quality certificate, telescoping filling tube, mounting tool, GL 28/S 28 (ETFE), GL 32 (ETFE), and S 40 (PTFE) bottle adapters, and instruction manual. Optionally with or without recirculation valve.

Volume ml	Valve spring	Recirculation	PU	Cat. No.
1.0 - 10.0	Platinum-iridium	no	1	1607515
1.0 - 10.0	Platinum-iridium	yes	1	1607525
1.0 - 10.0	Tantalum	no	1	1607535
1.0 - 10.0	Tantalum	yes	1	1607545

Accessories can be found on the following two pages.

Recommended dispensing media for VITLAB® TA

Dispensing medium	Valve spring: Pt-Ir	Valve spring: Ta
Acetic acid	+	+
Ammonia solution	+	+
Bromine	+	+
Hydrochloric acid	+	+
Hydrofluoric acid*)	+	-
Hydrogen peroxide	-	+
Nitric acid	+	+
Perchloric acid	+	+
Sodium hydroxide, 30%	+	-
Sulphuric acid	+	+
Water	+	+

+ suitable / - unsuitable

*) Note: Hydrofluoric acid attacks sapphire to a slight extent. Thus slightly elevated aluminum values may occur.

Please see page 40 for our wide range of PFA volumetric flasks, bottles and sample containers, perfect for use with our dispenser VITLAB® TA.

Recirculation valve for VITLAB® TA **NEW**

Exchangeable, choice between tantalum and platinum-iridium depending on the application.

Valve spring	PU	Cat. No.
Platinum-iridium	1	1671050
Tantalum	1	1671055

Dispensing cartridge for VITLAB® TA **NEW**

Calibrated, including safety ring, with quality certificate. Nominal volume 10 ml.

Description	PU	Cat. No.
Dispensing cartridge	1	1670700

Plastic stand for VITLAB® TA **NEW**

For secure anchoring, made entirely of polypropylene for contamination-free operation (no metal). Stand rod: 300 mm; base: 220 x 160 mm; weight: 1,130 g.

Description	PU	Cat. No.
Plastic stand	1	1671116

Telescoping filling tube for VITLAB® TA **NEW**

Individually adjustable lengths.

Description	Length mm	PU	Cat. No.
Telescoping filling tube, FEP, PTFE	70 – 140	1	1671080
Telescoping filling tube, FEP, PTFE	125 – 240	1	1671082
Telescoping filling tube, FEP, PTFE	195 – 350	1	1671083
Telescoping filling tube, FEP, PTFE	250 – 480	1	1671086

Adapter for VITLAB® TA **NEW**

For securely screwing the dispenser onto reagent bottles with GL screw threading or an S buttress thread.

Description	External thread	Bottle neck threads	PU	Cat. No.
Thread adapter, ETFE	GL 32	GL 25	1	1670072
Thread adapter, ETFE	GL 32	GL 28	1	1670080
Thread adapter, ETFE	GL 32	GL 45	1	1670105
Thread adapter, ETFE	GL 32	S*40	1	1670092
Thread adapter, ETFE	GL 45	GL 32	1	1670100
Thread adapter, ETFE	GL 45	GL 38	1	1670115
Thread adapter, PTFE	GL 45	S*40	1	1670125

* Buttress thread

VITLAB® piccolo

For dispensing tiny quantities of liquids in all areas of biochemical and medical research.

Even the smallest quantities can be dispensed directly from the bottle with the VITLAB® piccolo - a big help, particularly for serial dispensing operations. Special advantage: Disposable tips are unnecessary. This reduces costs.
The ergonomic design makes dispensing effortless and stress-free. The VITLAB® piccolo can be operated with only one hand. Use the thumb to depress the volume dispensing button, just as with a pipette, and a reset mechanism refills the volume automatically.
The discharge tube can be rotated over 360° so that it is always optimally situated with respect to the bottle label.
In order to guarantee high resistance to chemicals and a broad range of applications, only high-quality materials, such as PTFE, PFA, ETFE, FEP, borosilicate glass, and platinum-iridium come in contact with the media.

VITLAB® piccolo 1 with a fixed volume
VITLAB® piccolo 2 with two fixed volumes

Included in delivery:
VITLAB® piccolo 1 or 2 with GL 28 connecting threads, mounting tool, and instruction manual.

Type	Volume µl	A* ≤ ± %	CV* ≤ %	PU	Cat. No.
piccolo 1	100	3.0	0.4	1	1610501
piccolo 1	200	2.5	0.4	1	1610502
piccolo 1	250	2.0	0.4	1	1610503
piccolo 1	500	1.5	0.3	1	1610504
piccolo 1	1000	1.0	0.2	1	1610506
piccolo 2	100 / 250	2.0	0.4	1	1611503
piccolo 2	500 / 1000	1.0	0.2	1	1611506
piccolo 2	1000 / 2000	1.0	0.2	1	1611508

* Accuracy and coefficient of variation according to DIN EN ISO 8655-5
Other volumes available upon request.

Adapter for VITLAB® piccolo

For securely screwing the dispenser onto reagent bottles with GL screw threading.

Description	External thread	Bottle neck threads	PU	Cat. No.
Thread adapter, PP, piccolo	GL 28	GL 32	1	1670145

Perfection in Liquid Handling

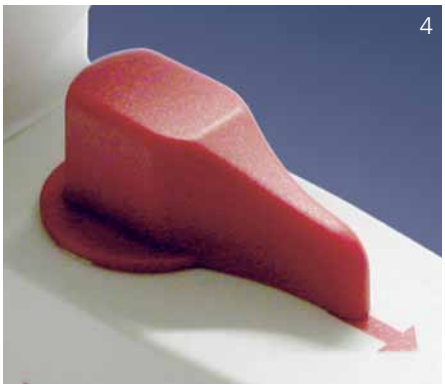
RAPID AND ACCURATE TITRATION

VITLAB®
Competence in Labware


1

2


3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VITLAB® continuous E/RS

Chemical volumetric analysis with small and the most minute liquid volumes requires substantial concentration. The VITLAB® continuous bottle-top burette (Figure 1) enables continuous titration, which leads to rapid, convenient, and accurate results. The angled display shows 4-position titration volume in large, easily read numbers (Figure 2), which simplifies operation. Turning the two hand wheels supplies the titration medium in a continuous and pulse-free manner via the patented double-piston pump (EP 801 982) (Figure 3). Filling procedures are not necessary. This innovative technology increases safety; its compact design and low centre of gravity reduce risk of overturning, especially with smaller bottles. The height and length of the discharge tube can be adjusted, making it possible to work safely with both short and tall bottles. The patented recirculation system (EP 542 241) (Figure 4) prevents the loss of valuable reagent and reduces the risk of splashes. With its simple-to-use calibration function, VITLAB® continuous fulfils the corresponding requirements for test equipment monitoring without instrument downtime. Margins of error are under those specified in the DIN EN ISO 8655-3 standard, even for partial volumes. VITLAB® continuous is certified compliant with DIN 12600.

- Continuous supply of titration medium using a patented double-piston pump
- Continuous, precise control of the titration rate with large, easy-grip hand wheels
- Simple, medium-specific readjustment / calibration using the keypad
- Easily readable, large numbers
- Long operating life using two easily-replaced 1.5 V microbatteries
- No loss of medium thanks to a patented recirculation valve
- Freely rotatable 360° around the bottle for optimal orientation of the label
- Adjustable for various bottle sizes using the corresponding adapter.
- Telescopic discharge tube which can be adjusted in both height and length
- Adjustable telescopic discharge tube suitable for a variety of bottle heights

Included in delivery:
VITLAB® continuous E/RS, with GL 45 connecting threads and GL 32, GL 38 and S*40 (buttress thread) size PP thread adapters, telescopic filling tube (200 - 350 mm), telescopic discharge tube (140 - 220 mm), two 1.5 V microbatteries (LR 03/AAA), instruction manual, and quality certificate.

Type	Volume/rot.** ml	A* ≤ ± %	CV* ≤ %	PU	Cat. No.
E	2.5	0.2 at 25 ml	0.1 at 25 ml	1	1620506
RS	5.0	0.2 at 50 ml	0.1 at 50 ml	1	1620507

*Accuracy and coefficient of variation according to DIN EN ISO 8655-3

**Volume dispensed per rotation of the hand wheel

Recommended range of use for VITLAB® continuous E/RS

The VITLAB® continuous E/RS bottle-top burette can be used for the following titrants up to a concentration of 1 mol/L:

Medium	Medium
Acetic acid	Potassium hydroxide
Ammonium iron (II) sulphate solution	Potassium iodate solution
Ammonium thiocyanate solution	Potassium permanganate solution
Barium chloride solution	Potassium thiocyanate solution
Bromide bromate solution	Silver nitrate solution
Cerium (IV) sulphate solution	Sodium arsenite solution
EDTA solution	Sodium carbonate solution
Hydrochloric acid	Sodium chloride solution
Iodine solution	Sodium hydroxide
Iron (II) sulphate solution	Sodium nitrite solution
Nitric acid	Sodium thiosulphate solution
Oxalic acid solution	Sulphuric acid
Perchloric acid	Tetra-n-butylammonium hydroxide solution
Potassium bromate solution	Zinc sulphate solution
Potassium bromide / bromate solution	
Potassium dichromate solution	

The recommendations in this table have been carefully tested and reflect the most current information available. Always follow the instruction manual for the instrument as well as the reagent manufacturer's specifications. Should you require information on chemicals not listed, please do not hesitate to contact us. As at 03/12.

Threaded bottles for VITLAB® continuous E/RS

Threaded brown glass (soda lime glass) bottles with an ethylene acrylate coating for increased safety, and a screw cap. The plastic coating significantly reduces the hazardous glass splintering during breakage. The maximum working temperature for coated bottles is 80 °C. To preserve the coating, do not clean at temperatures exceeding 60 °C.

Volume ml	Thread GL	Shape	PU	Cat. No.
1000	45	square	1	1671500
2500	45	round	1	1671510

Dispenser Accessories
can be found on pages 14-15.

Adapter for VITLAB® continuous E/RS

For secure screwing of the burettes onto reagent bottles with an NS neck, GL screw threading or an S buttress thread.

Description	External thread	Bottle neck threads	PU	Cat. No.
NS-adapter, PP	GL 32	NS 19/26	1	1670066
NS-adapter, PP	GL 32	NS 24/29	1	1670067
NS-adapter, PP	GL 32	NS 29/32	1	1670068
Thread adapter, PP	GL 32	GL 28	1	1670155
Thread adapter, PP	GL 38	GL 32	1	1670085
Thread adapter, PP	GL 45	GL 32	1	1670180
Thread adapter, PP	GL 45	GL 38	1	1670110
Thread adapter, PP	GL 45	S*40	1	1670120
Thread adapter, ETFE	GL 32	GL 28	1	1670080
Thread adapter, PTFE	GL 38	GL 32	1	1670095
Thread adapter, ETFE	GL 45	GL 32	1	1670100
Thread adapter, ETFE	GL 45	GL 38	1	1670115
Thread adapter, PTFE	GL 45	S*40	1	1670125

Drying tube for VITLAB® continuous E/RS

PP, transparent, unfilled. Can be connected directly to the burette.

Description	PU	Cat. No.
Drying tube, PP, unfilled	1	1671095

Telescopic filling tube for VITLAB® continuous E/RS

For the filling of titration medium from bottles of different heights.

Description	Length mm	PU	Cat. No.
Telescoping filling tube, FEP, ETFE, PTFE	200 - 350	1	1671085

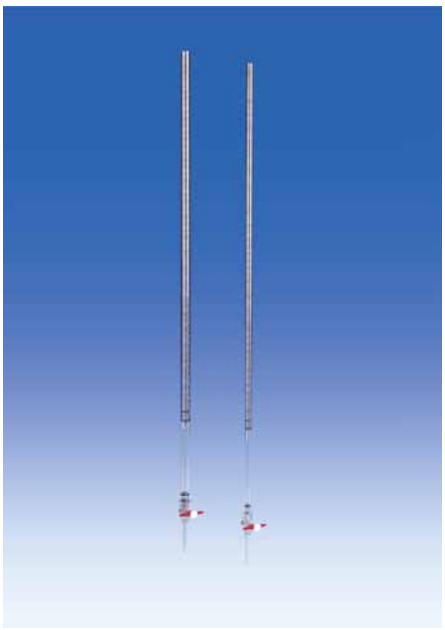
VITLAB® Dr. Schilling burettes

Burette made of borosilicate glass 3.3, tolerances according to DIN ISO 384 Class B, with high-contrast black markings. Calibrated to deliver 'Ex'. Automatic zero setting. The burette stopcock turns easily and enables fine titration. The holding device for the riser pipe serves as additional shock-proofing.

Materials: burette of borosilicate glass 3.3, PP filling tube, PMP/PTFE burette stopcock, and PE-LD reservoir bottle.

Volume ml	Tolerance ± ml	Graduation ml	Height mm	Bottle ml	PU	Cat. No.
Burette glass tube with thermally stable plastic coating and Schellbach stripes (blue/white)						
25	0.05	0.05	900	1000	1	106599
50	0.10	0.10	900	1000	1	106699
With Schellbach stripes (blue/white)						
25	0.05	0.05	900	1000	1	106399
50	0.10	0.10	900	1000	1	106499
Brown glass burettes						
25	0.05	0.05	900	1000	1	106799
50	0.10	0.10	900	1000	1	106899

Burettes, borosilicate glass 3.3



Plastic-coated burette made of borosilicate glass 3.3, tolerances corresponding to DIN ISO 384, Class B. With Schellbach stripes (blue/white) and high-contrast black marking. Calibrated to deliver 'Ex' The burette stopcock turns easily and enables fine titration. The temperature-stable plastic coating on the tube provides splinter protection.

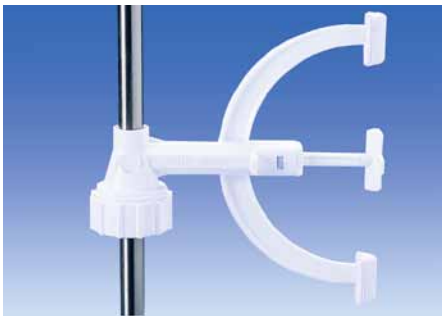
Materials: Burette of borosilicate glass 3.3, with PMP/PTFE burette stopcock.

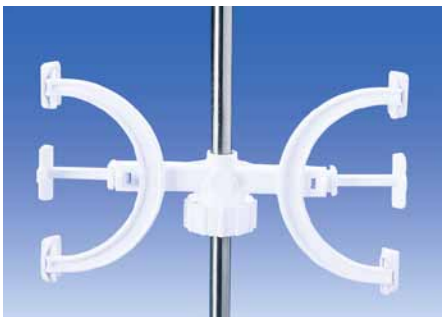
Volume ml	Tolerance ± ml	Graduation ml	Length mm	PU	Cat. No.
25	0.05	0.05	800	2	105599
50	0.10	0.10	800	2	105699

Burette stopcocks, PMP/PTFE

Stopcocks made of PMP. Plugs of PTFE with polished surfaces turn easily but fit tightly. Insert with two seals.
Art. No. 105799: For tubes with an inner diameter of 7.75 ± 0.1 mm.
Art. No. 105899: For tubes with an inner diameter of 11.5 ± 0.1 mm.

For burettes ml	Height mm	Tip inner diameter mm	Installed length mm	PU	Cat. No.
25	90	1.25	17	5	105799
50	90	1.25	17	5	105899





Burette clamps, PP

Practical holder for anchoring burettes vertically on the support stand. The volume scale remains clearly readable.
Burette clamps with slip-resistant rubber-coated tips and springs made of stainless steel. With stand clamps for securing to rods of diameter 8-14 mm.

Type	PU	Cat. No.
For 1 burette	5	80139
For 2 burettes	5	80140

Perfection in Liquid Handling

PRECISE AND CONVENIENT PIPETTING

VITLAB®
Competence in Labware

VITLAB® micropipettes **NEW**

The new VITLAB® piston-operated pipettes are the ideal manual pipettes for demanding laboratory applications, and have all the features required by users: robust, with ergonomic shape and simple operation, completely autoclavable, highly accurate with simple calibration for long-lasting reliability.

- Central, large pipetting button for easy, uniform piston movement
- Large, ergonomic eject button for rapid replacement of the tips
- Simple volume adjustment for right- and left-handers
- Precise, 4-position volume indicator, with integrated zoom function for optimal readability
- Colour-coded for easy selection of the right pipette tip
- Ergonomic finger loop for convenient handling
- Integrated calibration function for easy calibration without the need for tools
- Corrosion-resistant pistons and ejectors for long product life
- Completely autoclavable

The microliter pipettes are certified compliant with DIN 12600, CE-IVD compliant, and completely autoclavable at 121 °C (2 bar) according to DIN EN 285.

Included in delivery: VITLAB® micropipette, quality certificate, and instruction manual

Volume µl	A* ≤ ± %	CV* ≤ %	Tip µl	PU	Cat. No.
0.5 - 10	1.0	0.5	20	1	1641000
2 - 20	0.8	0.4	200	1	1641002
10 - 100	0.6	0.2	200/300	1	1641004
20 - 200	0.6	0.2	200/300	1	1641006
100 - 1000	0.6	0.2	1000	1	1641008
500 - 5000	0.6	0.2	5000	1	1641010
1000 - 10000	0.6	0.2	10000	1	1641012

* Calibrated to deliver ‚Ex'. * Accuracy and coefficient of variation based on the nominal volume (= maximum volume) printed on the instrument, if instrument, environment and distilled water are at the same temperature (20 °C), as well as uniform, jerk-free handling. The margins of error are under those specified in DIN EN ISO 8655-2.

Microtubes
can be found on page 90.

Reagent reservoirs
can be found on page 32.

VITLAB® micropipette -8/-12 **NEW**

The new VITLAB® -8 and -12 multi-channel pipettes complete the line of VITLAB® piston-operated pipettes, and are characterised by their especially user-friendly operation in the manual pipetting of long series. They have all the features of the VITLAB® single-channel micropipettes: robust, completely autoclavable, highly accurate, with simple calibration for lasting reliability, especially for established multi-channel pipette applications, such as immunological assays, dilutions series, or use with cell cultures in microplate format.

- Lightweight but still robust through the use of innovative plastic materials
- Corrosion-resistant pistons and ejectors for long product life
- Manifold with 360° free rotation in either direction, to offer optimal working positions
- Integrated calibration function for easy calibration without the need for tools
- Ergonomic finger loop for convenient handling
- Short stroke of only 12.5 mm to reduce the risk of muscle disorders (e.g., RSI)
- Central, large pipetting button for easy and uniform piston movement
- The combination of the stepped design of the ejector and special rings made from FKM reduces the effort needed for ejecting the tips
- Especially service-friendly: Shafts and seals can be easily removed, and thus can be directly cleaned or replaced in the laboratory making it possible to avoid long downtime or repairs
- Completely autoclavable

The multi-channel pipettes are certified compliant with DIN 12600, CE-IVD compliant, and completely autoclavable at 121 °C (2 bar) according to DIN EN 285.

Included in delivery: VITLAB® micropipette -8/-12, quality certificate, and instruction manual

Volume µl	A* ≤ ± %	CV* ≤ %	Tip µl	PU	Cat. No.
Micropipette -8					
5 - 50	0.8	0.4	200	1	1608002
10 - 100	0.8	0.3	200/300	1	1608004
20 - 200	0.8	0.3	200/300	1	1608006
30 - 300	0.6	0.3	300	1	1608008
Micropipette -12					
5 - 50	0.8	0.4	200	1	1612002
10 - 100	0.8	0.3	200/300	1	1612004
20 - 200	0.8	0.3	200/300	1	1612006
30 - 300	0.6	0.3	300	1	1612008

* Calibrated to deliver ‚Ex'. * Accuracy and coefficient of variation based on the nominal volume (= maximum volume) printed on the instrument, if instrument, environment and distilled water are at the same temperature (20 °C), as well as uniform, jerk-free handling. The margins of error are under those specified in DIN EN ISO 8655-2.

Accessories for VITLAB® microliter pipettes **NEW**

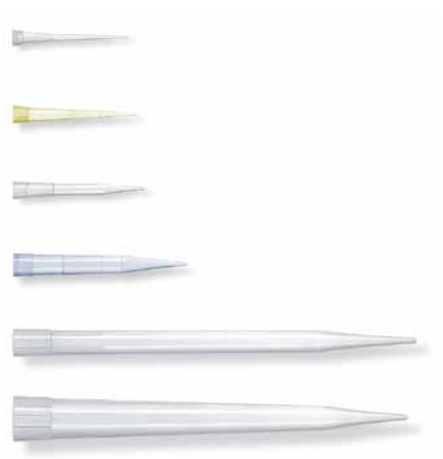
With the practical shelf mount and freely rotatable bench-top stand, VITLAB® microliter pipettes can be stored safely and ready to use.

Description	PU	Cat. No.
Shelf mount for 1 pipette	1	1672000
Bench-top stand for 6 single-channel instruments or 6 multi-channel instruments	1	1672002
Filter for pipette, 5 ml	25	1672010
Filter for pipette, 10 ml	25	1672012
Silicone oil for pipettes, up to 1000 µl	1	1672015
Silicone oil for pipettes, 5 ml / 10 ml	1	1672016

Pipette tips, PP **NEW**

121°C CE IVD

The pipette tips are certified compliant, CE marked according to the IVD Guideline 98/79 EC and optimally suited for VITLAB® microliter pipettes. In addition, they are also suitable for numerous other types of pipettes. VITLAB® pipette tips are made from high-quality polypropylene and are autoclavable at 121 °C (2 bar) according to DIN EN 285.



Pipette tip selection guide
Which pipette tips will fit my VITLAB® micropipette?

Tip volume	Tip types	Nominal volume VITLAB® micropipettes							Nominal volume VITLAB® micropipette -8/-12			
		10 µl	20 µl	100 µl	200 µl	1000 µl	5 ml	10 ml	50 µl	100 µl	200 µl	300 µl
0.5 - 20 µl	A	◆										
2 - 200 µl	B		◆	◆	◆				◆	◆	◆	
5 - 300 µl	C			◆	◆				◆	◆	◆	◆
50 - 1000 µl	D					◆						
0.5 - 5 ml	E						◆					
1 - 10 ml	F							◆				

Pipette tips, non-sterile, in a bag **NEW**

The tips are produced under the most modern clean-room conditions, and automatically heat-sealed in bags and packed in cartons. The catalogue number, volume range, and lot number of the tips are printed on each bag.

Volume µl	Colour	Packaging	PU	Cat. No.
0.5 - 20	colourless	10 bags with 1000 tips	10000	145494
2 - 200	yellow	10 bags with 1000 tips	10000	145694
50 - 1000	blue	10 bags with 500 tips	5000	145994
500 - 5000	colourless	1 bags with 200 tips	200	146294
1000 - 10000	colourless	2 bags with 100 tips	200	146494

Tip-Box filled with pipette tips (palleted, non-sterile) **NEW**

PP box with fitted lid. Available in two different heights. The shorter version is for 96 tips up to 300 µl, the taller for 100 tips of 1000 µl. The box is stackable and autoclavable at 121 °C (2 bar) according to DIN EN 285.

Volume µl	Tip types	Packaging	PU	Cat. No.
0.5 - 20	colourless	5 boxes of 96 tips on a gray mounting plate	5	149294
2 - 200	yellow	5 boxes of 96 tips on a yellow mounting plate	5	149494
5 - 300	colourless	5 boxes of 96 tips on a green mounting plate	5	149594
50 - 1000	blue	5 boxes of 100 tips on a blue mounting plate	5	149894

Tip-Box 5/10 filled with pipette tips (palleted, non-sterile) **NEW**

PP box with fitted lid. Filled with 5 ml tips (28 pc.) or 10 ml tips (18 pc.).
The box is autoclavable at 121 °C (2 bar) according to DIN EN 285.

Volume ml	Tip types	Packaging	PU	Cat. No.
0.5 - 5	colourless	1 box of 28 tips on a natural-colour mounting plate	1	150294
1 - 10	colourless	1 box of 18 tips on a natural-colour mounting plate	1	150394

Reagent reservoir, non-sterile, PP **NEW**

121°C

Transparent, with lid to guard against contamination and spilling out of contents during movement. Optimally suited for working with multi-channel pipettes. Made from PP for excellent chemical resistance and long-term reusability.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.

Volume ml	PU	Cat. No.
60	10	319099

Perfection in Liquid Handling

HIGH EFFICIENCY PIPETTING

VITLAB®
Competence in Labware

VITLAB pipeo®

CE

For all pipettes from 0.1 to 100 ml.
With the VITLAB pipeo® pipette controller, pipette handling is simple and comfortable. The ergonomic handle - very light weight at about 190 grams - and excellent balance all contribute to ease of operation. The speed can be adjusted easily, continuously and exactly with one hand using two buttons. A 50 ml pipette can be filled comfortably in less than ten seconds. The liquid release can be done either by gravity delivery when calibrated 'Ex' (to deliver), or in blow out mode using the battery-operated motor.
Pipettes are held securely and tightly in the exchangeable adapter. Liquid vapours are purged directly to protect the instrument,
The charge level of the recyclable battery is shown in the LED display. Defective batteries are easily replaced. To avoid surprises, the LED display changes from green to red two hours before the battery must be recharged. The VITLAB pipeo® can still be operated while the battery is being recharged.

Included in delivery:
VITLAB pipeo®, battery charger, battery, one battery compartment cover, two replacement 0.2 µm membrane filters, instruction manual.

Type	PU	Cat. No.
pipeo® with battery charger for the European continent 230 V/50 Hz	1	1631500
pipeo® with battery charger for UK/Ireland 230 V/50 Hz	1	1631510
pipeo® with battery charger for Australia 230 V/50 Hz	1	1631520
pipeo® with battery charger for Japan 100 V/50 Hz	1	1631530
pipeo® with battery charger for USA 120 V/60 Hz	1	1631540

VITLAB maneus®

NEW

121°C

The VITLAB maneus® pipette controller enables both left- and right-handers to operate all normal bulb and graduated pipettes easily and fatigue-free. Its safe and easy handling allows even inexperienced users to adjust the meniscus precisely.

With the new design, unscrewing the adapter enables easy and fast replacement of the hydrophobic membrane filter, which protects the instrument against fluid penetration.

The valve system is optimised so that liquids can be drawn up simply, without exerting pressure. The highly sensitive filling and discharge of liquids are controlled gently by the pipetting knob. Thus, the suction element provides rapid filling of the pipette (capacity: 50 ml in less than 10 seconds). The discharge bellows are used for the emptying (blow-out) of the pipette. The specially moulded intake cone ensures secure seating for all normal bulb and graduated pipettes (0.1 to 100 ml).

The VITLAB maneus® is simple to dismantle, easy to clean, and completely autoclavable at 121 °C (2 bar) according to DIN EN 285.

For all normal bulb and graduated pipettes from 0.1 to 100 ml. With replacement 3 µm membrane filter and instruction manual.

Type	PU	Cat. No.
maneus®	1	1630500

Accessories for VITLAB pipeo®& maneus®

For a detailed list of replacement parts, please see the instruction manual for the instrument, or visit our homepage: www.vitlab.de.

Description	PU	Cat. No.
Membrane filter, 0.2 µm, sterile, VITLAB pipeo®	1	1670647
Membrane filter, 0.2 µm, non-sterile, VITLAB pipeo®	10	1670648
Membrane filter, 3 µm, non-sterile, VITLAB pipeo®, VITLAB maneus®	10	1670650
Wall rack, VITLAB pipeo®	1	1670660

Pipette fillers, NR

Classic accessory for pipetting with volumetric or measuring pipettes. With 3 valves.
Valve A: Air release, Valve B: Liquid filling, Valve E: Liquid dispensing.

Type	PU	Cat. No.
Universal model, for pipettes up to 10 ml	1	104099
Universal model, for pipettes up to 100 ml	1	104199

Pipette fillers

For pipetting liquids, fit all glass and plastic pipettes. Slow rotation of the actuator-wheels draws liquid into the pipette. Pressing the air bleed valve automatically empties the pipette without returning the piston.

For pipettes ml	Colour	PU	Cat. No.
2	Blue	1	324594
10	Green	1	324694
25	Red	1	324794

Pipettes
can be found on pages 49 - 50.

Competence in Volume Measurement

MEASUREMENT TO THE HIGHEST DEGREE

VITLAB®
Competence in Labware

The very highes volumetric instr

Volume measurement is a routine laboratory operation. Therefore, volumetric instruments such as volumetric flasks, measuring cylinders and pipettes are standard equipment in any analytical laboratory.

The importance of the standard of measurement accuracy in your routine laboratory operations cannot be overstated. VITLAB has decades of experience in the development and production of laboratory products which are used to measure volumes. VITLAB is the first manufacturer to produce Class A measuring cylinders from PMP that are certified compliant according to DIN 12681.

All Class A PMP volumetric flasks are optionally available in transparent or UV-absorbing variations for light-sensitive substances.

t precision in uments

Calibration

Type "Ex": The delivered quantity of liquid corresponds to the volume printed on the instrument (pipettes and burettes).

Type "In": The contained quantity of liquid corresponds to the volume printed on the instrument (volumetric flasks and measuring cylinders).

VITLAB calibrates each individual volumetric flask "to contain" (In) at a reference temperature of 20 °C. The hydrophobic characteristics of the materials in plastic volumetric instruments lead to the measured volume being the same as the delivered quantity ("In" = "Ex") for aqueous solutions.

Accuracy classes

Class A: The volume tolerances lie within the limits specified by DIN and ISO.

Class B: The volume tolerances are twice the error limits for Class A specified by DIN and ISO. Detailed explanations on "accuracy in volume measurement" are available in the chapter on "General and Technical Information".

Certificate of conformity

The certificate of conformity is VITLAB's guarantee that the respective products comply with the German Calibration Regulations. The special manufacturing process developed by VITLAB, and the proven VITLAB quality management system, ensure compliance with the volume tolerances specified by the standards.

Volumetric flasks, PFA, Class A, with screw cap, PFA

Highly transparent
Ring mark individually calibrated to `In´.
Class A tolerances according to DIN EN ISO 1042.
The PFA screw cap guards against contamination.
Outstanding chemical resistance, can be used with strong oxidants, highly concentrated acids and alkalis, hydrocarbons, and ketones.
With laser-engraved lot number and batch certificate. Thermal stress up to 121 °C (autoclaving) does not permanently exceed the tolerance limit.
To preserve the ring mark, do not clean at temperatures exceeding 60 °C.

The advantages of PFA

- Long-term maintenance of low-concentration reference materials in PFA containers
- No memory effects
- Practically no carryover, no cross-contamination due to the extremely hydrophobic, anti-adhesive and smooth surfaces
- High thermal stability, from -200 °C to +260 °C
- Chemical inertness against nearly all chemicals
- Good transparency and dimensional stability, suitable for volumetric instruments
- Easy to clean
- Use of high purity raw materials

Further information on PFA can be found starting on page 132.

Volume ml	Tolerance ± ml	Height mm	Thread GL	PU	Cat. No.
10	0.04	90	18	1	107097
25	0.04	115	18	1	107197
50	0.06	150	18	1	107297
100	0.10	180	18	1	107397
250	0.15	235	25	1	107497
500	0.25	270	25	1	107597

Compare: VITLAB® volumetric flasks …

… have a circular, precisely calibrated ring mark with which the meniscus can be read accurately from any position
… have a straight neck for precise volume measurement
… have a specially formed bottom for superior stability

… are MADE IN GERMANY

VITLAB® opaque volumetric flasks, PMP, Class A with NS stoppers, PP

NEW

UV-absorbing, highly transparent. For storage of light-sensitive substances.

With ring mark individually calibrated to 'In'.
Class A tolerances according to DIN EN ISO 1042.
With printed lot number and batch certificate.
Thermal stress up to 121 °C (autoclaving) does not permanently exceed the tolerance limit.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Tolerance ± ml	Height mm	Neck NS	PU	Cat. No.
10	0.04	90	10/19	2	670950
25	0.04	115	10/19	2	671950
50	0.06	150	12/21	2	672950
100	0.10	180	14/23	2	673950
250	0.15	235	19/26	2	674950
500	0.25	270	19/26	2	675950
1000	0.40	310	24/29	1	676950

VITLAB® opaque replaces brown glass
and is…
… substantially lighter in weight
… practically unbreakable
… practically impermeable in the UV region
… comparable to a light protection factor of 20

VITLAB® opaque volumetric flasks, PMP, Class A, with coloured screw caps, PP

UV-absorbing, highly transparent. For storage of light-sensitive substances.

With ring mark individually calibrated to 'In'.
Class A tolerances according to DIN EN ISO 1042.
With printed lot number and batch certificate.
Thermal stress up to 121 °C (autoclaving) does not permanently exceed the tolerance limit.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Tolerance ± ml	Height mm	Thread GL	PU	Cat. No.
10	0.04	90	18	2	670040
25	0.04	115	18	2	671040
50	0.06	150	18	2	672040
100	0.10	180	18	2	673040
250	0.15	235	25	2	674040
500	0.25	270	25	2	675040
1000	0.40	310	32	1	676040

Volumetric flasks, PMP, Class A with NS stoppers, PP

Crystal clear.
With ring mark individually calibrated to 'In'.
Class A tolerances according to DIN EN ISO 1042.
With printed lot number and batch certificate.
Thermal stress up to 121 °C (autoclaving) does not permanently exceed the tolerance limit.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Tolerance ± ml	Height mm	Neck NS	PU	Cat. No.
10	0.04	90	10/19	6	67704
25	0.04	115	10/19	6	67104
50	0.06	150	12/21	6	67204
100	0.10	180	14/23	6	67304
250	0.15	235	19/26	5	67404
500	0.25	270	19/26	4	67504
1000	0.40	310	24/29	3	67604

Volumetric flasks, PMP, Class B with NS stoppers, PP

Crystal clear.
With ring mark individually calibrated to 'In'.
Class B tolerances according to DIN EN ISO 1042.
Thermal stress up to 121 °C (autoclaving) does not permanently exceed the tolerance limit.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Tolerance ± ml	Height mm	Neck NS	PU	Cat. No.
10	0.08	90	10/19	6	67795
25	0.08	115	10/19	6	67195
50	0.12	150	12/21	6	67295
100	0.20	180	14/23	6	67395
250	0.30	235	19/26	5	67495
500	0.50	270	19/26	4	67595
1000	0.80	310	24/29	3	67695

Volumetric flasks, PMP, Class B with screw caps, PP

Crystal clear.
With ring mark individually calibrated to 'In'.
Class B tolerances according to DIN EN ISO 1042.
Thermal stress up to 121 °C (autoclaving) does not permanently exceed the tolerance limit.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Tolerance ± ml	Height mm	Thread GL	PU	Cat. No.
10	0.08	90	18	6	677895
25	0.08	115	18	6	671895
50	0.12	150	18	6	672895
100	0.20	180	18	6	673895
250	0.30	235	25	5	674895
500	0.50	270	25	4	675895
1000	0.80	310	32	3	676895

Volumetric flasks, PP, Class B with NS stoppers, PP

Highly transparent.
With ring mark individually calibrated to 'In'.
Class B tolerances according to DIN EN ISO 1042.
Thermal stress up to 60 °C does not permanently exceed the tolerance limits.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Tolerance ± ml	Height mm	Neck NS	PU	Cat. No.
10	0.08	90	10/19	6	677941
25	0.08	115	10/19	6	671941
50	0.12	150	12/21	6	672941
100	0.20	180	14/23	6	673941
250	0.30	235	19/26	5	674941
500	0.50	270	19/26	4	675941
1000	0.80	310	24/29	3	676941

Volumetric flasks, PP, Class B, with screw cap, PP

Highly transparent.
With ring mark individually calibrated to 'In'.
Class B tolerances according to DIN EN ISO 1042.
Thermal stress up to 60 °C does not permanently exceed the tolerance limits.
To preserve markings, cleaning at no higher than 60 °C is recommended.

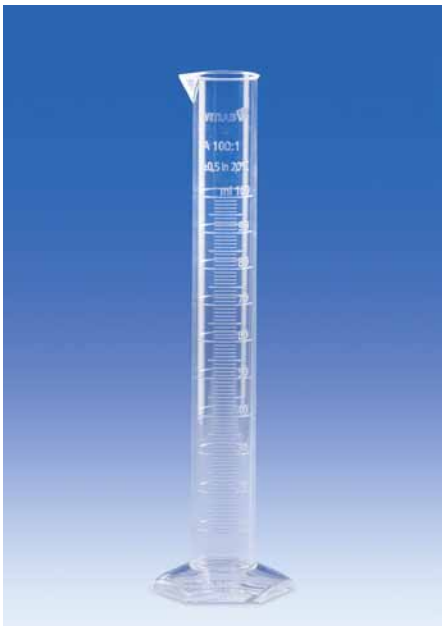
Volume ml	Tolerance ± ml	Height mm	Thread GL	PU	Cat. No.
10	0.08	90	18	6	677891
25	0.08	115	18	6	671891
50	0.12	150	18	6	672891
100	0.20	180	18	6	673891
250	0.30	235	25	5	674891
500	0.50	270	25	4	675891
1000	0.80	310	32	3	676891

Graduated cylinders, PMP, Class A, CC, tall shape, raised scale

Crystal clear. Certified compliant.
With a raised scale and ring marks at the primary scale points, calibrated 'In'.
The lot certificate supplied bears the batch number and the actual nominal value ascertained under the test conditions. The resulting deviations from the nominal value fall well under the allowed tolerances of Class A according to DIN 12681 and ISO 6706. With the laser engraved batch number and the year of manufacture.
Hexagonal base with bottom studs provides high stability. Thermal stress up to 121 °C (autoclaving) does not cause tolerance limits to be permanently exceeded.

Volume ml	Tolerance ± ml	Graduation ml	Height mm	Ø mm	PU	Cat. No.
10	0.10	0.20	145	15	2	64604
25	0.25	0.50	170	22	2	64704
50	0.50	1.00	200	27	2	64804
100	0.50	1.00	250	33	2	64904
250	1.00	2.00	315	44	2	65004
500	2.50	5.00	360	58	1	65104
1000	5.00	10.00	440	69	1	65204
2000	10.00	20.00	482	97	1	65304

Graduated cylinders, PMP, Class A tall shape, raised scale



Crystal clear.
With a raised scale and ring marks at the primary scale points, calibrated 'In'.
Class A tolerances according to DIN 12681 / ISO 6706.
Hexagonal base with bottom studs provides high stability. Thermal stress up to 121 °C (autoclaving) does not cause tolerance limits to be permanently exceeded.

Volume ml	Tolerance ± ml	Graduation ml	Height mm	Ø mm	PU	Cat. No.
10	0.10	0.20	145	15	12	64695
25	0.25	0.50	170	22	12	64795
50	0.50	1.00	200	27	12	64895
100	0.50	1.00	250	33	12	64995
250	1.00	2.00	315	44	6	65095
500	2.50	5.00	360	58	6	65195
1000	5.00	10.00	440	69	6	65295
2000	10.00	20.00	482	97	3	65395

Graduated cylinders, PP, Class B, tall shape, with raised blue scale

Highly transparent.
With easily readable, raised, embossed blue scale and ring marks at the primary scale points. Calibrated 'In'. Class B tolerances according to DIN 12681 / ISO 6706.
Hexagonal base with bottom studs provides high stability. Thermal stress up to 80 °C does not cause tolerance limits to be permanently exceeded. To preserve markings, do not clean at temperatures exceeding 60 °C.

Volume ml	Tolerance ± ml	Graduation ml	Height mm	Ø mm	PU	Cat. No.
10	0.20	0.20	145	15	12	646081
25	0.50	0.50	170	22	12	647081
50	1.00	1.00	200	27	12	648081
100	1.00	1.00	250	33	12	649081
250	2.00	2.00	315	44	6	650081
500	5.00	5.00	360	58	6	651081
1000	10.00	10.00	440	69	6	652081
2000	20.00	20.00	482	97	3	653081

Graduated cylinders, PP, Class B tall shape, with a raised scale

Highly transparent.
With a raised scale and ring marks at the primary scale points, calibrated 'In'.
Class B tolerances according to DIN 12681 / ISO 6706.
Hexagonal base with bottom studs provides high stability. Thermal stress up to 80 °C does not cause tolerance limits to be permanently exceeded.

Volume ml	Tolerance ± ml	Graduation ml	Height mm	Ø mm	PU	Cat. No.
10	0.20	0.20	145	15	12	646941
25	0.50	0.50	170	22	12	647941
50	1.00	1.00	200	27	12	648941
100	1.00	1.00	250	33	12	649941
250	2.00	2.00	315	44	6	650941
500	5.00	5.00	360	58	6	651941
1000	10.00	10.00	440	69	6	652941
2000	20.00	20.00	482	97	3	653941

Graduated cylinders, SAN, Class B tall shape, with a raised scale

Crystal clear.
With a raised scale and ring marks at the primary scale points, calibrated 'In'.
Class B tolerances according to DIN 12681 / ISO 6706.
Hexagonal base with bottom studs provides high stability. Thermal stress up to 60 °C does not cause tolerance limits to be permanently exceeded.

Volume ml	Tolerance ± ml	Graduation ml	Height mm	Ø mm	PU	Cat. No.
10	0.20	0.20	140	16	12	64691
25	0.50	0.50	169	21	12	64791
50	1.00	1.00	199	28	12	64891
100	1.00	1.00	260	34	12	64991
250	2.00	2.00	315	47	6	65091
500	5.00	5.00	350	61	6	65191
1000	10.00	10.00	415	76	6	65291
2000	20.00	20.00	482	97	3	65391

Graduated cylinders, PP, Class B short shape, with a raised scale

Highly transparent.
With a raised scale and ring marks at the primary scale points, calibrated 'In'.
Thermal stress up to 80 °C does not cause tolerance limits to be permanently exceeded.

Volume ml	Tolerance ± ml	Graduation ml	Height mm	Ø mm	PU	Cat. No.
25	0.50	0.50	122	22	12	640941
50	1.00	1.00	142	27	12	641941
100	2.00	2.00	163	37	12	642941
250	5.00	5.00	192	51	6	643941
500	10.00	10.00	218	67	6	644941
1000	20.00	20.00	285	78	6	645941

Graduated cylinders, SAN, Class B, short shape, with a raised scale

Crystal clear.
With a raised scale and ring marks at the primary scale points, calibrated 'In'.
Thermal stress up to 60 °C does not cause tolerance limits to be permanently exceeded.

Volume ml	Tolerance ± ml	Graduation ml	Height mm	Ø mm	PU	Cat. No.
25	0.50	0.50	122	22	12	64091
50	1.00	1.00	142	27	12	64191
100	2.00	2.00	163	37	12	64291
250	5.00	5.00	192	51	6	64391
500	10.00	10.00	218	67	6	64491
1000	20.00	20.00	285	78	6	64591

Compare: VITLAB® graduated cylinders…

… have guaranteed seamless interiors, which mean the analysis is unaffected by residues and carryover
… have precise calibration ring marks at the primary scale points, with which the meniscus can be read accurately
… a sturdy, even stand for precise volume measurement

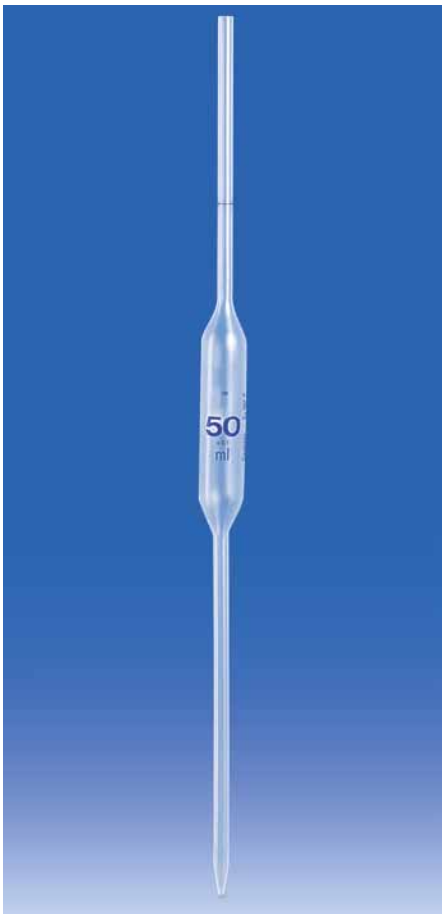
… are MADE IN GERMANY

Hydrometer cylinder, PP

Highly transparent, with spout and overflow vessel. For density measurements using a hydrometer. Hydrometer can be read through the overflow vessel with a completely filled cylinder.
With a raised scale and ring marks at the primary scale points, calibrated 'In'.
Class B tolerances according to DIN 12681 / ISO 6706.
Hexagonal base with bottom studs provides high stability. Thermal stress up to 80 °C does not cause tolerance limits to be permanently exceeded.

Volume ml	Graduation ml	Height mm	Ø mm	PU	Cat. No.
500	5.00	351	73	1	760941

Bulb pipettes, PP

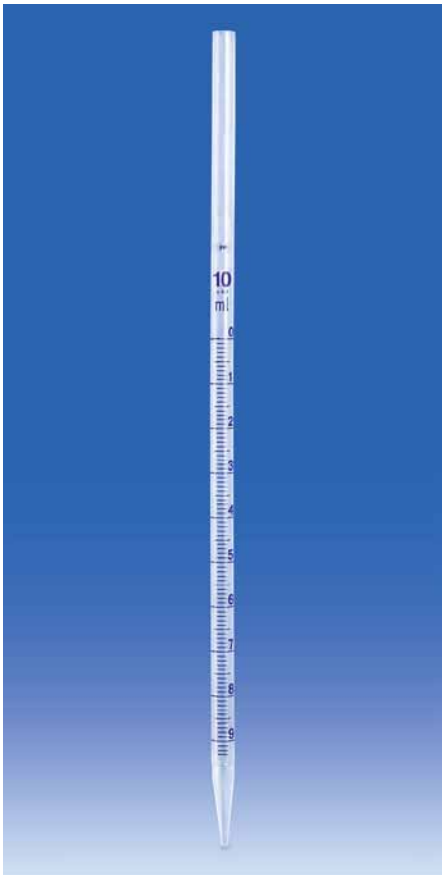


Calibrated to deliver 'Ex'.
Highly transparent. With high-contrast, blue markings.
Break-resistant.
High chemical resistance.

Exposure to temperatures above 60 °C can lead to volume changes.
Recommended cleaning with mild alkaline detergents up to 60 °C.

Volume ml	Tolerance ± ml	Length mm	PU	Cat. No.
1	0.02	300	12	164094
2	0.02	300	12	164194
5	0.03	300	6	164294
10	0.04	440	6	164394
25	0.05	450	6	164494
50	0.10	460	6	164594

Graduated pipettes, PP

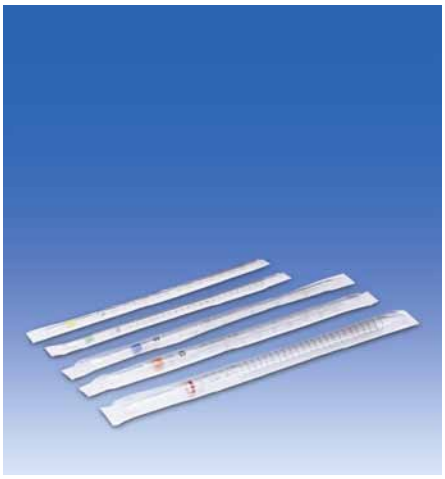


Calibrated to deliver 'Ex'.
Highly transparent. With high-contrast, blue markings.
Break-resistant.
High chemical resistance.
Outer diameter of suction tube: max. 8 mm.

Exposure to temperatures above 60 °C can lead to volume changes.
Recommended cleaning with mild alkaline detergents up to 60 °C.

Volume ml	Tolerance ± ml	Graduation ml	Length mm	PU	Cat. No.
1	0.02	0.1	300	12	163094
2	0.02	0.1	300	12	163194
5	0.05	0.1	330	12	163294
10*	0.10	0.1	330	12	163394
10	0.10	0.1	320	12	163594

* Suction tube outer diameter: 10 mm



Disposable pipettes, PS, sterile

Crystal clear, graduated, individual sterile packaging, pyrogen-free. Identified by bar-code.

Volume ml	Graduation ml	Length mm	PU	Cat. No.
1	0.01	272	25	160110
2	0.01	272	25	160210
5	0.10	320	25	160510
10	0.10	320	25	161010
25	0.20	345	10	162510

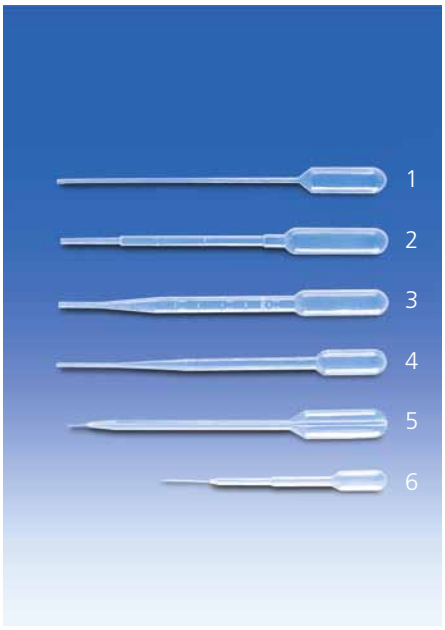
Disposable pipettes, PS, non-sterile

Crystal clear, graduated, non-sterile. Identified by bar-code.

Volume ml	Graduation ml	Length mm	PU	Cat. No.
1	0.01	272	10	160119
2	0.01	272	10	160219
5	0.10	320	10	160519
10	0.10	320	10	161019

Pipette Helpers
can be found on pages 34-36.

Pasteur pipettes, PE-LD



Disposable. Very good reproducibility of the number of drops per milliliter, thus ideal for distributing aliquots of liquid portions. Pasteur pipettes can be deep-frozen when filled, or if needed, be converted into sealed vessels through heat-sealing. The integrated suction bulb can readily be compressed. Thus, finger fatigue from frequent pipetting is avoided. Can be sterilised with gas or gamma radiation.

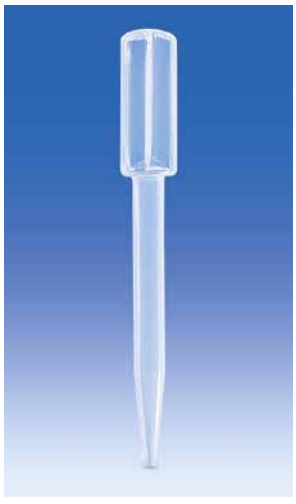
Figure No.	Gradua-tions/ divi-sions ml	Max. suc-tion vol-ume ml	Tip outer diameter mm	Length mm	Number of drops per ml	PU	Cat. No.
1	-	3.0	2.8	152	25-27	5000	148893
2	1/0.25	3.5	3.4	151	25-30	5000	148993
3	3/0.5	3.5	3.2	152	21-28	5000	149093
4	2/0.5	2.0	3.3	152	22-26	5000	149193
5	-	4.0	1.0	148	52-65	5000	149293
6	-	1.0	1.0	105	50	3200	149393

Dropping pipettes, PE-LD

With integrated bellows.
For sampling and decanting of infectious or toxic liquids.
Graduated.

Volume ml	Length mm	PU	Cat. No.
1.5	133	100	149893
5	194	100	149993

Dropping pipettes, PE-LD



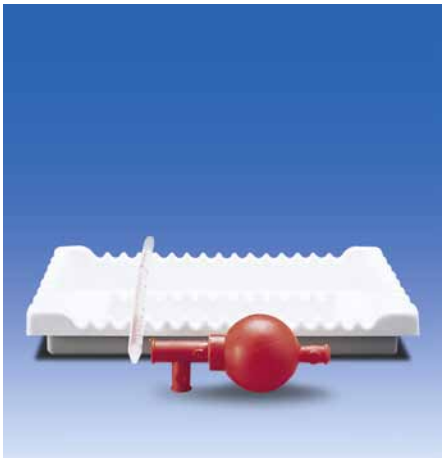
With integrated pipetting bulb.
For sampling and decanting of infectious or toxic liquids.
Without graduations.

Volume ml	Length mm	PU	Cat. No.
1.8	98	250	149693

Pipette stands, PP

Upper portion with 94 bore holes of different diameters for secure placement of volumetric and measuring pipettes of any size.
The stable base has a rotatable, ribbed base plate in which the pipette tips can be gently seated.
The racks are supplied unassembled, and can easily be assembled according to the accompanying assembly instructions.

Ø mm	Height mm	PU	Cat. No.
230	470	2	79194



Pipette tray, PVC

Holds pipettes from 120 mm length.
Pipettes can easily be placed in and taken out from the troughs in the tray, even with gloves.

L x W x H mm	PU	Cat. No.
285 x 215 x 40	1	80996

Pipette tray, PVC

Suitable for drawers, divided lengthwise into 4 compartments.

L x W x H mm	PU	Cat. No.
420 x 300 x 30	1	80252

Pipette washer, PE-HD

For simple and basic cleaning of pipettes. With discharge siphon for an automatic water exchange.
The complete washing system includes the pipette washer, pipette jar (for pre-cleaning) and pipette basket (for dipping pipettes into the pipette washer or pipette jar).
Suitable for the use with pipette baskets (cat. nos. 80219 and 80222).

Ø mm	Height mm	Effective length mm	PU	Cat. No.
165	740	600	1	80217
165	1000	840	1	80215

Pipette jars, PE-HD

For pre-cleaning pipettes in detergent solutions.
Suitable for the use with pipette baskets (cat. nos. 80219 and 80222).

Ø mm	Height mm	PU	Cat. No.
125	250	1	80223
165	500	1	80221
165	650	1	80218

Pipette baskets, PE-HD

For dipping pipettes into the pipette jar or pipette-washer and for transferring pipettes.
With the extension piece, the total height of the pipette basket (cat. no. 80219) increases from 650 to 870 mm.

Description	Ø mm	Overall height mm	Basket height mm	PU	Cat. No.
Pipette basket	130	650	300	1	80219
Pipette basket	130	495	300	1	80222
Extension piece for the handle (pipette basket 80219)				2	81219

Graduated beakers, PP, raised blue scale

Highly transparent. With easily readable, raised, embossed blue scale, and stable, easy-grip handle. To preserve markings, do not clean at temperatures exceeding 60 °C. Conditionally autoclavable at 121 °C (2 bar) according to DIN EN 285. For autoclaving, we recommend the design with raised graduations (cat. nos. 440941 - 447941).

Volume ml	Divisions ml	Height mm	Ø mm	PU	Cat. No.
50	2	70	40	24	446081
100	2	80	50	24	447081
250	5	120	70	12	440081
500	10	133	91	12	441081
1000	10	170	116	6	442081
2000	20	215	150	6	443081
3000	50	242	170	6	444081
5000	100	270	210	6	445081

Graduated beakers, PP, raised scale

Highly transparent. With a raised scale and stable, easy-grip handle. Autoclavable at 121 °C (2 bar) according to DIN EN 285.

Volume ml	Divisions ml	Height mm	Ø mm	PU	Cat. No.
50	2	70	40	24	446941
100	2	80	50	24	447941
250	5	120	70	12	440941
500	10	133	91	12	441941
1000	10	170	116	6	442941
2000	20	215	150	6	443941
3000	50	242	170	6	444941
5000	100	270	210	6	445941

Graduated beakers, stackable, PP

Highly transparent. With easily readable, printed blue scale and stable handle.
To preserve markings, cleaning at no higher than 60 °C is recommended. For autoclaving we recommend the design with raised graduations (cat. nos. 440941 - 447941).

Volume ml	Divisions ml	Height mm	Ø mm	PU	Cat. No.
250	5	115	75	12	480941
500	10	140	100	12	481941
1000	10	167	125	12	482941
2000	20	212	148	12	483941
3000	50	242	170	12	484941

Graduated beakers, SAN

Crystal clear.
With a raised scale and stable, easy-grip handle.

Volume ml	Divisions ml	Height mm	Ø mm	PU	Cat. No.
250	5	120	70	12	44091
500	10	133	91	12	44191
1000	10	170	116	6	44291
2000	20	215	150	6	44391
3000	50	242	170	6	44491

Griffin beakers, PFA

Transparent. With a raised scale. Excellent chemical resistance and very high thermal stability from -200 to +260 °C.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.

The advantages of PFA

- Especially suitable for use in trace analysis
- Ideal for sensitive and valuable samples
- Long-term maintenance of low-concentration reference materials in PFA containers
- No memory effects
- Practically no carryover, no contamination due to the extremely hydrophobic, anti-adhesive and smooth surfaces
- High thermal stability, from -200 °C to +260 °C
- Chemical inertness against nearly all chemicals
- Good transparency and dimensional stability
- Easy to clean
- Use of high purity raw materials

Further information on PFA can be found starting on page 132.

Volume ml	Divisions ml	Height mm	Ø mm	PU	Cat. No.
25	5	50	32	1	110205
50	10	59	39	1	110305
100	20	72	50	1	110405
250	50	96	67	1	110605
500	100	122	88	1	110905
1000	100	141	109	1	111005

Watch glasses
can be found on page 91.

Griffin beakers, ETFE

Transparent. With easily readable, printed black scale.
Very good chemical resistance and very high thermal stability from -100 to +150 °C.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Divisions ml	Height mm	Ø mm	PU	Cat. No.
25	5	50	32	1	110204
50	10	59	39	1	110304
100	20	72	50	1	110404
250	50	96	67	1	110604
400	50	109	77	1	110704
500	100	122	88	1	110904
600	100	125	91	1	110804
1000	100	143	105	1	111004

Watch glasses
can be found on page 91.

Griffin beakers, PTFE

White, opaque, thick-walled.
Without scale.
Excellent chemical resistance and high thermal stability from -200 to +260 °C.
Also suitable for microwave ovens.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.

Volume ml	Wall thickness mm	Height mm	Ø mm	PU	Cat. No.
5	2	24	22	1	112197
10	2	39	25	1	112297
25	2	47	32	1	112397
50	2	55	42	1	112497
100	3	68	55	1	112597
250	3	93	62	1	112697
500	4	126	81	1	112797
1000	4	157	102	1	112897

Griffin beakers, PMP

Crystal clear. With easily readable, printed red scale.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Divisions ml	Height mm	Ø mm	PU	Cat. No.
10	2	35	25	12	60503
25	5	47	31	12	60603
50	10	60	40	12	60703
100	20	70	49	12	60803
150	20	80	56	12	60903
250	50	94	68	6	61003
400	50	109	77	6	61103
500	100	122	88	6	61803
600	100	125	91	6	61203
800	100	136	98	6	61303
1000	100	149	102	6	61403
2000	200	183	133	6	61503
3000	200	214	174	4	61603
5000	500	248	185	4	61703

Griffin beakers, PP

Highly transparent. With easily readable, printed blue scale.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Divisions ml	Height mm	Ø mm	PU	Cat. No.
10	2	35	25	12	605081
25	5	47	31	12	606081
50	10	60	40	12	607081
100	20	70	49	12	608081
150	20	80	56	12	609081
250	50	94	68	6	610081
400	50	109	77	6	611081
500	100	122	88	6	618081
600	100	125	91	6	612081
800	100	136	98	6	613081
1000	100	149	102	6	614081
2000	200	183	133	6	615081
3000	200	214	174	4	616081
5000	500	248	185	4	617081

Collectors, PP or SAN

With a raised scale. Volume: 2000 ml; divisions: 20 ml.
With stable, easy-grip handle and white PC lid.
Diameter: 150 mm; height: 220 mm.

Description	PU	Cat. No.
SAN, raised scale	6	97891
PP, raised scale	6	978941
PP, raised, blue embossed scale	6	978081
Accessories for collectors		
Lid, PC	6	97791

Measuring cup, PP

Transparent. With a raised scale. Volume: 30 ml; divisions: 1 ml.
Fitting lid made of PE - please order separately.
Diameter: 37 mm; height: 42 mm.

Description	PU	Cat. No.
Measuring cup	100	69394
Lid, PE	100	69493

Apothecary beakers, PP

Transparent. With a raised scale.
The broad round base provides high stability and prevents tipping over.

Volume ml	Divisions ml	Height mm	PU	Cat. No.
100	2	120	12	80422
250	5	160	18	80423
500	10	180	8	80424
1000	20	270	3	80425

Erlenmeyer flasks, PMP with PP screw cap

Crystal clear, wide-mouth, can also be used with NS stoppers (not included).
Ideal for use as a receiving vessel in titrations.
Well suited for storage and cultivation of cell cultures. Far safer than glass flasks for use in incubator shakers due to the break resistance of plastic. Suitable for microwaves.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Divisions ml	Thread GL	Neck NS	PU	Cat. No.
50	10	40	34/35	6	66695
100	20	40	34/35	6	66795
250	50	52	45/40	6	66895
500	100	52	45/40	6	66995
1000	200	52	45/40	4	67095

Erlenmeyer flasks, PP with PP screw cap

Highly transparent, wide-mouth, can also be used with NS stoppers (not included).
Well suited for storage and cultivation of cell cultures. Far safer than glass flasks for use in incubator shakers due to the break resistance of plastic. Suitable for microwaves.
To preserve markings, cleaning at no higher than 60 °C is recommended.

Volume ml	Divisions ml	Thread GL	Neck NS	PU	Cat. No.
50	10	40	34/35	6	666941
100	20	40	34/35	6	667941
250	50	52	45/40	6	668941
500	100	52	45/40	6	669941
1000	200	52	45/40	4	670941

NS stoppers
can be found on page 83.

Competence in Plastic Labware

SAVING AND STORAGE WITH CONFIDENCE

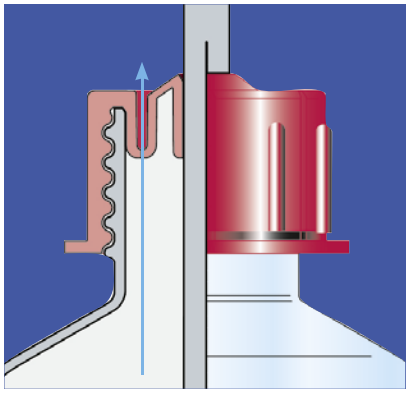
VITLAB®
Competence in Labware

VITsafe™ – the safety wash bottles

The VITsafe™ safety wash bottles will meet your safety requirements, especially when working with dangerous chemicals.

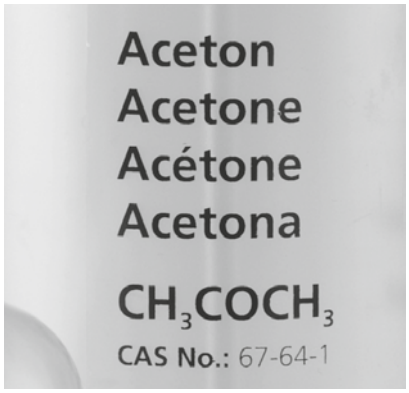
VENT-CAP

The metal-free VENT-CAP (patent pending), bright red coloured screw cap reduces excess static overpressure according to the principle of gas / steam permeability. Dripping is thus almost completely eliminated.



Safety imprint

VITsafe™ safety wash bottles are permanently printed in accordance with the Directive (EC) No. 1272/2008 (GHS), as well as with all important information. Includes material name in German, English, French and Spanish, hazard pictogram with signal word, chemical formula, CAS number, H-phrases, P-phrases and NFPA code.



Narrow-mouth or wide-mouth

VITsafe™ safety wash bottles are available in narrow- and wide-mouth styles. The especially large opening in the wide-mouth bottle permits simple refilling without a funnel. Select the safety wash bottles to fit your requirements from among 17 different material names and three volumes.

VITsafe™ safety wash bottles, narrow-mouth

Bottles from PE-LD or PP, spray tube from PP.
More safety due to the durable safety imprint in accordance to Directive (EC) No. 1272/2008 (GHS), as well as with all important information:

- Material name in German, English, French and Spanish
- Chemical formula, CAS No., hazard pictogram, signal word
- Risk phrases (H phrases), safety phrases (P phrases), as well as NFPA Code

Precise spray jet and optimised medium backflow through the continuous and finely drawn tip of the spray tube. Practically no leakage or dripping with the bright red VENT-CAP screw cap, the design of which prevents almost all static overpressure.

Imprint	Material	Volume ml	Thread GL	Height* mm	Ø mm	PU	Cat. No.
Acetone	PP	250	25	135	58	12	1431829
Acetone	PP	500	25	180	74	12	1432829
Acetone	PP	1000	32	215	92	12	1433829
Acetonitrile	PE-LD	500	25	180	74	6	1332969
Distilled Water	PE-LD	250	25	135	58	12	1331819
Distilled Water	PE-LD	500	25	180	74	12	1332819
Distilled Water	PE-LD	1000	32	221	92	12	1333819
Acetic acid	PE-LD	500	25	180	74	6	1332979
Ethanol	PE-LD	250	25	135	58	12	1331869
Ethanol	PE-LD	500	25	180	74	12	1332869
Ethanol	PE-LD	1000	32	221	92	12	1333869
Ethyl acetate	PE-LD	250	25	135	58	12	1331859
Ethyl acetate	PE-LD	500	25	180	74	12	1332859
Ethyl acetate	PE-LD	1000	32	221	92	12	1333859
Isopropanol	PE-LD	250	25	135	58	12	1331849
Isopropanol	PE-LD	500	25	180	74	12	1332849
Isopropanol	PE-LD	1000	32	221	92	12	1333849
Methanol	PE-LD	250	25	135	58	12	1331839
Methanol	PE-LD	500	25	180	74	12	1332839
Methanol	PE-LD	1000	32	221	92	12	1333839
Methylene chloride	PE-LD	500	25	180	74	6	1332879
Methyl ethyl ketone (MEK)	PP	500	25	180	74	6	1432989
Heptane	PE-LD	500	25	180	74	6	1332899
Hexane	PE-LD	500	25	180	74	6	1332909
N,N-Dimethylformamide	PE-LD	500	25	180	74	6	1332889
Pentane	PE-LD	500	25	180	74	6	1433959
Tetrahydrofuran (THF)	PE-LD	500	25	180	74	6	1332939
Toluene	PE-LD	500	25	180	74	6	1332949
Xylene	PE-LD	500	25	180	74	6	1332959

* without spray tube

Other variations available upon request.

VENT-CAP spray caps
can be found on page 65

VITsafe™ safety wash bottles, wide-mouth

Bottles made from PE-LD, spray tube from PP.
More safety due to the durable safety imprint in accordance to Directive (EC) No. 1272/2008 (GHS), as well as with all important information:

- Material name in German, English, French and Spanish
- chemical formula, CAS No., hazard pictogram, signal word
- Risk phrases (H phrases), safety phrases (P phrases), as well as NFPA Code

Precise spray jet and optimised medium backflow through the continuous and finely drawn tip of the spray tube. Practically no leakage or dripping with the bright red VENT-CAP screw cap, the design of which prevents almost all static overpressure.

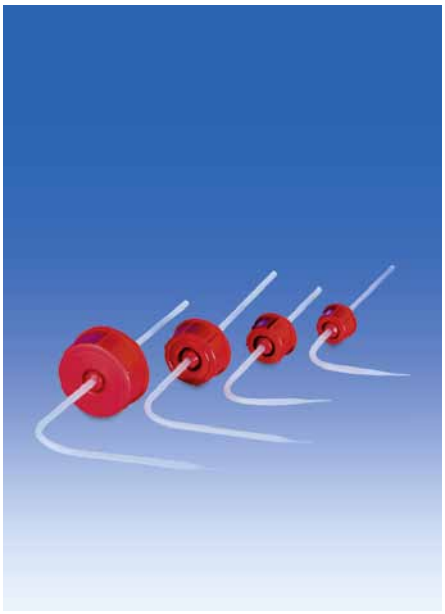
Imprint	Material	Volume ml	Thread GL	Height* mm	Ø mm	PU	Cat. No.
Acetone	PP	250	45	146	58	12	1451829
Acetone	PP	500	45	166	76	12	1452829
Acetone	PP	1000	63	226	91	12	1453829
Acetonitrile	PE-LD	500	45	166	76	6	1352969
Distilled Water	PE-LD	250	45	146	58	12	1351819
Distilled Water	PE-LD	500	45	166	76	12	1352819
Distilled Water	PE-LD	1000	63	226	91	12	1353819
Acetic acid	PE-LD	500	45	166	76	6	1352979
Ethanol	PE-LD	250	45	146	58	12	1351869
Ethanol	PE-LD	500	45	166	76	12	1352869
Ethanol	PE-LD	1000	63	226	91	12	1353869
Ethyl acetate	PE-LD	250	45	146	58	12	1351859
Ethyl acetate	PE-LD	500	45	166	76	12	1352859
Ethyl acetate	PE-LD	1000	63	226	91	12	1353859
Isopropanol	PE-LD	250	45	146	58	12	1351849
Isopropanol	PE-LD	500	45	166	76	12	1352849
Isopropanol	PE-LD	1000	63	226	91	12	1353849
Methanol	PE-LD	250	45	146	58	12	1351839
Methanol	PE-LD	500	45	166	76	12	1352839
Methanol	PE-LD	1000	63	226	91	12	1353839
Methylene chloride	PE-LD	500	45	166	76	6	1352879
Methyl ethyl ketone (MEK)	PP	500	45	166	76	6	1452989
Heptane	PE-LD	500	45	166	76	6	1352899
Hexane	PE-LD	500	45	166	76	6	1352909
N,N-Dimethylformamide	PE-LD	500	45	166	76	6	1352889
Pentane	PE-LD	500	45	166	76	6	1453959
Tetrahydrofuran (THF)	PE-LD	500	45	166	76	6	1352939
Toluene	PE-LD	500	45	166	76	6	1352949
Xylene	PE-LD	500	45	166	76	6	1352959

* without spray tube

Other variations available upon request.

VENT-CAP spray caps
can be found on page 65

VENT-CAP wash bottle caps, PP



Screw cap and spray tube from PP.
Practically no leakage or dripping with the bright red VENT-CAP screw cap, the design of which prevents almost all static overpressure.
Precise spray jet and optimised medium backflow through the continuous and finely drawn tip of the spray tube.

Thread GL	PU	Cat. No.
25	12	833019
32	12	833029
45	12	833039
63	12	833049

Wash bottles with imprint, PE-LD/PP

Narrow- / wide-mouth bottles made of PE-LD, transparent.
Screw cap and spray tube from PP.
Imprinted with "Distilled Water" in German, English and French.
Precise spray jet and optimised medium backflow through the continuous and finely drawn tip of the spray tube.

Upon request, also with other imprints for non-hazardous media according to the REACh Directive.
Other variations available upon request.

Volume ml	Thread GL	Height* mm	Ø mm	PU	Cat. No.
250	25	135	58	12	133181
250	45	146	58	12	135181
500	25	180	74	12	133281
500	45	166	76	12	135281
1000	32	221	92	12	133381
1000	63	226	91	12	135381

* without spray tube

Wash bottles made from PE-LD/PP with no imprint, transparent and coloured, can be found on page 67.

PFA-economy wash bottles

"PFA-economy" quality wash bottles. Transparent.
With recycled PFA content. Thus, reasonably priced and environmentally friendly.
PFA-economy bottles have excellent chemical resistance and high thermal stability from -200 °C to +260 °C and can be used for less critical applications for which pure PFA is not necessary.
Screw cap made from ETFE, spray tube from FEP.
Precise spray jet and optimised medium backflow through the continuous and finely drawn tip of the spray tube.

Volume ml	Thread GL	Height* mm	Ø mm	PU	Cat. No.
250	25	157	61	1	108792
500	25	189	76	1	108892
1000	32	233	96	1	108992

* without spray tube

Wash-bottles, PP

Narrow- / wide-mouth bottles made of PP, transparent. Screw cap and spray tube from PP.
Precise spray jet and optimised medium backflow through the continuous and finely drawn tip of the spray tube.

Volume ml	Thread GL	Height* mm	Ø mm	PU	Cat. No.
250	25	135	58	12	94993
250	45	146	58	12	93793
500	25	180	74	12	95093
500	45	166	76	12	93993
1000	32	215	92	12	95193
1000	63	226	91	12	94193

* without spray tube

Wash-bottles, PE-LD/PP

Narrow- / wide-mouth bottles made of PE-LD, transparent. Screw cap and spray tube from PP.
Precise spray jet and optimised medium backflow through the continuous and finely drawn tip of the spray tube.

Volume ml	Thread GL	Height* mm	Ø mm	PU	Cat. No.
50	18	73	37	24	94588
100	18	95	43	24	94688
250	25	135	58	12	94988
250	45	146	58	12	93788
500	25	180	74	12	95088
500	45	166	76	12	93988
1000	32	221	92	12	95188
1000	63	226	91	12	94188

* without spray tube

Wash bottles with imprint are found on page 65.

Coloured wash-bottles, PE-LD/PP

Narrow-mouth bottles, made from PE-LD. Available in four different colours to facilitate ready identification. Screw cap and spray tube from PP.
Precise spray jet and optimised medium backflow through the continuous and finely drawn tip of the spray tube.

Colour	Volume ml	Thread GL	Height* mm	Ø mm	PU	Cat. No.
Red	250	25	135	58	5	132603
Red	500	25	180	74	5	132703
Green	250	25	135	58	5	132605
Green	500	25	180	74	5	132705
Yellow	250	25	135	58	5	132606
Yellow	500	25	180	74	5	132706
Blue	250	25	135	58	5	132608
Blue	500	25	180	74	5	132708

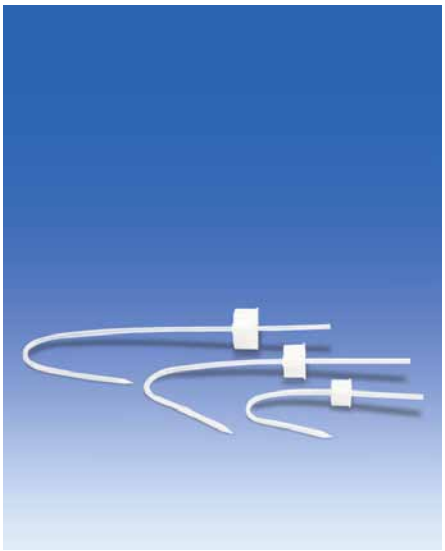
* without spray tube

Wash-bottles, PE-LD

Narrow-mouth bottles, transparent, with screw cap. Spray tube and spray-tube insert made from PE-LD. The classic model, made from soft material with good restoring force.

Volume ml	Thread GL	Height* mm	Ø mm	PU	Cat. No.
100	18	106	45	50	134293
250	25	140	59	50	134393
500	25	180	75	50	134493
1000	28	212	94	25	134593

* without spray tube



Wash bottle caps, PP

Screw cap and spray tube with drawn-out tip, made of PP. Precise spray jet and optimised medium backflow through the continuous and finely drawn tip of the spray tube.

Thread GL	PU	Cat. No.
18	24	83300
25	12	83301
32	12	83302
45	12	83303
63	12	83304

Wash bottles with an integrated spray insert, PE-LD

Transparent, with integrated spray insert. No need to remove when refilling.
The cap cover prevents dripping.

Volume ml	Thread GL	Height mm	PU	Cat. No.
250	32	143	10	81633
500	32	181	10	81634

Dropping bottles, PE-LD/PE-HD

Narrow-mouth bottles made of PE-LD, transparent, with dropper insert and screw cap made from PE-HD.
Extra long, fine dropping tip for accurate dispensing.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
50	18	117	37	24	94587
100	18	142	43	24	94687
250	25	183	58	12	94987
500	25	228	74	12	95087
1000	32	269	92	12	95187

Caps with dropper inserts, PE-HD

For bottles with GL threads. Cap with dropper insert, complete with screw cap made from PE-HD.
Extra long, fine dropping tip for accurate dispensing.

Thread GL	PU	Cat. No.
18	24	83306
25	12	83307
32	12	83308

Dropping bottles, PE-LD

Narrow-mouth bottles, transparent, with dropper insert and red screw cap made of PE-LD.
The classic model, made from soft material with good restoring force.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
20	14	88	31	100	132193
30	14	96	34	100	132293
50	18	115	39	100	132393
100	18	136	45	50	132493
250	25	170	59	50	132593
500	25	209	75	50	132693

Spray bottles, PP

White or transparent bottles made from PP.
Sprayer insert with stable, smoothly operated pump trigger and adjustable spray nozzle, which can be regulated from the finest mist (nebulising) to a precise liquid jet.
Range: approx. 3-4 meters.

Ideal for spraying detergents or disinfectants, especially into difficultly accessible areas, as well as applications in thin layer chromatography.

Volume ml	Colour	PU	Cat. No.
400	white	5	53510
850	white	5	53610
1000	transparent	5	95286

Narrow-mouth bottles, PFA

Transparent.
With screw cap with buttress threads made of PFA. Ideal for long-term storage of high-purity oxidants, acids, alkalis, as well as hydrocarbons, trace analysis solvents and standards.

The advantages of PFA

- Long-term maintenance of low-concentration reference materials in PFA containers
- No memory effects
- Practically no carryover, no cross-contamination due to the extremely hydrophobic, anti-adhesive, smooth surfaces
- High thermal stability, from -200 °C to +260 °C, autoclavable
- Chemical inertness against nearly all chemicals
- Good transparency and dimensional stability
- Easy to clean
- Use of high purity raw materials

Further information on PFA can be found starting on page 132.

Volume ml	Thread	Height mm	Ø mm	PU	Cat. No.
50	S 28	86	37	1	109297
100	S 28	120	45	1	109397
250	S 28	160	61	1	108297
500	S 28	190	76	1	108397
1000	S 28	240	96	1	108497

PFA-economy narrow-mouth bottles

Narrow-mouth, "PFA-economy" quality wash bottles. Transparent.
With recycled PFA content. Thus, reasonably priced and environmentally friendly.
PFA-economy bottles have excellent chemical resistance and high thermal stability from -200 °C to +260 °C and can be used for less critical applications for which pure PFA is not necessary.
With screw cap made of ETFE.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
50	18	90	37	1	108092
100	18	114	45	1	108192
250	25	157	61	1	108292
500	25	189	76	1	108392
1000	32	233	96	1	108492

Narrow-mouth bottles, PE-HD

Transparent. With broad shoulders.
With screw cap made of PP.
Heavy duty.
Good chemical resistance, ideal for long-term storage of liquids.

Volume ml	Thread mm	Height mm	Ø mm	PU	Cat. No.
4	20	41	16	12	5583170
8	20	44	25	12	5583180
15	20	57	25	12	5583190
30	20	70	31	12	5583100
60	20	84	38	12	5583110
125	24	101	50	12	5583120
250	24	134	61	12	5583130
500	36	185	75	12	5583140
1000	36	206	92	6	5583150

Narrow-mouth bottles, PE-HD, brown

Coloured brown, for storage of light-sensitive materials.
With broad shoulders.
With screw cap made of PP.
Heavy duty.
Good chemical resistance, ideal for long-term storage of liquids.

Volume ml	Thread mm	Height mm	Ø mm	PU	Cat. No.
4	13	41	16	12	5581170
8	20	44	25	12	5581180
15	20	57	25	12	5581190
30	20	70	32	12	5581200
60	20	84	40	12	5581210
125	24	101	51	12	5581220
250	24	134	62	12	5581230
500	36	185	75	12	5581240
1000	36	206	92	6	5581250

Narrow-mouth bottles, PP

Transparent. With broad shoulders.
With screw cap made of PP.
Heavy duty.
Good chemical resistance, ideal for long-term storage of liquids.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.

Volume ml	Thread mm	Height mm	Ø mm	PU	Cat. No.
4	13	41	16	12	5582070
8	20	44	25	12	5582080
15	20	57	25	12	5582090
30	20	70	32	12	5582100
60	20	84	40	12	5582110
125	24	101	51	12	5582120
250	24	134	62	12	5582130
500	36	185	75	12	5582140
1000	36	206	92	6	5582150

Narrow-mouth bottles, PP

Transparent. With high shoulders.
With screw cap made of PP.
Good chemical resistance, ideal for long-term storage of liquids.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
250	25	135	58	12	94994
500	25	180	74	12	95094
1000	32	215	92	12	95194

Narrow-mouth bottles, PE-LD

Transparent. With high shoulders.
With screw cap made of PP.
Flexible material with good resilience.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
50	18	73	37	24	94589
100	18	95	43	24	94689
250	25	135	58	12	94989
500	25	180	74	12	95089
1000	32	221	92	12	95189

Narrow-mouth bottles, PE-LD

Transparent. With flat shoulders.
With screw cap made of PE-LD.
Flexible material with good resilience.
Reasonably priced model for routine operations.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
10	14	50	26	100	138093
20	14	58	31	100	138193
30	14	66	34	100	138293
50	18	85	39	100	138393
100	18	106	45	50	138493
250	25	140	59	50	138593
500	25	180	75	50	138693
1000	28	212	94	25	138793
2000	28	264	117	25	138893

Narrow-mouth bottles, PE-HD

Transparent.
With screw cap made of PP.
Small footprint due to the square cross-section and the high shoulders.

Volume ml	Thread GL	Height mm	Size mm	Mouth inner diameter mm	PU	Cat. No.
100	25	76	43 x 43	17.5	24	91789
100	25	76	43 x 43	17.5	500	128493
250	28	80	80 x 80	21	24	91989
250	28	80	80 x 80	21	250	128593
500	32	106	90 x 90	24	12	92089
500	32	106	90 x 90	24	100	128693
1000	32	187	80 x 80	24	12	92189
1000	32	187	80 x 80	24	50	128793

Wide-mount bottles, PFA

Transparent.
With screw cap made of PFA with buttress threads. Ideal for long-term storage of high-purity oxidants, acids, alkalis, as well as hydrocarbons, trace analysis solvents and standards.

The advantages of PFA

- Long-term maintenance of low-concentration reference materials in PFA containers
- No memory effects
- Practically no carryover, no cross-contamination due to the extremely hydrophobic, anti-adhesive, smooth surfaces
- High thermal stability, from -200 °C to +260 °C, autoclavable
- Chemical inertness against nearly all chemicals
- Good transparency and dimensional stability
- Easy to clean
- Use of high purity raw materials

Further information on PFA can be found starting on page 132.

Volume ml	Thread	Height mm	Ø mm	PU	Cat. No.
250	S 40	150	61	1	109497
500	S 40	179	76	1	109597
1000	S 40	217	96	1	109697
2000	S 40	245	130	1	109797
5000	S 40	320	175	1	109997

PFA screw caps
can be found on page 84.

Wide-mount bottles, PTFE

White. Opaque. Thick walled.
With screw cap made of PTFE.
Very high thermal stability and chemical resistance.
With very wide mouth, ideal for filling with powders and paste-like materials.

Volume ml	Thread mm	Height mm	Ø mm	PU	Cat. No.
10	12	50	26	1	122597
25	19	61	33	1	122697
50	25	76	43	1	122797
100	35	88	52	1	122897

Wide-mouth bottles, PE-HD

Transparent.
With screw cap made of PP. Heavy duty.
Good chemical resistance, ideal for long-term storage of liquids.
Wider mouth for simple filling, also ideal for powders and paste-like materials.

Volume ml	Thread mm	Height mm	Ø mm	PU	Cat. No.
30	28	70	32	12	5584200
60	28	84	40	12	5584210
125	38	101	51	12	5584220
250	43	134	62	12	5584230
500	53	185	75	12	5584240
1000	63	206	92	6	5584250

Wide-mouth bottles, PE-HD, brown

Coloured brown, for storage of light-sensitive materials.
With screw cap made of PP. Heavy duty.
Good chemical resistance, ideal for long-term storage of liquids.
Wider mouth for simple filling, also ideal for powders and paste-like materials.

Volume ml	Thread mm	Height mm	Ø mm	PU	Cat. No.
30	28	70	31	12	5581300
60	28	84	38	12	5581310
125	38	98	50	12	5581320
250	43	131	61	12	5581330
500	53	180	75	12	5581340
1000	63	200	92	6	5581350

Wide-mouth bottles, PP

Transparent.
With screw cap made of PP. Heavy duty.
Good chemical resistance, ideal for long-term storage of liquids.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.
Wider mouth for simple filling, also ideal for powders and paste-like materials.

Volume	Thread	Height	Ø	PU	Cat. No.
	mm	mm	mm		
30	28	70	31	12	5582200
60	28	84	38	12	5582210
125	38	98	50	12	5582220
250	43	131	61	12	5582230
500	53	180	75	12	5582240
1000	63	200	92	6	5582250

Wide-mouth bottles, PP

Transparent.
With screw cap made of PP.
Good chemical resistance, ideal for long-term storage of liquids.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.
Wider mouth for simple filling, also ideal for powders and paste-like materials.

Volume	Thread	Height	Ø	PU	Cat. No.
ml	GL	mm	mm		
250	45	146	58	12	93794
500	45	166	76	12	93994
1000	63	226	91	12	94194

Wide-mouth bottles, PE-LD

Transparent.
With screw cap made of PP.
Flexible material with good resilience.
Wider mouth for simple filling, also ideal for powders and paste-like materials.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
50	32	87	39	24	93389
100	32	94	47	24	93489
250	45	146	58	12	93789
500	45	166	76	12	93989
1000	63	226	91	12	94189

Wide-mouth bottles, PE-LD

Transparent.
With screw cap made of PE-LD.
Flexible material with good resilience.
Wider mouth for simple filling, also ideal for powders and paste-like materials.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
50	32	80	38	100	139393
100	32	94	48	50	139493
250	40	126	62	50	139593
500	50	155	76	50	139693
1000	65	208	93	25	139793
2000	65	246	120	25	139893

Wide-mouth bottles, PE-HD

Transparent.
With screw cap made of PP.
Small footprint due to the square cross-section and the high shoulders.
Wider mouth for simple filling, also ideal for powders and paste-like materials.

Volume ml	Thread GL	Height mm	Size mm	PU	Cat. No.
100	32	78	46 x 46	24	92489
100	32	78	46 x 46	500	129493
250	50	83	80 x 80	24	92689
250	50	83	80 x 80	250	129593
500	65	120	90 x 90	12	92789
500	65	120	90 x 90	100	129693
1000	65	168	90 x 90	12	92889
1000	65	168	90 x 90	50	129793

Wide-mouth bottles, PE-LD, with eye closure

Transparent.
With eyes on the bottle and the screw cap for sealing.
With screw cap made of PE-LD.
Wider mouth for simple filling, also ideal for powders and paste-like materials.

Volume ml	Thread mm	Height mm	Ø mm	PU	Cat. No.
50	24	75	40	25	80408
100	24	90	50	25	80409
250	36	130	60	25	80410
500	36	160	75	10	80411
1000	50	200	95	10	80412
2000	50	250	115	10	80413

Reagent bottles, PP

Transparent.
With screw cap made of PP.
Good chemical resistance, ideal for long-term storage of liquids.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.
Size: 10,000 ml, with two handles.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
100	18	100	52	20	100389
100	32	96	55	20	101589
250	25	132	70	20	100489
500	25	165	87	10	100589
1000	32	202	108	10	100689
1000	63	204	108	10	101889
2000	32	245	131	6	100789
2000	63	243	131	6	101989
10000	63	394	222	1	100989

Reagent bottles, PP, GL 45 **NEW**

Transparent.
With screw cap made of PP.
Good chemical resistance, ideal for long-term storage of liquids.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.
Wider mouth for simple filling, also ideal for powders and paste-like materials.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
250	45	132	73	20	101689
500	45	172	87	10	101789
1000	45	197	105	10	102089
2000	45	241	131	6	102189
5000	45	315	178	1	100889

Reagent bottles, PP

121°C

Transparent.
With NS stopper made of PP.
Stopper type A: With square-knob cap and red core.
Stopper type B: With hexagonal-knob cap and red core.
Good chemical resistance, ideal for long-term storage of liquids.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.
Size: 5000 ml, with one handle.

Volume ml	Neck NS	Height mm	Ø mm	Stopper	PU	Cat. No.
100	14/23	106	52	A	20	100394
100	29/32	111	55	B	20	101594
250	19/26	138	70	A	20	100494
250	34/35	144	73	B	20	101694
500	24/29	172	87	A	10	100594
500	45/40	183	87	B	10	101794
1000	29/32	213	108	A	10	100694
1000	60/46	214	108	B	10	101894
2000	29/32	255	131	A	6	100794
2000	60/46	263	131	B	6	101994
5000	45/40	325	178	B	1	100894

Reagent bottles, opaque, PP, wide mouth

121°C

Transparent. Made from opaque, pigmented PP for light-sensitive substances.
According to DIN 12039.
With NS stopper made of PP.
Good chemical resistance, ideal for long-term storage of liquids.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.
Wider mouth for simple filling, also ideal for powders and paste-like materials.
Further information on our opaque products can be found on page 134.

VITLAB® opaque replaces brown glass
and is…
… substantially lighter in weight
… practically unbreakable
… practically impermeable in the UV region
… comparable to a light protection factor of 20

Volume ml	Neck NS	Height mm	Ø mm		PU	Cat. No.
500	45/40	183	87		10	1017940
1000	60/46	214	108		10	1018940
2000	60/46	263	131		6	1019940

Standard joint stoppers, PP

Stopper type A: With square-knob cap and red core.
Stopper type B: With hexagonal-knob cap and red core.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.

NS	Model	PU	Cat. No.
7/16	A	1	90594
10/19	A	1	90694
12/21	A	1	90794
14/23	A	1	90894
19/26	A	1	90994
24/29	A	1	91094
29/32	A	1	91194
29/32	B	1	92194
34/35	B	1	91294
45/40	B	1	91394
60/46	B	1	91494

Screw caps, PFA

121°C

Transparent. For sealing all PFA containers with GL threads or buttress threads. Autoclavable at 121 °C (2 bar) according to DIN EN 285.

The advantages of PFA

- Especially suitable for use in trace analysis
- Ideal for sensitive and valuable samples
- Long-term maintenance of low-concentration reference materials in PFA containers
- No memory effects
- Practically no carryover, no cross-contamination due to the extremely hydrophobic, anti-adhesive and smooth surfaces
- High thermal stability, from -200 °C to +260 °C, autoclavable
- Chemical inertness against nearly all chemicals
- Good transparency and dimensional stability
- Easy to clean
- Highly pure starting materials used

Further information on PFA can be found starting on page 132.

Thread	PU	Cat. No.
GL 18	1	102597
GL 25	1	102397
S 28	1	102697
S 40	1	102897

Screw caps, PP

121°C

Transparent. Autoclavable at 121 °C (2 bar) according to DIN EN 285.

Thread GL	PU	Cat. No.
18	24	83310
25	12	83311
32	12	83312
40	12	83315
45	12	83313
52	12	83316
56	12	83317
63	12	83314

Storage bottles, PE-HD, without tap

Transparent.
With stable carrying handle and screw cap.
Available in wide- and narrow-mouth models.

Volume l	Thread mm	Height mm	Ø mm	PU	Cat. No.
5	94	340	170	1	81640
5	62.5	345	170	1	81644
10	108	415	210	1	81642
10	62.5	425	210	1	81646

Storage bottles, PE-HD, with tap

Transparent. Narrow-mouth model.
With stable carrying handle and screw cap. The 25 and 50 l sizes come equipped with two carrying handles.
Complete with exchangeable, easily operated tap made from PP with a ¾" pipe fitting.

Volume l	Thread mm	Height mm	Ø mm	PU	Cat. No.
5	62.5	345	170	1	81660
10	62.5	425	210	1	81662
25	95.5	565	280	1	81664
50	95.5	700	350	1	81666

Tap for storage bottles, PP

Replacement tap for storage bottles made from PP (Cat. No. 81660 to 81666).
Complete with ¾" pipe fitting and rubber ring.

Description	PU	Cat. No.
Tap for storage bottles	1	80375

Container, PP

Ideal for low-footprint storage of media. The rectangular shape means that the containers can be lined up side by side with no wasted space. Each container is supplied with a scale. With a wide opening for filling. Comfortable, simple dispensing of media with the easily operated dispensing and discharge tap. Dripping is prevented with the rotatable spout. Container supplied without stopcock.
Capacity 6 L
Measurements 65 x 335 x 335 mm
Filling opening diameter: 41 mm

Description	PU	Cat. No.
Rectangular carboy	10	155094
Vented screw cap	1	155594
Safety supports for 2 rectangular carboys	1	155699
Safety supports for 3 rectangular carboys	1	155799
Filling tap	1	156094

Urine bottles, PP and PC

Bottles from transparent PP or translucent PC. With a durable, raised scale, divisions of 50 ml. Available with or without attached lid made of PE-LD. Bottles autoclavable at 121 °C (2 bar) according to DIN EN 285.
CE marked according to IVD Directive 98/79 EC.

Type	Volume ml	PU	Cat. No.
Urine bottle without lid, PP	1000	6	97494
Urine bottle with lid, PP	1000	6	00394
Urine bottle without lid, PC	1000	6	97496
Urine bottle with lid, PC	1000	6	00396
Urine bottle lid, PE-LD		6	97593

Sample containers, PFA

With screw cap made of PFA. Cylindrical, tall shape.
Ideal for sample collection, transport and storage of samples.

The advantages of PFA

- Especially suitable for use in trace analysis
- Ideal for sensitive and valuable samples
- Long-term maintenance of low-concentration reference materials in PFA containers
- No memory effects
- Practically no carryover, no cross-contamination due to the extremely hydrophobic, anti-adhesive, smooth surfaces
- High thermal stability from -200 °C to +260 °C, autoclavable at 121 °C (2 bar) according to DIN EN 285
- Chemical inertness against nearly all chemicals
- Good transparency and dimensional stability
- Easy to clean
- Use of high purity raw material

Further information on PFA can be found starting on page 132.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
30	40	54	38	1	130297
60	40	90	38	1	130397
90	56	62	54	1	130497
180	56	112	54	1	130597

Sample containers, PE-HD

With screw cap made of PE-HD. Cylindrical, tall shape.
Ideal for sample collection, transport and storage of samples.

Volume ml	Thread mm	Height mm	Ø mm	PU	Cat. No.
5	23	36	21	10	80910
10	23	58	21	10	80911

Sample containers, PP

Transparent. With screw cap made of PP. Cylindrical, tall shape.
Ideal for sample collection, transport and storage of samples.

Volume ml	Thread GL	Height mm	Ø mm	PU	Cat. No.
30	40	54	38	10	130294
60	40	90	38	10	130394
90	56	62	54	10	130494
180	56	112	54	10	130594

Sample containers, PP

Transparent. With snap-on lid made of PE-LD. Conical shape.

Volume ml	Height mm	Ø mm	PU	Cat. No.
5	25	20	25	68594
12	37	22	25	68794
18	57	22	25	68894
50	97	30	10	69194
160	110	50	10	69294

Sample containers, PE-LD

Transparent. With attached snap-on lid made of PE-LD.

Volume ml	Height mm	Ø mm	PU	Cat. No.
1	32	9	500	80730
2	32	14	100	80731
5	50	15	100	80737
8	56	17	100	80732
10	32	22	100	80733
25	72	24	100	80734
30	52	31	50	80736
50	74	30	50	80735

Weighing jars, PP

Transparent. With knobbed lid. Cylindrical shape.

Volume ml	Height mm	Ø mm	PU	Cat. No.
25	30	40	10	80342
30	50	30	10	80340
50	30	50	10	80345
65	35	60	10	80346
65	60	40	10	80343
200	90	60	10	80347
400	120	70	10	80348

Multi-purpose container, SAN

Crystal clear, with fitted lid. Planar bottom inside, reinforced edge outside for stable placement on the lab bench.
Ideal for dust-proof storage of small components, instruments and utensils.

Volume ml	L x W x H mm	PU	Cat. No.
4000	340 x 230 x 94	1	36491

Sample tubes, PFA

Sample tubes made from PFA for sample preparation, centrifugation and for use in autosampler racks. With or without individually calibrated ring mark at 10 ml with GL 25 screw cap made from PFA or PE stopper (see Table).

The advantages of PFA

- Especially suitable for use in trace analysis
- No memory effects
- Practically no carryover due to the extremely hydrophobic, anti-adhesive, smooth surfaces
- High thermal stability, from -200 °C to +260 °C, autoclavable
- Chemical inertness against nearly all chemicals
- Good transparency and dimensional stability
- Easy to clean

Further information on PFA can be found starting on page 132.

Figure No.	Type	Volume ml	Height mm	Ø mm	PU	Cat. No.
1	With ring mark and screw cap	15	110	22	1	103897
-	Without ring mark	15	110	22	1	1038971
2	With ring mark and stopper	12	110	16	1	1037979
3	Without ring mark	12	110	16	1	103797

Test tube racks
are found on page 96.

Microtubes, PP

With lid, with frosted labelling field. Raised graduations for reading the volume. The lid membrane has a uniform thickness and can be easily pierced by an analyzer. The attached lid seals tightly and is firmly seated, yet reopens easily. The microtubes have a uniform wall thickness and are highly transparent. CE marked according to IVD Directive 98/79 EC.

- Can be centrifuged at an RCA of up to 20,000 RCF at 20 °C for up to 20 min
- Lid membrane diameter: 8 mm; approx. 0.35 mm thick
- Outer diameter x H: 11 x 41 mm

Volume ml	Packaging units	PU	Cat. No.
1.5	1x500	500	145094
1.5	6x500	3000	145194

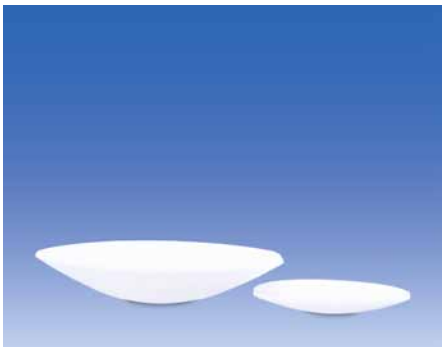
Microtube stands
can be found on pages 96-97.

Watch glasses, PTFE

121°C

White. Without base.
High thermal stability and chemical resistance.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.
Ideal for use to cover beakers.

Ø mm	PU	Cat. No.
50	1	113197
75	1	113297
100	1	113397
125	1	113497



Beakers
can be found on pages 54-58.

Watch glasses, PP

121°C

Transparent. With base.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.
Ideal for use to cover beakers.

Ø mm	PU	Cat. No.
60	10	80452
80	10	80454
100	10	80455
125	10	80456

Instrument trays, MF

White. Flat shape. Rounded corners. Smooth surfaces, easy to clean.
Practical tray for instruments, tools, and sensitive utensils. Stable and self-supporting.

L x W x H mm	PU	Cat. No.
190 x 150 x 17	5	71598
240 x 180 x 17	5	71698
268 x 208 x 17	5	71798
355 x 240 x 17	5	71898
428 x 288 x 17	5	71998

Instrument trays, MF

White. Tall shape. Rounded corners. Smooth surfaces, easy to clean.
Practical tray for instruments, tools, and sensitive utensils. Stable and self-supporting.
Fitting lid made of PS, please order separately.

L x W x H mm	PU	Cat. No.
190 x 150 x 40	5	72098
290 x 160 x 35	5	72198
290 x 160 x 60	5	72398
340 x 245 x 100	5	72498
350 x 250 x 40	5	72298

Lids for instrument trays, PS

Crystal clear. With handle. Rounded corners. Smooth surfaces, easy to clean.
Protects the contents of the instrument trays from dust and contamination.
The contents remain readily visible.

Size mm	For instrument tray No.	PU	Cat. No.
190 x 150	72098	5	79790
290 x 160	72198, 72398	5	79890
340 x 245	72498	5	79990

Laboratory trays / catchment trays, PP

White. All-purpose. Robust design. Very good chemical resistance
Rounded corners and edges. Smooth surfaces, easy to clean.

Inner bottom dimensions mm	Edge dimensions mm	Height mm	PU	Cat. No.
130 x 180	180 x 230	42	1	165094
180 x 240	250 x 310	65	1	165194
240 x 300	310 x 370	75	1	165294
300 x 400	420 x 520	120	1	165394
400 x 500	534 x 634	140	1	165494
500 x 700	648 x 846	160	1	165594

Dishes, PVC

White. All-purpose. Rounded corners and edges. Easy to clean.

Inner bottom dimensions mm	Height mm	PU	Cat. No.
200 x 150	50	1	80280
250 x 200	60	1	80281
320 x 260	70	1	80282
350 x 300	85	1	80283
430 x 330	95	1	80284
520 x 420	95	1	80285
675 x 540	100	1	80286
550 x 430	190	1	80288

Drawer organiser, PVC

White. With 9 lengthwise compartments opening at the front. For vials with a diameter of 25 mm.

Size mm	Height mm	PU	Cat. No.
355 x 300	45	1	80952

Drawer organiser, PVC

White. With 12 compartments. Ideal for the orderly storage of small components. Stabilising circumferential edge.

Size mm	Height mm	PU	Cat. No.
410 x 300	65	1	80953

Drawer organiser, PVC

White. Compartments of 5 different sizes for pipettes, thermometers, connectors, etc. Stabilising circumferential edge.

Size mm	Height mm	PU	Cat. No.
410 x 300	70	1	80954

Bowls, PP

White. Round. With broad, stable edge and circumferential standing ring on the bottom.

Volume l	Height mm	Ø mm	PU	Cat. No.
1	70	160	5	42594
2	80	200	5	42694
3	100	240	5	42794
4	120	280	5	42894
7	130	320	3	42994
9	150	360	3	43094
13	180	400	3	43194

Mixing vessel, MF

White. Round. With spout and handle.
With slip-resistant, circumferential standing ring on the bottom for especially stable positioning.
Especially easy to clean due to the rounded corners and edges and the smooth surfaces.

Volume ml	Height mm	Ø mm	PU	Cat. No.
3000	140	220	1	73298

Bowl, PP, with lid **NEW**

White. Rectangular shape.
Broad, stable, easy to grip edge.
Especially easy to clean due to the rounded corners and edges and the smooth surfaces.

Volume l	L x W x H mm	PU	Cat. No.
17	430 x 331 x 195	1	43610

Transport containers, PE-HD

Transparent.
Easy stackable.
With reinforcing ribs and integrated carrying handles.
Broad, stable edge.

Volume l	L x W x H mm	PU	Cat. No.
20	380 x 280 x 200	1	80602
46	560 x 330 x 250	1	80603
72	660 x 400 x 300	1	80604

Buckets, PE-HD

White. Without spout. With division into 1 liter segments.
Stable handle with reinforcement in the middle for comfortable carrying.
Tightly closing, transparent lid made of PE-LD - please order separately.

Description	Volume l	Divisions l	Height mm	Ø mm	PU	Cat. No.
Buckets	5	1	240	250	1	96093
Buckets	10	1	300	290	1	96393
Lid	for 5 L				1	96293
Lid	for 10 L				1	96593

Buckets with spout, PP

Transparent. With division into 1 liter segments.
With stable handle and spout for easy emptying.
Highly resistant to chemicals.
Without lid.

Volume l	Divisions l	Height mm	Ø mm	PU	Cat. No.
12	1	330	310	1	96694
15	1	370	310	1	96794

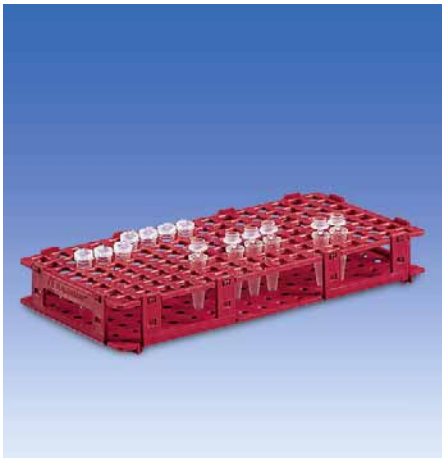
Microtube stands, PP

NEW

121°C

Opaque, gray. Numbered positions for 20 microtubes with volume of 1.5 ml.
For working with samples as well as short- and medium-term storage.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.

Positions	L x W x H mm	PU	Cat. No.
20	210 x 70 x 37	1	3190941



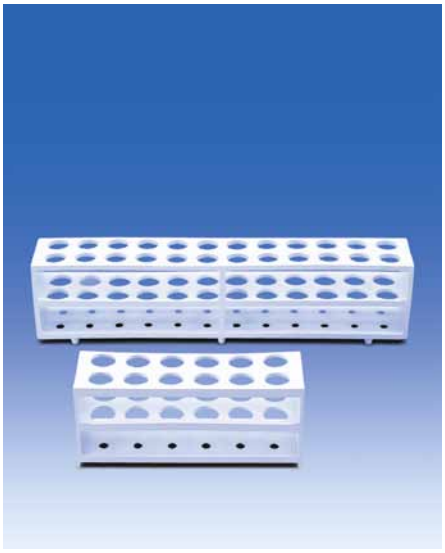
Microtube racks, coloured, PP

121°C

Stackable racks for micro- or cryotubes. Alphanumerically identified positions. Suitable for tempering in a water bath. The racks are supplied as folded out flat, and can be firmly and inseparably joined together in just a few steps. Working temperatures of -20 to +90 °C.
Autoclavable at 121 °C (2 bar) according to DIN EN 285. Base area: 265 x 126 mm.

For diameters up to mm	Positions	Colour	Height mm	PU	Cat. No.
11	8 x 16	White	38	5	3197940
13	6 x 14	White	38	5	3198940
11	8 x 16	Blue	38	5	3197948
13	6 x 14	Blue	38	5	3198948
11	8 x 16	Red	38	5	3197943
13	6 x 14	Red	38	5	3198943

Microtubes
can be found on page 90.



Reagent tube racks, PP

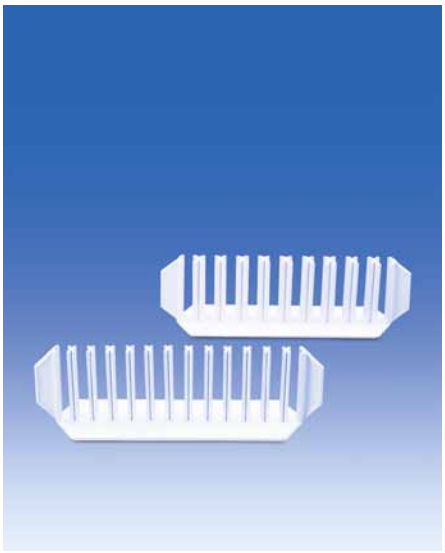
121°C

White. For reagent tubes with a diameter of 21 mm.
With three levels for precise, vertical positioning of the reagent tubes.

Working temperatures of -20 to +90 °C.
Autoclavable at 121 °C (2 bar) according to DIN EN 285.

For diameters up to mm	Positions	L x W x H mm	PU	Cat. No.
21	2 x 6	190 x 60 x 80	5	80560
21	2 x 12	375 x 65 x 85	5	80562

Reagent tube racks, PE

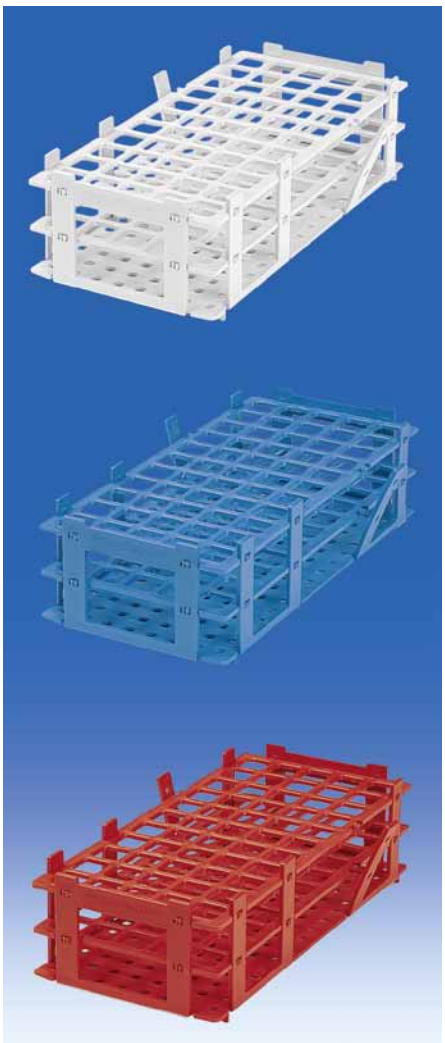


White. The special shape makes it possible to check the amounts present in the reagent tubes.
With two side-mounted handle straps.

For diameters up to mm	Positions	L x W x H mm	PU	Cat. No.
16	10	200 x 55 x 65	4	80130
18	9	200 x 55 x 65	4	80131

Test tube racks, coloured, PP

121°C



Stackable, simple, and small footprint. Alphanumerically identified positions. Suitable for tempering in a water bath as well as storage of samples in the refrigerator and incubation in a climate chamber. The racks are supplied as folded out flat, and can be firmly and inseparably joined together in just a few steps. Working temperatures of -20 to +90 °C. Autoclavable at 121 °C (2 bar) according to DIN EN 285. Base area: 265 x 126 mm.

For diameters up to mm	Positions	Height mm	Colour	PU	Cat. No.
13	6 x 14	75	White	5	3190940
16	5 x 11	75	White	5	3191940
18	5 x 11	75	White	5	3192940
20	4 x 10	75	White	5	3193940
25	4 x 8	88	White	5	3194940
30	3 x 7	88	White	5	3195940
13	6 x 14	75	Blue	5	3190948
16	5 x 11	75	Blue	5	3191948
18	5 x 11	75	Blue	5	3192948
20	4 x 10	75	Blue	5	3193948
25	4 x 8	88	Blue	5	3194948
30	3 x 7	88	Blue	5	3195948
13	6 x 14	75	Red	5	3190943
16	5 x 11	75	Red	5	3191943
18	5 x 11	75	Red	5	3192943
20	4 x 10	75	Red	5	3193943
25	4 x 8	88	Red	5	3194943
30	3 x 7	88	Red	5	3195943

Drying rack

Back plate and trough made from PVC with drainage nozzle.
With 75 metal pegs with PE coating for hanging various sizes of apparatus.
With two bore holes for simple wall mounting.
Delivered without installation hardware.

Size mm	PU	Cat. No.
450 x 630	1	76299

Drying rack, PS

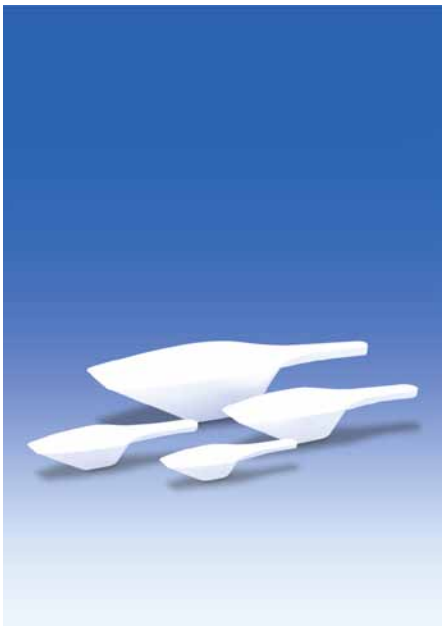
With wide draining trough and drainage nozzles.
Rack with 72 pegs 95 x 15 mm. For drying larger apparatus, some of the pegs can be removed and the bore holes closed at the rear.
Delivered complete with drainage tube and accessories for the wall installation.
In addition, 11 pegs (95 x 6 mm) are included for objects having a smaller diameter, such as reagent tubes.

Description	Size mm	PU	Cat. No.
Drying rack	450 x 630	1	80213
Pegs	95 x 6	11	81213

Competence in Plastic Labware

BOTTLING AND DECANTING

VITLAB®
Competence in Labware



Measuring scoops, PP

White. Also suitable as weighing scoops. With precision formed filling edge and comfortable, stable handle. Easily readable volume quantities on the upper side of the handle.

Volume ml	Length mm	PU	Cat. No.
2	60	12	39194
5	82	12	39294
10	100	12	39394
25	135	12	39494
50	160	12	39594
100	200	12	39694
250	260	6	39794
500	315	6	39894
1000	385	6	39994

Measuring scoops, coloured, PP **NEW**

Measuring scoops (size: 100 ml) in seven different colours. Also suitable as weighing scoops. With precision formed filling edge and comfortable, stable handle. Easily readable volume quantities on the upper side of the handle.

Volume ml	Colour	PU	Cat. No.
100	red	12	396940
100	gray	12	396943
100	black	12	396944
100	yellow	12	396946
100	blue	12	396950
100	green	12	396952
100	bright blue	12	396955

Scoops, PE-HD

Natural colouring. Conical in shape with tapered filling edge.

Volume ml	Length mm	PU	Cat. No.
15	115	12	40093
25	135	12	40193
65	185	12	40293
110	215	12	40393
150	250	12	40493
350	310	6	40593
750	350	6	40693
1250	400	6	40793

Funnels, PP

Transparent. Rapid flow due to a steep 60° angle.
Practical handle with loop for hanging.

Volume approx. ml	Ø mm	Length mm	Stem diameter mm	Stem length mm	PU	Cat. No.
5	30	45	1.5	25	24	40894
6	30	47	4	25	24	41094
14	40	65	4	35	24	41194
32	50	85	7	43	24	41294
88	75	110	6	55	12	41394
222	100	155	8	77	12	41494
342	120	180	11	90	12	41594
817	150	220	15	95	12	41694

Large funnels, PP

Transparent. Rapid flow due to a steep 60° angle. Practical handle for hanging. Suitable for filling large amounts of liquids.
Optional accessories available: Stainless steel and aluminium sieve insert; however, not permissible for use with foodstuffs.

Volume approx. ml	Ø mm	Length mm	Stem diameter mm	PU	Cat. No.
1300	200	200	22	6	41794
3200	250	260	30	6	41894
12500	350	440	35	1	41994
Sieve insert diameter: 50 mm, for funnels no. 41794, 41894				1	42099

Large funnels, PE-HD

Transparent. Rapid flow due to a steep 60° angle. Practical handle for hanging. Suitable for filling large amounts of liquids.

Volume approx. ml	Ø mm	Length mm	Stem diameter mm	PU	Cat. No.
12500	400	365	42	1	42294
17500	430	420	37	1	42393

Standard joint funnels, PP

Transparent. For multi-neck flasks, laterally flattened, suitable for standard joint necks of various sizes. Suitable for the filling of liquid or powdered reagents into a reaction flask, especially for loading of multi-neck flasks during a reaction.

NS	Length mm	Wide opening mm	Stem length mm	PU	Cat. No.
14/23	75	40	17	10	70494
19/26	95	50	23	10	70594
29/32	135	75	30	5	70694

Powder funnels, PP

Transparent. With short, wide stem. For transfer of powdered and granular substances. Rapid flow due to a steep 60° angle.

Ø mm	Length mm	Stem diameter mm	Stem length mm	PU	Cat. No.
65	68	15	25	10	70794
80	75	21	25	10	70894
100	94	22	20	10	70994
120	110	26	20	10	71094
150	138	28	22	5	71194

Funnel holders, PP

For one or two funnels with a diameter of 50-120 mm. With exchangeable insert for different funnel sizes, and a practical clamp for easy securing to a stand rod of diameter 8-14 mm.

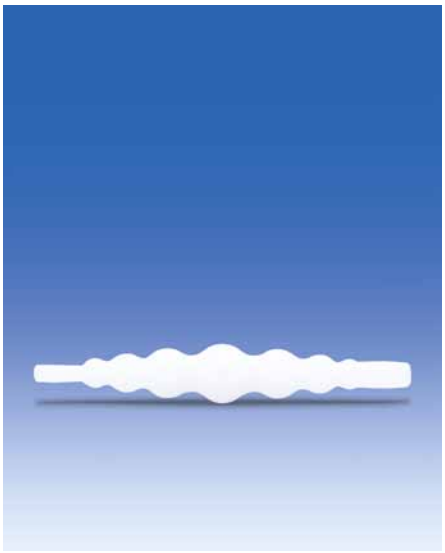
Positions	PU	Cat. No.
1	5	80268
2	5	80269

Chemical waste disposal system, PE/PP

For collection of liquid chemicals in the laboratory. The inlet hopper made from PE-HD contains a self-closing float, overfill protection, and a splash guard.

Volume l	Height mm	Ø mm	PU	Cat. No.
10	560	222	1	151594

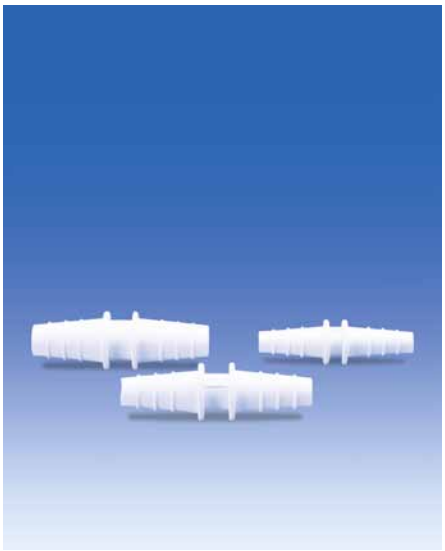
Urbanti, Büchner, and analytical funnels can be found on page 116.



Connectors, universal PP

Transparent. Due to its special shape, it can be used for a wide variety of different tubing inner diameters.

For tubing with an inner diameter of mm	PU	Cat. No.
5 - 15	10	78794



Connectors, straight, PP

Transparent. Conical shape to accept tubing of various inner diameters.

For tubing with an inner diameter of mm	Outlet opening diameter mm	PU	Cat. No.
3 - 5	2.0	20	80510
5 - 7	3.5	20	80511
7 - 10	4.5	20	80512
9 - 12	6.5	20	80513
11 - 14	8.5	20	80514
13 - 16	10.5	20	80515

Connectors, straight, PP

Conical shape, stepped. With different fitting diameters on the two sides to be able to connect with tubing having different diameters.

For tubing with an inner diameter of mm	Outlet opening diameter mm	PU	Cat. No.
4 - 8 / 8 - 12	1.6 / 4.6	20	80877
4 - 8 / 12 - 16	1.6 / 7.6	20	80878
8 - 12 / 12 - 16	4.6 / 7.5	20	80879

2-way connectors, PE-HD

For connecting tubing of varying diameters. The connectors can be joined together with the next size up. Not suitable for pressure applications!

For tubing with an inner diameter of mm	Outlet opening diameter mm	PU	Cat. No.
3 - 5	1.6	20	80434
5 - 7	2.7	20	80435
7 - 9	3.6	20	80436
9 - 12	5.5	20	80535
11 - 14	7.3	20	80536
13 - 16	8.8	20	80537

Connectors 90°, PP

121°C

For running tubing across edges and corners.

For tubing with an inner diameter of mm	Outlet opening diameter mm	PU	Cat. No.
3 - 4	1.3	20	81250
4 - 5	2.5	20	81251
6 - 7	4.5	20	81252
8 - 9	6.0	20	81253
10 - 11	6.0	20	81254
12 - 13	10.5	20	81255
14 - 15	11.6	20	81256

Connectors, T-shape, PP

121°C

For the splitting or combining of liquid lines in a tubing system.

For tubing with an inner diameter of mm	Outlet opening diameter mm	PU	Cat. No.
3	1.6	20	80459
4 - 5	3.7	20	80460
6 - 7	4.4	20	80461
8 - 9	6.3	20	80462
10 - 11	8.2	20	80463
12 - 13	10.0	20	80520
14 - 15	12.1	20	80521

Connectors, Y-shape, PP

121°C

For the splitting or combining of liquid lines in a tubing system.

For tubing with an inner diameter of mm	Outlet opening diameter mm	PU	Cat. No.
3	2.0	20	80464
4 - 5	2.7	20	80465
6 - 7	4.6	20	80466
8 - 9	5.5	20	80467
10 - 11	7.3	20	80468
12 - 13	9.7	20	80525
14 - 15	11.9	20	80526

Non-return valve, PE-HD

With valve disc made from FKM. Max. operating pressure 2 bar.

For tubing with an inner diameter of mm	PU	Cat. No.
6 - 9	10	78593

Non-return valves, PP

With valve discs made from nitrile rubber (NBR). Max. operating pressure 2 bar.

For tubing with an inner diameter of mm	PU	Cat. No.
8 - 10	10	80418
10 - 15	10	80419

Water flow stopcocks, PE

With reinforced handles and strong tubing fittings.
Suitable only for non-pressurised operation.

For tubing with an inner diameter of Inches/mm	PU	Cat. No.
1/2 / 12	10	75093
3/8 / 9	10	75193

2-way / 3-way valves, PE/PP

For connection to tubing. Usable as cut-off, 2-way, or 3-way stopcock.
Max. working pressure 1 bar.

Model	For tubing with an inner diameter of mm	PU	Cat. No.
2-way	5	1	137094
2-way	7	1	137294
2-way	9	1	137494
3-way	5	1	137194
3-way	7	1	137394
3-way	9	1	137594

Flow monitor, SAN

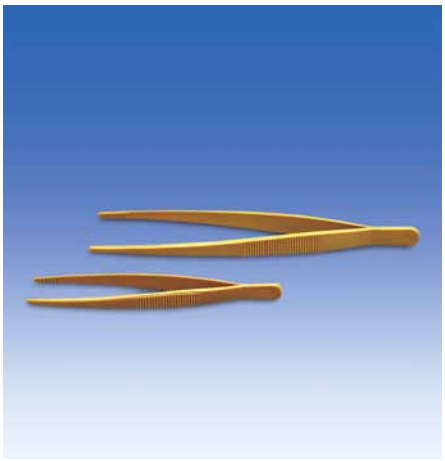
Crystal clear. The flow monitor provides a visual indication of the flow rate of liquids or gases through tubing. The impeller functions in both flow directions. For liquid flow rates from 150 ml/min. With compact dimensions (88 mm overall length including tubing fittings, 40 mm wide, and 15 mm deep), the flow monitor can also be installed in laboratory equipment and assemblies.

For tubing with an inner diameter of mm	PU	Cat. No.
6.5 - 11	10	138591

Spatula, PA

Glass-fibre reinforced. Double spatula or spatula spoon, with stable, easy to hold handle in the middle.

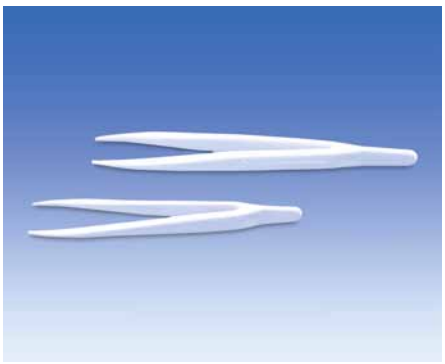
Description	Length mm	PU	Cat. No.
Double spatula	150	10	80594
Double spatula	180	10	80595
Spatula spoon	180	10	80596
Spatula spoon	210	10	80593



Forceps, POM

Yellow, blunt, elastic, very good resilience. With grooves on the outside for optimum handling and grip.

Length mm	PU	Cat. No.
115	5	68099
145	5	68199
180	5	68299
250	5	68399

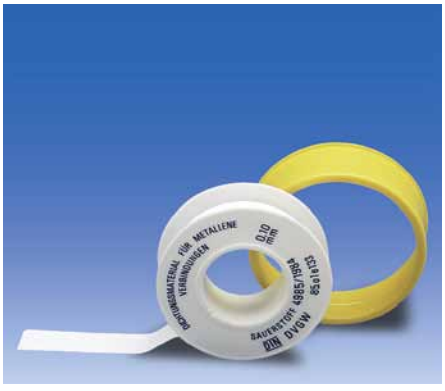


Forceps, PMP

121°C

White, pointed, elastic, very good resilience.

Length mm	PU	Cat. No.
115	10	67895
145	10	67995



PTFE-tape

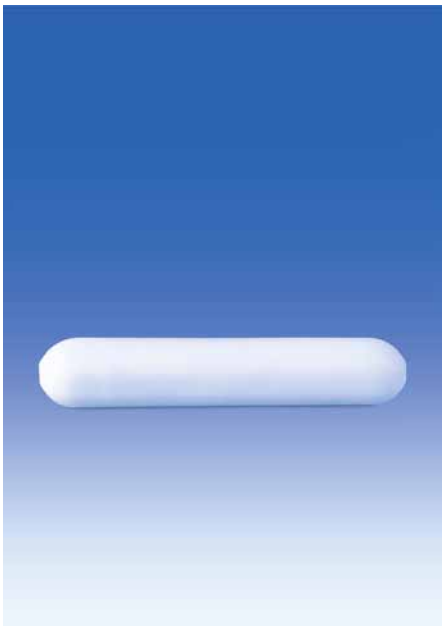
For sealing and wrapping of threads and other connections. High chemical resistance. Working temperatures up to 250 °C.

Length m	Width mm	PU	Cat. No.
12	12	10	131097

Competence in Plastic Labware

PREPARATION, SEPARATION, AND CONCENTRATION

VITLAB®
Competence in Labware



Magnetic stirring bars, polygonal, PTFE

121°C

With permanent magnet Alnico V core. The angled shape gives rise to significant turbulence, and thus achieves effective mixing, even at low spin rates.

Ø mm	Length mm	PU	Cat. No.
2	5	5	300497
2	7	5	300597
3	8	5	300897
3	10	5	301097
3	13	5	301197
4.5	12	10	301597
6	10	10	301697
6	15	10	301797
6	25	10	301997
6	30	10	302097
7	20	10	301897
7	50	10	302297
7	60	10	302397
8	40	10	302197
10	70	5	302497
10	80	5	302597
27	57	1	303097
27	108	1	303197
27	159	1	303297

Magnetic stirring bars, oval, PTFE

121°C

With permanent magnet Alnico V core. Highly suitable for vessels with a round bottom, such as round-bottom flasks. The angled side surfaces act to produce high turbulence, and thus achieve effective mixing.

Ø mm	Length mm	PU	Cat. No.
5	10	3	311097
6	15	3	311197
10	20	3	311297
12	25	3	311397
16	30	3	311497
16	35	3	311597
20	40	1	311697
20	50	1	311797
20	64	1	311897
20	70	1	311997

Magnetic stirring bars, octagonal, PTFE

121°C

With rings and permanent magnet Alnico V core. The eight-sided shape gives rise to significant turbulence, and thus achieves effective mixing, even at low spin rates.
The middle ring also promotes stable centering with convex or uneven bottoms.

Ø mm	Length mm	PU	Cat. No.
8	13	3	307697
8	15	3	307797
8	22	3	307897
8	25	3	307997
8	28	3	308097
8	38	3	308197
8	41	3	308297
8	51	3	308397
8	64	3	308497
10	13	3	308597
10	15	3	308697
10	22	3	308797
10	25	3	308897
10	35	3	308997
10	38	3	309097
10	48	3	309197
10	51	3	309297
10	64	3	309397
13	38	1	309497
13	75	1	309597

Magnetic stirring bars, cross shape, PTFE

121°C

With permanent magnet Alnico V core. The angled shape gives rise to significant turbulence, and thus achieves effective mixing, even at low spin rates.
The cross shape promotes very stable centering.

Size mm	Height mm	PU	Cat. No.
10 x 10	5	1	316097
20 x 20	8	1	316197
25 x 25	9	1	316297
30 x 30	10	1	316397
38 x 38	11	1	316497

Magnetic stirring bars, double spinfin, PTFE

121°C

With permanent magnet Alnico V core. For microtubes and reagent tubes. Effective mixing, even at low spin rates.

Ø mm	Height mm	PU	Cat. No.
14	10	1	314097
17	13	1	314197
22	15	1	314297

Magnetic stirring bars, triangular, PTFE

121°C

With permanent magnet Alnico V core. The angled shape gives rise to significant turbulence, and thus achieves effective mixing, even at low spin rates.

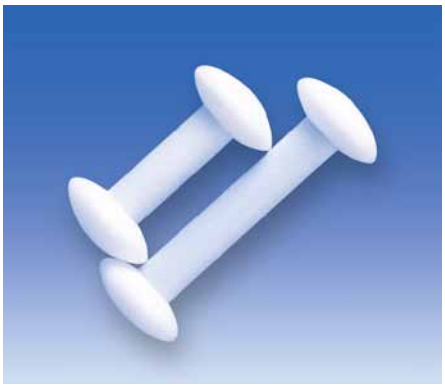
Edges mm	Length mm	PU	Cat. No.
6	12	3	310197
8	25	3	310297
14	40	3	310397
12	50	3	310497

Magnetic stirring bars, single spin fin, PTFE

121°C

With permanent magnet Alnico V core. With a diameter of only 9 mm, ideal for use in cuvettes and reagent tubes. Easily centered.

Ø mm	Height mm	PU	Cat. No.
9	6	1	317297



Magnetic stirring bars, barbell, PTFE

121°C

With permanent magnet Alnico V core. Excellent centering due to the small contact surface, and effective mixing. Disk diameter: 20-mm; shaft diameter: 8-mm.

Length mm	PU	Cat. No.
35	3	3125970
55	3	3126970

Magnetic stirring bar retrievers, PE

With a permanent magnet on one end and holding ring on the other one.
Magnet is completely encapsulated in a PE mantle.

Length mm	PU	Cat. No.
300	1	318293
450	1	318393

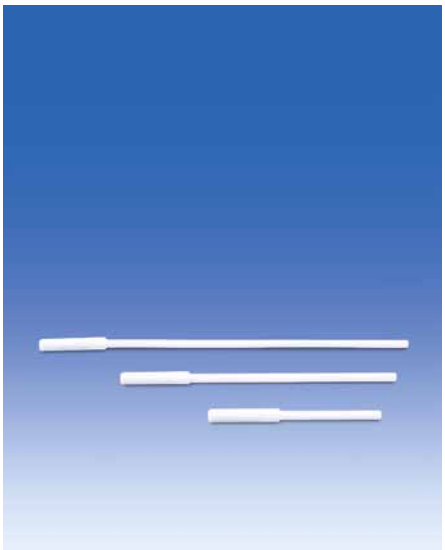
Magnetic stirring bar retrievers, flexible, PTFE

Flexible magnetic stir bar retriever with a total length of 330 mm. Magnet encapsulated. Ø x L 12.5 x 51 mm. Due to the high flexibility, the magnet stir bar can be retrieved from inaccessible locations, e.g., from the water trap in a laboratory sink.
High chemical resistance, simple to clean.

Length mm	PU	Cat. No.
330	1	318597

Magnetic stirring bar retrievers, PTFE

With PTFE encapsulated magnetic core. Straight shape. High chemical resistance, simple to clean.

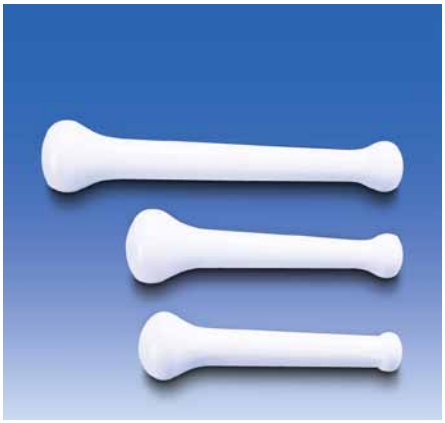


Length mm	PU	Cat. No.
150	1	122097
250	1	122197
350	1	122297

Mortars, MF

White, with spout. Stable circumferential edge. Very stable.

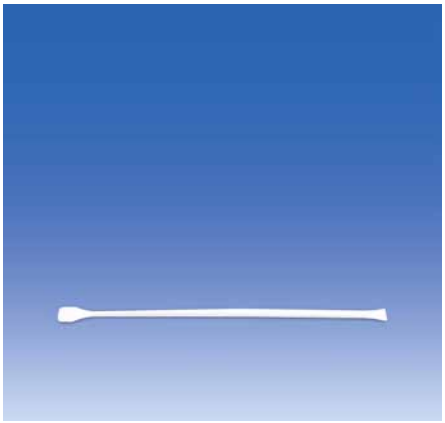
Volume ml	Height mm	Ø mm	PU	Cat. No.
300	75	125	5	72898
500	90	150	5	72998



Pestles, MF

White, heavy design. with ergonomically shaped grip.

Length mm	Head diam-eter mm	Weight g	PU	Cat. No.
125	30	55	5	73498
145	35	85	5	73598
160	40	120	5	73698
215	42	175	1	73898

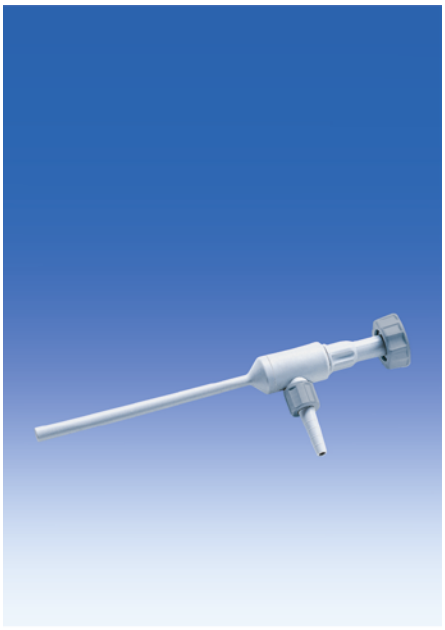


Stirring rod, PP

Spatula-shaped extension for effective manual stirring of small volumes.

Length mm	PU	Cat. No.
245	10	80828

Water-jet pump, PP



For generation of a vacuum and to siphon off liquids and vapours (if necessary, with a suction main or condensation trap connected upstream).
Pump fluid: Water
Length of the unit: approx. 210 mm (R 3/4“ connector fitted)
Weight: approx. 33 g (R 3/4“ connector fitted)

- High chemical resistance, since the pumped media only come into contact with polypropylene, FKM and PTFE.
- Operating temperature up to a maximum of 80 C°.
- Integrated non-return valve increases operating safety.
- Simple operation, and easy to clean.
- Detachable vacuum connection.
- Variety of supplied adapters simplify connections to most water sources, and additional reducing adapters are available.

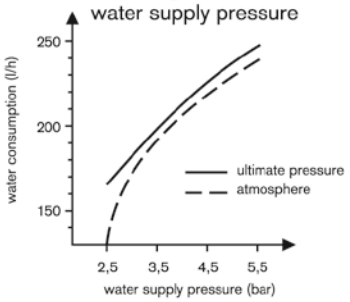
Very low water consumption:
The flow configuration has been optimised, resulting in a 33% reduction of water consumption (190 liters/h at 3.5 bar water supply pressure).

Constant discharge pressure:
The discharge pressure of 16 mbar (water temperature: 12 °C) is reachable across a wide range of water supply pressures of from 3 to 6 bar.

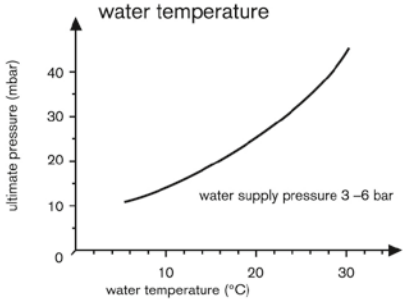
High suction capacity:
The suction capacity is approx. 400 L/hour of air (vs. atmospheric pressure, 12 °C water temperature, 3.5 bar water supply pressure).

Included in delivery:
Water jet pump, including: water supply connection (lock nut R ¾”, reducing adapter R ½” and hose connection (olive) with outer diameter 10-12 mm), vacuum connection (olive with outer diameter 6-9 mm, detachable with GL 14 screw cap).

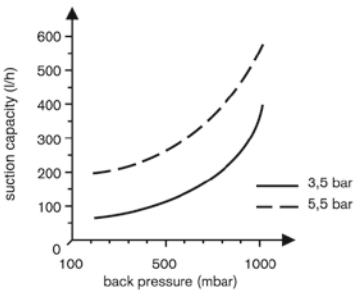
Water consumption as function of water supply pressure



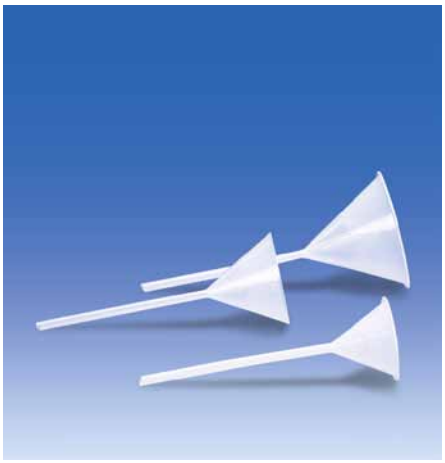
Ultimate pressure as function of water temperature



Pumping capacity as function of back pressure



Description	PU	Cat. No.
Water-jet pump	1	77094
Accessories:		
Reducing adapter R3/4 inch to R3/8 inch	1	159665
Reducing adapter R3/4 inch to M 22x1, Perlator thread	1	159670



Analytical funnels, PP

Transparent. With long stem and grooves. Rigidified by a thickened edge.
Rapid flow due to a steep 60° angle.

Volume approx. ml	Ø mm	Length mm	Stem diameter mm	Stem length mm	PU	Cat. No.
50	50	194	5	150	10	80162
100	72	208	5	143	10	80164
225	91	227	5	145	10	80165

Urbanti funnels, PMP

Crystal clear. The spiral-shaped ribs increase the rate of filtration and prevent the trapping of air between the filter paper and the funnel. With long stem.

Volume approx. ml	Ø mm	Length mm	Stem diameter mm	Stem length mm	PU	Cat. No.
30	51	195	3	150	6	325095
80	70	210	3	150	6	325195
250	100	198	7	108	4	325295
630	140	247	10	132	3	325395
1800	196	315	20	155	2	325495

Büchner funnels, PP

Three parts. Upper and lower parts are detachable to facilitate cleaning.

Volume approx. ml	Filter diameter mm	Length mm	Hole diameter mm	PU	Cat. No.
40	42.5	95	1.2	1	80437
70	55	113	1.1	1	80438
180	70	145	2.0	1	80439
280	80	165	2.0	1	80440
390	90	180	2.5	1	80441
810	110	210	2.5	1	80442
2100	160	280	2.75	1	80443
6000	240	350	3.0	1	80445

Filtering racks

Funnel holder with base and adjustable height, made from PP, support stand made from aluminium, diameter: 12.7 mm; and, length: 595 mm. To hold from two to four funnels with an upper outer diameter of 50-120 mm.

Positions	Base plate mm	PU	Cat. No.
2	250 x 140	1	78394
4	450 x 140	1	78294

Additional funnels
can be found on pages 102-103.

Support for separatory funnels, PP

For separatory funnels of from 125-500 ml. With practical clamps for simple attachment to stand rods with diameters of 8-14 mm.

Positions	PU	Cat. No.
1	5	80970

Imhoff or sedimentation cone, SAN

According to DIN 12 672. Crystal clear, with raised scale for precise reading of volumes.
For simple, basic cleaning and rinsing, the screw coupling on the tip can be removed.
Lower breakage risk than for PC or glass containers.
For determination of suspended matter in liquids (e.g., for industrial and municipal wastewater).

Graduation:

0 -	2 ml	=	0.1 ml
2 -	10 ml	=	0.5 ml
10 -	40 ml	=	1 ml
40 -	100 ml	=	2 ml
100 -	1000 ml	=	50 ml

Volume ml	PU	Cat. No.
1000	3	75991

Sedimentation rack, PMMA

Holds two Imhoff sedimentation cones. Base plate with depression for exact vertical positioning of the sedimentation cone.

L x W x H mm	PU	Cat. No.
150 x 300 x 290	1	81056

Round-bottom flasks, PFA

Transparent, neck with NS 29/32. Can be used as a safety flask with a rotary evaporator. High thermal stability and chemical resistance.

The advantages of PFA

- Especially suitable for use in trace analysis
- Long-term maintenance of low-concentration reference materials in PFA containers
- No memory effects
- Practically no carryover, no cross-contamination due to the extremely hydrophobic, anti-adhesive and smooth surfaces
- High thermal stability, from -200 °C to +260 °C, autoclavable.
- Chemical inertness against nearly all chemicals
- Good transparency and dimensional stability
- Easy to clean
- Use of high purity raw materials

Further information on PFA can be found starting on page 132.

Volume ml	Height mm	Ø mm	PU	Cat. No.
100	117	65	1	107797
250	147	88	1	107897
500	177	107	1	107997

Round-bottom flask stand, PP

White, for flasks with a round bottom. Excellent chemical resistance. Autoclavable at 121 °C (2 bar) according to DIN EN 285.

Ø mm	PU	Cat. No.
160	5	80271

Gas wash bottles, PFA

Cap with S 40 buttress threads, and frit made of PTFE. A pore size of approx. 50 µm for optimal optimal pearling of the gas into the liquid. A wide field of application is possible due to the use of high-quality fluoroplastic. Suitable only for non-pressurised operation.

The advantages of PFA

- Especially suitable for use in trace analysis
- Long-term maintenance of low-concentration reference materials in PFA containers
- No memory effects
- Practically no carryover, no cross-contamination due to the extremely hydrophobic, anti-adhesive and smooth surfaces
- High thermal stability, from -200 °C to +260 °C, autoclavable
- Chemical inertness against nearly all chemicals
- Good transparency and dimensional stability
- Easy to clean
- Use of high purity raw materials

Further information on PFA can be found starting on page 132.

Volume ml	Height mm	Ø mm	Hose connection inner / outer diameter mm	PU	Cat. No.
250	160	61	4 / 6	1	159497
500	190	76	4 / 6	1	159597
1000	240	96	5 / 8	1	159697

Desiccators with stopcock, PC

Crystal clear, with stopcock for evacuation. Lower sections can be filled with desiccants. The materials to be dried are placed on a perforated disc made of PP.
Lid is sealed by a neoprene gasket. Ideal for use in educational laboratories.

Ø mm	Disc diameter mm	PU	Cat. No.
171	140	1	326496
230	190	1	326596
273	230	1	326696

Desiccators, PP/PC

Lower portion made from PP can be filled with desiccants. The materials to be dried are placed on a perforated disc made of PP. The lid made from PC is sealed with a neoprene gasket. Ideal for use in educational laboratories.

Ø mm	Disc diameter mm	PU	Cat. No.
171	140	1	326094
230	190	1	326194
273	230	1	326294

Desiccators with stopcock, PP/PC

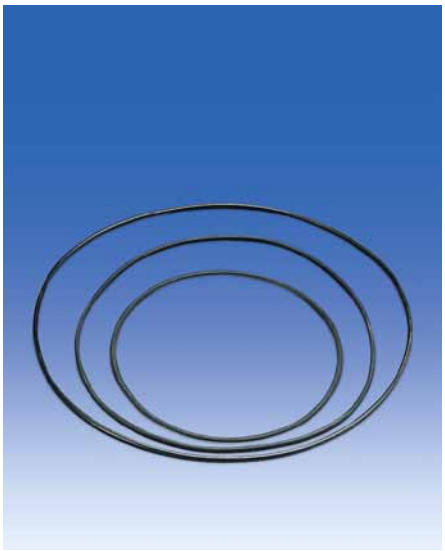
With a bleed valve and an O-ring seal between the dome and the lower portion.
The desiccators are suitable for vacuum and are provided with a non-return valve.
Hot crucibles should only be placed on a porcelain plate, and should not come into too close contact with the rim of the desiccator. The insert made of PP serves to hold the drying agent. Desiccator plates should be purchased separately.

Ø mm	PU	Cat. No.
150	1	80550
200	1	80230
250	1	80554

Desiccator plates, PP and porcelain

PP plate, usable up to a max. of 120 °C. Porcelain plates are suitable for hot objects.

Material	For desiccator diameter mm	Ø mm	PU	Cat. No.
PP	150	141	1	80551
PP	200	190	1	80231
PP	250	239	1	80553
Porcelain	150	140	1	65965
Porcelain	200	190	1	65975
Porcelain	250	240	1	65980



Replacement parts for desiccators

Replacement O-rings and valves for desiccators (cat. nos. 80550, 80230, 80554).

Description	PU	Cat. No.
O-ring for desiccator no. 80550	1	80555
O-ring for desiccator no. 80230	1	80556
O-ring for desiccator no. 80554	1	80557
Valve, PC, for desiccator nos. 80550, 80230 and 80554	1	80229

Slide storage boxes, PS

With lid. For 25, 50 or 100 slides, 76 x 26 mm. Handy, stackable, break resistant, easy to clean. The positions are numbered individually. With an index card.

Positions	L x W x H mm	PU	Cat. No.
25	122 x 96 x 34	4	80276
50	229 x 96 x 34	1	80277
100	229 x 181 x 34	1	80278

Staining chamber for slides, POM

Consists of staining jar and a staining rack for 25 slides 76 x 26 mm.

L x W x H mm	PU	Cat. No.
100 x 87 x 51	5	99099

Staining rack for slides, POM

For serial staining of 25 slides 76 x 26 mm.
Usable in the staining jar, cat. no. 99199. (see below).

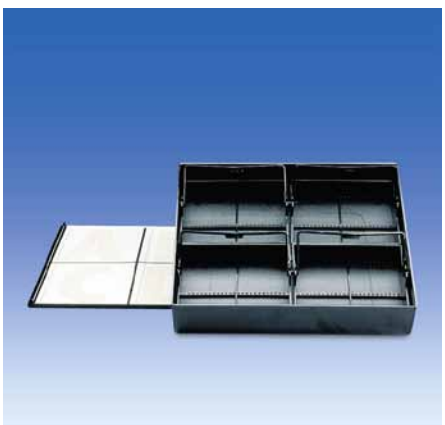
L x W x H mm	PU	Cat. No.
91 x 79 x 38	10	99299

Staining jar for slides, POM

For combination with staining rack, cat. no. 99299 (see above).
Can also be used as a storage box for 25 slides.

L x W x H mm	PU	Cat. No.
100 x 87 x 51	5	99199

Storage boxes for slides, stackable, PS



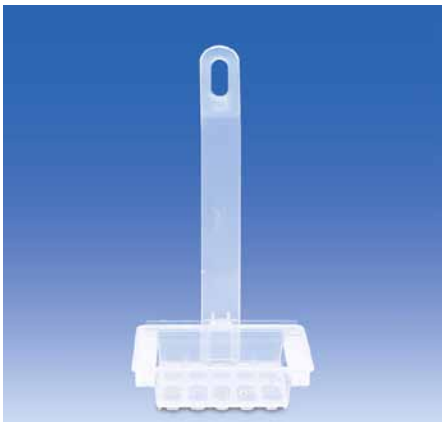
Storage box for four staining racks, each with 25 slides.
Optionally available with or without staining racks.

Description	L x W x H mm	PU	Cat. No.
With 4 staining racks	192 x 169 x 39	3	99390
Without staining racks	192 x 169 x 39	3	99490

Staining jar, PMP

Crystal clear. For the staining of slides in combination with the staining insert, PP (cat. no. 80354). With 2 lids: one lid to reduce evaporation of the liquid when not in use, the other with a small opening for introducing the staining insert during staining.

L x W x H mm	PU	Cat. No.
103 x 82 x 70	4	80353



Staining insert, PP

With handle. For the staining of up to 20 slides, 76 x 26 mm.
Fits in the staining jar, cat. no. 80353.

L x W x H mm	PU	Cat. No.
86 x 70 x 21	2	80354

'Hellendahl' staining chamber, PMP

Crystal clear. With lid. Holds 8 slides, or 16 slides stacked back to back, 76 x 26 mm.

L x W x H mm	PU	Cat. No.
58 x 53.5 x 86	4	80355

Coplin staining chamber, PP

With screw top. For serial staining of 10 slides 76 x 26 mm.

Height mm	Screw cap outer diameter mm	Inner diameter mm	PU	Cat. No.
94	50	34	10	136693

Cuvettes, PS and PMMA

Standard single-use cuvettes are ideal for kinetics measurements, and are supplied in clear, reclosable packaging.

- Cluster number sorting
- Slight deviations in the extinction coefficients
- Optically perfect transmission range
- Recessed window to protect against scratching
- Arrow indicates the direction of radiation

Size:

Cuvette:	12.5 x 12.5 x 45 mm
Window: Macro cuvette	10 x 35 mm
Window: Semi-micro cuvette	4.5 x 23 mm
Layer thickness:	10 mm

Cuvettes made from polystyrene (PS)

Typical range of application	> 340 nm
Standard deviations at 360 nm	Extinction coefficient of 0.005

Cuvettes made from poly(methyl methacrylate) (PMMA)

Typical range of application	> 300 nm
Standard deviations at 320 nm	Extinction coefficient of 0.004

Description	Fill volume ml	PU	Cat. No.
Macro cuvette, PS	2.5 - 4.5	1000	146190
Semi-micro cuvette, PS	1.5 - 3.0	1000	146290
Macro cuvette, PMMA	2.5 - 4.5	1000	146399
Semi-micro cuvette, PMMA	1.5 - 3.0	1000	146499

Cuvette stand, PP

121°C

Opaque, gray. Numbered positions for 16 (standard) cuvettes with 10 mm layer thickness. Autoclavable at 121 °C (2 bar) according to DIN EN 285.

Positions	L x W x H mm	PU	Cat. No.
16	210 x 70 x 38	1	146099

VITLAB® Promotional

ADVERTISE WITH YOUR GOOD NAME

VITLAB®
Competence in Labware

Your good name in daily use

Precision is usually of great significance when it comes to ensuring the effective use of granulates, powders or liquids. The transportation, storage and decanting of small volumes often require special containers. VITLAB is one of the leading manufacturers of high-grade plastic labware and specializes in high-precision printing on plastic products with superior chemical and break resistance.

This offers a great advantage: by having your name and logo printed on these products, you will work "hand in hand" with your clients and always maintain a high presence. The products can be used wherever people work with granulates, powders or liquids; for example, in agriculture, laboratories, the medical sector, the food industry and the cleaning business, as well as when using colours and chemicals.

Plastic labware by VITLAB guarantees that you have the best manufacturing quality and optimal functionality associated with your good name, thus ensuring a sustained positive echo.

A positive echo through individuality

VITLAB develops and manufactures its products at its own production facilities. This allows us to produce and print plastic labware according to your individual requirements and specifications. Please do not hesitate to inform us of your wishes and we will let you know what sort of individual solution we can provide for you.

When it comes to precision and accuracy

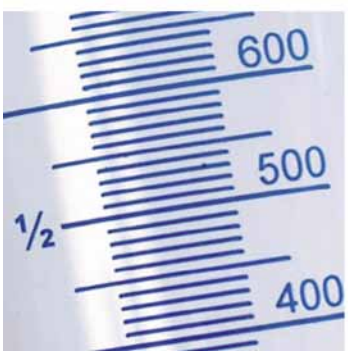
Volumetric containers by VITLAB stand out due to the greater precision and accuracy ensured by the measuring scale. On request, VITLAB can also print a customized scale on your product. The quality colours guarantee that the scale remains readable and does not wear off.

Small gifts keep the friendship alive

Plastic products have a high level of usability and are ideally suited as advertising articles or for promotional campaigns for your products. You can have your company name and logo or other motifs printed on them permanently and thus advertise with your good name.

A unique position thanks to an unmistakable design

VITLAB provides advertising materials of the very highest quality with round, conical or flat printing, using screen or pad printing systems and with particularly durable and luminescent colours according to the Pantone and HKS colour table. Various marking techniques, such as laser printing and heat embossing, provide you with an unmistakable design.



Would you like to have more information?

Please do not hesitate to contact us!

Please do not hesitate to contact us for advice on the selection, design and colour of your plastic products. A personal consultant ensures that you receive competent advice from the first meeting to the delivery of the product.

Our contact information:

Tel: +49 (0) 6026 977 99-0

Fax: +49 (0) 6026 977 99 -30

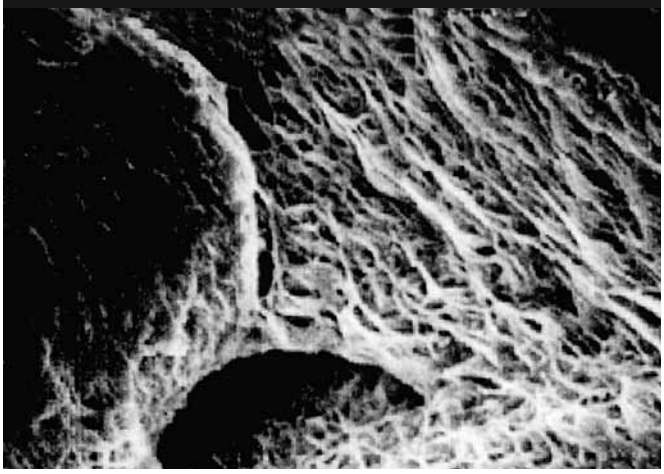
E-mail: info@vitlab.de

www.vitlab.de

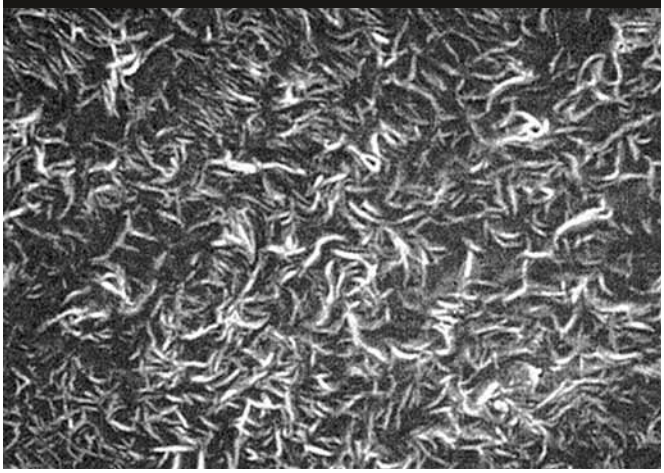
Technical information

PFA evaporating dish

PTFE beaker



PE-HD bottle



Pictures of the surface structure of PTFE, PFA, and PE-HD
with a scanning electron microscope (8000 times magnification).

Fluoroplastic PFA

Today, trace analysis operates with concentrations in the range of ng/g (ppb) and pg/g (ppt). Thus, all modern processes require a corresponding trace analytical laboratory hygiene. However, the analytical accuracy of the measurement depends not only on the accuracy of the analytical instrument, but also directly on the judicious selection of container materials and the preparation of the samples themselves. Under these conditions, the fluoroplastic PFA truly shows its worth.

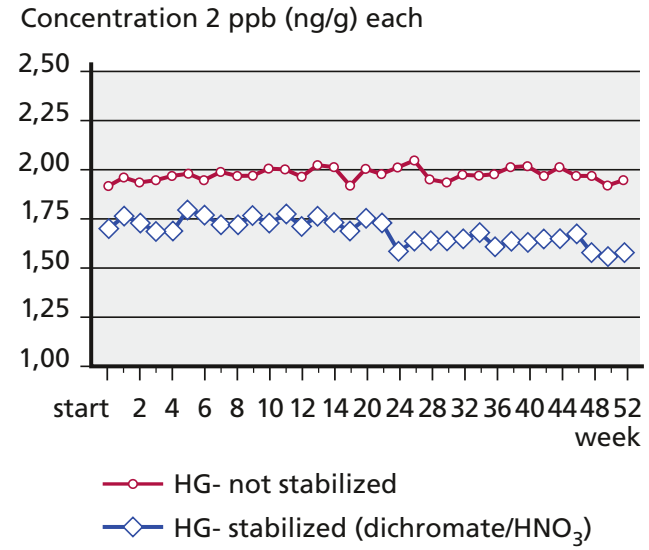
Labware made from polyolefins, such as polypropylene (PP) or polyethylene (PE), has found broad application in modern laboratories. Since catalysts (e.g., Ziegler-Natta or Philipps) are used during the manufacturing process, the constituent elements (frequently Al, Cr, Mg, Si, Ti or Zn) can still be detected in the ultra-trace range, and thus might affect the analysis results. In direct comparison to these manufacturing processes, PFA is especially suitable for trace element analysis because it is manufactured without the use of additives, and therefore cannot become contaminated by the additive components.

In addition to this advantage, PFA has other remarkable properties. PFA can be used for a broad range of applications by virtue of its resistance to almost all organic and inorganic compounds. PFA is one of the most resistant materials after platinum, and is practically chemically inert. Moreover, PFA stands apart with extraordinarily high thermal stability, making it possible to operate in the temperature range of -200 to +260 °C.

For all PFA products, VITLAB uses only high-purity PFA, which is particularly well-suited for trace analysis. For less critical uses, e.g. if the main requirement is a high chemical resistance, VITLAB offers bottles of "economy grade" PFA, which are partly made of recycled PFA. These are favourably priced and also environmentally friendly.

VITLAB's PFA vessels have unique, extremely smooth, liquid-repellent surfaces that are made possible through modern manufacturing processes and acknowledged expertise (see pictures on "Surface Structure"). This is especially significant in the illustrative comparison. The pictures taken in a scanning electron microscope show uneven and irregular surfaces for PE-HD and PTFE, and deep pores and concavities can be identified in the PTFE surface. In contrast to the uneven surfaces, PFA evaporating dishes had to be marked (X) and exhibit a completely smooth, even and uniform surface structure.

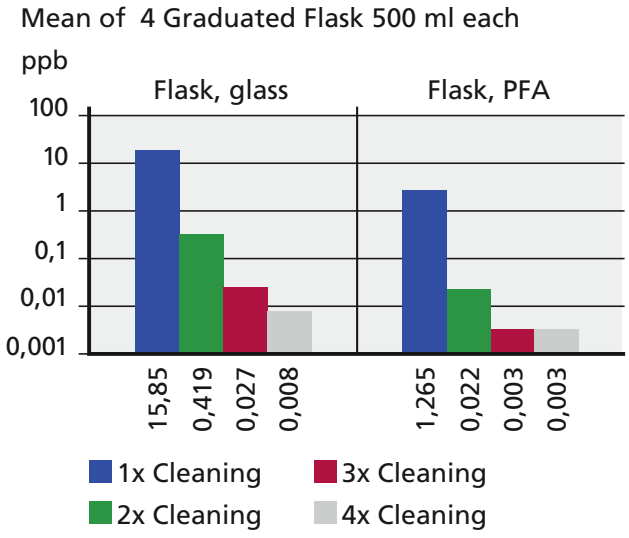
Due to this characteristic, all PFA labware is particularly easy to clean and presents hardly any interactions with samples as compared to conventional container materials. With these advantages combined with the minimal water absorption by PFA (< 0.03%), even samples at very low concentration can be stored for long periods of time in PFA containers without changes in their concentration (see the application example on Mercury Standards).



Application Example - Mercury Standards: Storage of an Hg standard in high-purity PFA containers (concentration 2 ppb (ng/g) each).
Source: GIT Laboratory Trade Magazine 1/95

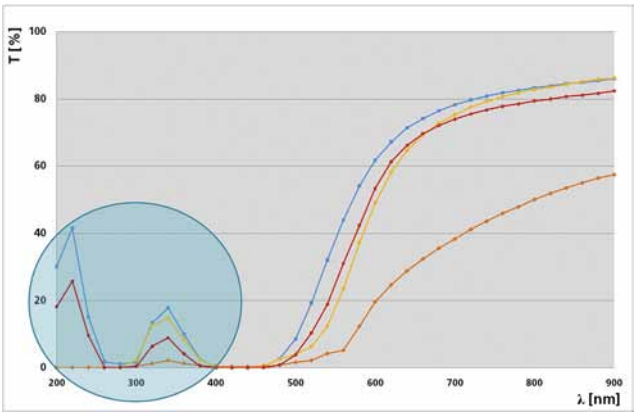
Cleaning after contamination

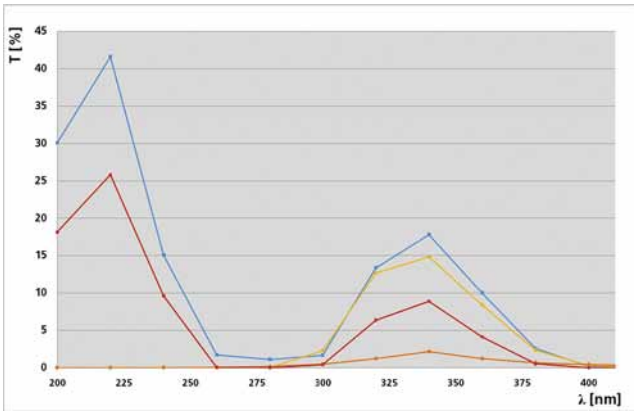
The valuable properties of PFA, primarily the near absence of memory effects, ensure the reliability of trace analytical results. In comparison with a commercially available glass flask, the simple cleaning after contamination with lead (Pb) solution at a concentration of 1000 ppb (ng/g) is a telling example (see the section on Cleaning of Volumetric Flasks). The cleaning of the glass and PFA volumetric flasks was conducted by shaking with 65% HNO_3 *Suprapur® (Pb < 0.005 ppm) at room temperature. With PFA volumetric flasks, the minimum concentration of 0.003 ppb is reached after three rinses, while substantially higher lead concentrations can be measured in glass flasks even after four rinses. The experiment also shows that PFA labware does not require the usual time-consuming boiling.



Cleaning of glass and PFA volumetric flasks after contamination.
Source: Kali-Forschungsinstitut, K. Mangold

*Suprapur® is a trademark of Merck KGaA.





Light transmission diagram: Comparison of results for the measurement of transmission (T%) between VITLAB® opaque and brown glass in volumetric flasks and bottles, in the wavelength range of λ = 200 to 900 nm. VITLAB® opaque provides better protection of the container contents from the effects of light, particularly in the UV range (see diagram below).

- Brown glass volumetric flasks
- Brown glass bottle
- VITLAB® opaque bottle
- VITLAB® opaque volumetric flask

VITLAB® opaque

Greater protection for light-sensitive substances.

Light-sensitive substances require protection from the effects of light and particularly UV light so that they have a longer usable lifetime. In 2008, VITLAB manufactured the world's first opaque volumetric flasks developed from specially pigmented plastic. The special pigments safely protect samples from the effects of light, while still maintaining high transparency to enable volumes to be set accurately.

The opaque volumetric flasks and reagent bottles safeguard the contained substances with a light protection factor of virtually 20. The absorption spectrum properties exhibited by the products are significantly better over the entire spectral range of 200 - 900 nm versus comparable brown glass products. VITLAB® opaque reagent bottles are especially effective below 560 nm. They have a maximum of 5% transmission at 560 nm, and less than 2.5% transmission measurable at or below 520 nm. The pigments in the opaque products exhibit a brilliant characteristic shine in the UV range starting at 400 nm.

In the UV range from 280 nm and in the upper visible range from 580 nm, VITLAB® opaque reagent bottles and volumetric flasks are thus significantly better than even high-quality brown glass containers. The differences between reagent bottles made of VITLAB® opaque and those of brown glass bottles can be more or less pronounced depending on the type of the glass, since the brown glass bottles are subjected to significantly greater production fluctuations.

The higher break resistance and lower weight are advantageous during daily use in the laboratory, and make VITLAB® opaque an attractive alternative to conventional volumetric flasks and reagent bottles made of brown glass.

Classification and type description of plastics

In general, plastics can be divided into the three groups. The abbreviations of the described plastics used are those according to DIN 7728.

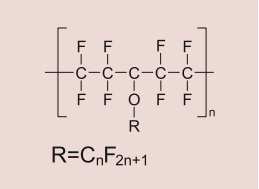
Thermoplastics

Plastics with a linear molecular structure, with or without side chains, can be reversibly moulded through heat treatment without changing their thermoplastic properties. Thermoplastics are frequently used in the production of plastic labware. Hence we provide here a brief description of some of the more important plastics, and explain their molecular structure, as well as their mechanical, chemical and physical properties. The most frequently used thermoplastics are polyolefins, such as polyethylene and polypropylene.

PFA (perfluoroalkoxy copolymer)

121°C

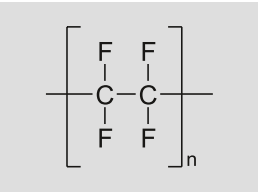
- Highly transparent, elastic thermoplastic with high-molecular, semi-crystalline structure
- Very good temperature stability
- Broad range of application, from -200 °C to +260 °C
- Virtually chemically inert, excellent chemical stability against practically all chemicals
- Very low water absorption (< 0.03%)
- Ultra-smooth, anti-adhesive surface with unique surface structure
- Typical products are, for example: Class A volumetric flasks, bottles, sample containers
  ➡ Especially suitable for use in trace analysis, and for the storage of low-concentration solutions



PTFE Polytetrafluoroethylene

121°C

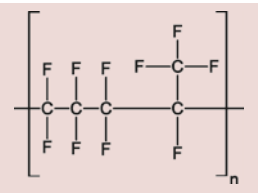
- Non-transparent, white, elastic thermoplastic with high-molecular, semi-crystalline structure
- Very good temperature stability
- Broad range of application, from -200 °C to +260 °C
- Virtually chemically inert, excellent chemical stability against practically all chemicals
- Anti-adhesive surface
- Very good sliding properties and electrical insulating capability (very low friction coefficient)
- Typical products are, for example: Bottles, beakers, sheathing for magnetic stir bars



FEP Tetrafluoroethylene-perfluoropropylene copolymer

121°C

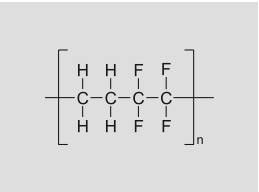
- Translucent, white, thermoplastic copolymer with high-molecular, semi-crystalline structure
- Anti-adhesive surface
- Very good temperature stability
- Broad range of application, from -100 °C to +205 °C
- Excellent chemical stability



ETFE Ethylene-tetrafluoroethylene copolymer

121°C

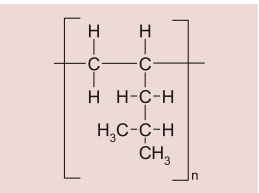
- Translucent, white copolymer from ethylene and tetrafluoroethylene
- Very good temperature stability
- Broad range of application, from -100 °C to +150 °C
- Very good chemical stability
- Typical products are, for example: Thread adapters, Griffin beakers, threaded connectors



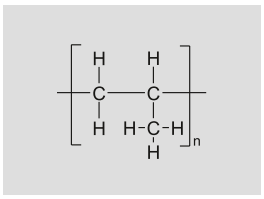
PMP Polymethylpentene

121°C

- Crystal-clear, stiff thermoplastic
- Similar structure to PP, with the methyl group replaced by an isobutyl group
- Good thermal stability
- Range of application from 0 to +150 °C
- Good tensile strength and dimensional stability
- Good chemical stability
- Typical products are, for example: Class A volumetric flasks, Class A measuring cylinders
  ➡ For the storage of light-sensitive substances, also available in highly transparent, UV-absorbing VITLAB® opaque



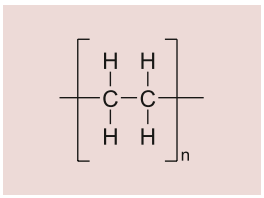
Classification and type description of plastics



PP Polypropylene

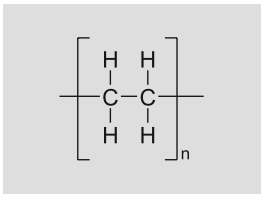
121°C

- Highly transparent, elastic thermoplastic
- Similar structure to PE, with a methyl group attached to alternate carbon atoms in an isotactic arrangement
- Good thermal stability
- Range of application from 0 °C to +125 °C
- Good tensile strength and dimensional stability
- Good chemical stability, comparable to PE
- Typical products are, for example: Class B volumetric flasks, Class B measuring cylinders, measuring pitchers, sample containers, funnels
  - ➡ For the storage of light-sensitive substances, also available in highly transparent, UV-absorbing VITLAB® opaque



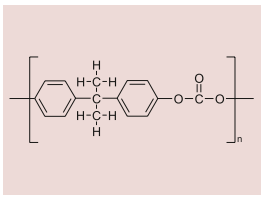
PE-HD High-density polyethylene

- Transparent, elastic thermoplastic
- Good thermal stability
- Range of application from -50 °C to +105 °C
- Compact, with increased tensile strength due to less cross-linking compared with PE-LD
- Good chemical stability
- Better chemical stability to organic solvents compared to PE-LD
- Typical products are, for example: Bottles, buckets, scoops
  - ➡ For the storage of light-sensitive materials, also available in brown-dyed version



PE-LD Low-density polyethylene

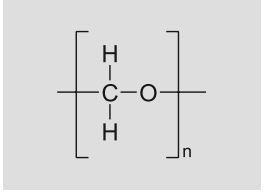
- Highly transparent, elastic thermoplastic
- Moderate thermal stability
- Range of application from -50 °C to +80 °C
- Very good flexibility
- Good chemical stability
- Typical products are, for example: Wash bottles, dropping pipettes



PC Polycarbonate

121°C

- Transparent, stiff thermoplastic
- Linear polymer of carbon dioxide
- Very good temperature stability
- Broad range of application, from -130 °C to +125 °C
- Good tensile strength and impact resistance
- Moderate chemical stability
- Typical products are, for example: Desiccators
- Note: Polycarbonates can lose their tensile strength through autoclaving or exposure to alkaline detergents



POM Polyoxymethylene

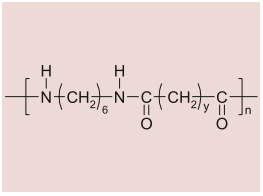
121°C

- Non-transparent, white, stiff, and high-molecular thermoplastic
- Good thermal stability
- Broad range of application, from -40 °C to +130 °C
- High hardness and dimensional stability
- Good sliding properties and abrasion resistance
- Good chemical resistance to aliphatic, aromatic, and halogenated hydrocarbons, and alkalis. Unstable to acids and esters
- Typical products are, for example: Slide boxes, staining jars
  - ➡ Especially good chemical stability to organic solvents
  - ➡ POM can replace metal in many applications

Classification and type description of plastics

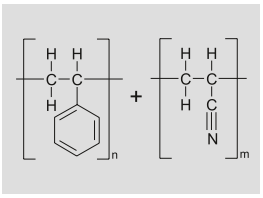
PA Polyamide

- Linear polymers with regularly repeating amide bonds along the main chain
- Good thermal stability
- Range of application from -40 °C to +100 °C
- Outstanding durability and tensile strength, often used as construction material and for metal coatings
- Good chemical resistance to organic solvents
- Readily attacked by acids and oxidising agents
- Typical products are, for example: Spatula



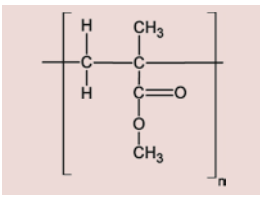
SAN Styrene-acrylonitrile copolymer

- Crystal clear, stiff thermoplastic copolymer
- Moderate thermal stability
- Range of application from -40 °C to +70 °C
- Brittle and dimensionally stable
- Low tendency to form stress cracks
- Moderate chemical stability, SAN is slightly more chemically stable than PS
- Typical products are, for example: Graduated beakers, Class B graduated cylinders



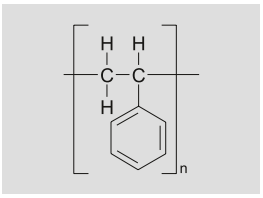
PMMA Poly(methyl methacrylate)

- Crystal clear ("organic glass"), dimensionally stable thermoplastic
- Moderate thermal stability
- Range of application from -50 °C to +65 °C
- Very good UV radiation stability
- Poor chemical stability
- Typical products are, for example: Cuvettes



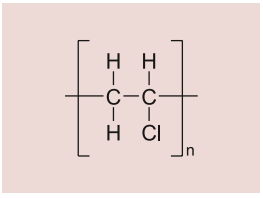
PS Polystyrene

- Crystal clear, stiff, amorphous or semi-crystalline thermoplastic
- Moderate thermal stability
- Range of application from -20 °C to +70 °C
- Hard, brittle, and dimensionally stable
- Tendency to form stress cracks
- Moderate chemical stability
- Typical products are, for example: Containers, cuvettes



PVC Poly(vinyl chloride)

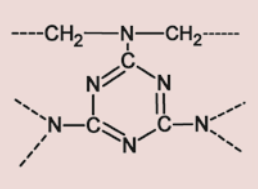
- Amorphous thermoplastic, transparent with a slight blue tint
- Moderate thermal stability
- Range of application from -20 °C to +80 °C
- Good chemical stability, especially resistant to oils
- The addition of plasticisers opens up many useful applications, ranging from artificial leather to injection moulding components
- Typical products are, for example: Drawer organisers, dishes, trays



Classification and type description of plastics

Thermosets

Plastics with densely cross-linked molecules, which are very hard and brittle at normal temperatures. Heating causes irreversible hardening. These plastics are rarely used for plastic labware. The best known thermosets are the melamine resins. Melamine resin is produced by polycondensation of melamine with formaldehyde.

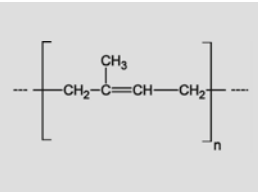


MF Melamine-formaldehyde resin

- Colourless thermoset, also belongs to the aminoplast group
- Good thermal stability
- Broad range of application, from -80 °C to +120 °C
- High surface hardness, abrasion resistance, and fire resistance
- Good electrical insulator, high creep resistance
- Good chemical stability
- Typical products are, for example: Trays, plates, mixing bowls
- Caution necessary when used in a microwave oven: Heating can release amounts of melamine and formaldehyde that can be harmful to health!

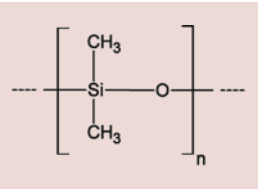
Elastomers

Plastics with loosely cross-linked molecules that exhibit rubber-like elasticity at room temperature. Heating causes irreversible integration (vulcanisation). The best known elastomers are natural rubber and silicone rubber.



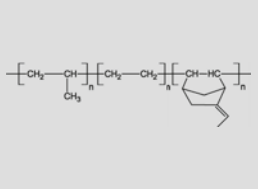
NR Natural rubber

- Elastomer obtained from latex (milk-like sap from rubber tree bark) and vulcanised with sulphur to improve the elasticity
- Composed of polymerised isoprene, with an extremely uniform structure
- Moderate thermal stability, not stable to UV
- Range of application from -40 °C to +80°C
- High tensile strength and elongation at rupture
- Poor chemical stability
- Typical products are, for example: pipette filler bulbs



SI Silicone rubber

- Synthetic elastomer in which silicon atoms are linked together by oxygen atoms
- Includes polyorganosilanes that have groups such as hydrogen atoms, hydroxyl groups or vinyl groups for cross-linking reactions
- Very good thermal stability, and resistance to UV, ozone, and weather
- Broad range of application, from -60 °C to +180 °C
- High dimensional stability, even at high temperatures
- Very good durability, even at low temperatures
- Poor chemical stability



EPDM Ethylene-propylene-diene rubber

- Synthetic terpolymeric elastomer
- Manufactured with metallocene or Ziegler-Natta catalysts that utilise vanadium compounds and aluminium alkyl chlorides
- Good thermal stability
- Range of application from -40 °C to +130 °C
- High elasticity, even at low temperatures
- Stable to UV and ozone, and weather-resistant
- Very good chemical stability

Chemical resistance of plastics

With regard to chemical stability, plastics are classified as follows:

+

Very good chemical resistance

Within 30 days, continuous exposure to media causes no damage to the plastic. The plastic may remain resistant for years.

0

Good to limited chemical resistance

Within 7-30 days, continuous exposure to media causes minor damage (e.g. swelling, softening, loss of mechanical strength, discolouration), some of which is reversible.

–

Poor chemical resistance

Not suitable for continuous exposure to media. Immediate damage may occur (e.g. loss of mechanical strength, deformation, discolouration, cracking, liquification).

Chemical resistance of plastics to various substance classes

Classes of substances at 20 °C	PFA	PTFE	FEP	ETFE	PMP	PP	PE-HD	PE-LD	PC	POM	PA	SAN	PMMA	PS	PVC	MF	NR	SI	EPDM	FKM
Alcohols, aliphatics	+	+	+	+	+	+	+	+	+	+	o	+	-	+	+	+	+	+	+	-
Ethers	+	+	+	+	-	o	o	o	-	+	+	-	-	-	-	-	-	-	-	-
Aldehydes	+	+	+	+	o	+	+	o	o	o	o	-	o	-	-	+	o	o	+	+
Esters	+	+	+	+	o	o	o	o	-	-	+	-	o	-	-	+	o	o	o	-
Hydrocarbons, aliphatic	+	+	+	+	o	+	+	o	o	+	o	-	+	-	+	+	-	-	-	o
Hydrocarbons, aromatic	+	+	+	+	-	o	+	o	-	+	o	-	-	-	-	+	-	-	-	o
Hydrocarbons, halogenated	+	+	+	+	-	o	o	o	-	+	o	-	-	-	-	+	-	-	-	o
Ketones	+	+	+	o	o	o	o	o	-	+	+	-	-	-	-	+	-	-	o	-
Alkalis	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	-	+	o	+	o
Acids, strong or concentrated	+	+	+	+	+	+	+	+	-	-	-	-	-	o	+	-	-	-	+	o
Acids, weak or diluted	+	+	+	+	+	+	+	+	o	-	-	o	-	o	+	o	o	o	+	+
Oxidising acids, oxidising agents	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o	o

The carefully prepared recommendations listed here are based on technical literature and made available by the manufacturers of raw materials, to provide information and advice.

However, nothing can replace suitability tests conducted by the end user under the actual conditions of use.

Chemical stability of plastics

Medium	PFA/FEP		PTFE		ETFE		PMP		PP		HDPE		LDPE	
	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C
Acetaldehyde	+	+	+	+	+	0	0	-	+	-	+	0	+	-
Acetic acid (glacial acetic acid), 100%	+	+	+	+	+	+	+	0	+	0	+	+	+	0
Acetic acid, 50%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Acetic anhydride	+	+	+	+	+	+	+	0	0	0	0	0	-	-
Acetone	+	+	+	+	+	0	+	+	+	+	+	+	+	0
Acetonitrile	+	+	+	+	+	+	0	-	+	0	+	0	+	0
Acetophenone	+	+	+	+	+	+	0	-	0	0	0	0	-	-
Acetyl chloride(acetic acid chloride)	+	+	+	+	+	+			+		+		+	
Acetylacetone	+	+	+	+	+	+	+		+		+		+	
Acrylic acid (2-propenic acid)	+	+	+	+	+	+	+		+		+		+	
Acrylonitrile	+	+	+	+	+	+	-	-	0	-	+	+	+	+
Adipic acid	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Allyl alcohol (2-propan-1-ol)	+	+	+	+	+	+	+	0	+	+	+	+	+	+
Aluminium chloride	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Aluminium hydroxide	+	+	+	+	+	+	+	0	+	+	+	+	+	+
Amino acids	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ammonium chloride	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ammonium fluoride	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ammonium hydroxide, 30% (ammonia)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ammonium sulphate			+	+			+	+	+	+	+	+	+	+
n-Amyl acetate (pentyl acetate)	+	+	+	+	+	+	+	0	0	-	+	0	0	-
Amyl alcohol (pentanol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Amyl chloride (chloropentane)	+	+	+	+	+	+	-	-	-	-	-	-	-	-
Aniline	+	+	+	+	+	0	+	0	+	+	+	+	+	0
Aqua regia	+	+	+	+	+	+	-	-	-	-	-	-	-	-
Barium chloride	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Benzaldehyde	+	0	+	+	+	0	+	+	+	+	+	+	+	+
Benzene	+	+	+	+	+	+	0	0	+	0	+	+	0	-
Benzoyl chloride			+	+	+	+	0	0	+	0	+	+	0	-
Benzyl alcohol	+	+	+	+	+	+	0	-	0	-	0	-	0	-
Benzyl chloride			+	+	+	+								
Benzylamine	+	+	+	+	+	+	0		0		0		0	-
Boric acid, 10%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Bromine	+	+	+	+	+	+	-	-	-	-	-	-	-	-
Bromobenzene	+	+	+	+	0	-	-	-	-	-	-	-	-	-
Bromoform	+	+	+	+	+	+	-	-	-	-	-	-	-	-
Bromonaphthalene	+	+	+	+	+	+								
Butanediol	+	+	+	+	+	+	+	+	+	+	+	+	+	+
1-Butanol (butyl alcohol)	+	+	+	+	+	+	+	0	+	+	+	+	+	+
n-Butyl acetate (acetic acid n-butyl ester)	+	+	+	+	+	+	+	0	0	0	+	+	0	0
Butyl methyl ether	+	+	+	+	+	0	+	-	+	0	0	-	0	-
Butylamine			+	+	+	+								
Butyric acid (butanoic acid)	+	+	+	+	+	+			-	-	0	-	-	-
Calcium carbonate	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Calcium chloride	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Calcium hydroxide	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Calcium hypochlorite	+	+	+	+	+	+	+	0	+	+	+	+	+	+

PC		POM		PA		SAN		PMMA		PS		PVC		MF	NR	SI	EPDM	FKM
20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	20 °C	20 °C	20 °C	20 °C
0	-	+	+	0		-	-	-	-	-	-	-	-		-	-	0	-
-	-	-	-	-	-					-	-			0	0	0	0	-
+	0	0	-	-	-	+	0	-	-	0	0	+	0	+	-	-	-	-
-	-	-	-	0	0					-	-	-	-		0	0	0	-
-	-	+	+	+		-	-	-	-	-	-	-	-	+	0	-	+	-
-	-	+		+		-	-	-	-	-	-	-	-		-	-	-	-
-	-	+		+		-	-	-	-	-	-	-	-	+	-	-	+	-
-	-			-	-	-	-	-	-	-	-	-	-		-	-	-	+
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-	-	-	-			-	-	-	-	-	-	-	-		-	-	-	-
-	-	-	-	+		-	-	-	-	-	-	-	-		-	-	-	-
+	+	+	+	+		+	+	+	+	+	+	+	0		+	+	+	+
0	0	+	+	0		0	-	-	-	0	0	0	-		0	-	+	+
-	-	+	0	0	-	+	+	+	+	+	+	+	0	+	0	0	+	+
0	-	+	+	+	+	0	0	0	0	0	0	+	+		+	+	+	+
+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+
0	0	+	+	+		+	+	0	0	+	+	+	0		+	+	+	+
0	0	+	+	+		+	+	0	0	+	+	+	0		-	+	+	0
-	-	0	0	0		+	0	+	+	0	-	+	0	+	+	0	+	-
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+	+	+	+	+		+	+			0	0	0	0		0	-	0	0
-	-	+	+	+		-	-	-	-	-	-	-	-		-	-	-	+
0	-	0	0	0	-	-	-	-	-	-	-	-	-		-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
+	+	+	+	+		+	+	+	+	+	+	+	+		+	+	+	+
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+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+
+	+	+	+	-	-	+	+	+	+	+	+	0	-		+	+	+	+
-	-	+	+	+		+	0	+	+	+	0	+	+		+	0	+	+
0	-	+	+	+	-	+	+	0	0	+	+	0	-		-	0	+	+

Chemical stability of plastics

Medium	PFA/FEP		PTFE		ETFE		PMP		PP		HDPE		LDPE	
	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C
Carbon disulphide	+	+	+	+	+	0	-	-	-	-	-	-	-	-
Carbon tetrachloride	+	+	+	+	+	+	-	-	-	-	0	-	0	-
Chloroacetaldehyde, 45%			+	+	+	+								
Chloroacetic acid (monochloroacetic acid)	+	+	+	+	+	+	+	0	+	0	+	+	+	+
Chloroacetone			+	+	+	+								
Chlorobenzene	+	+	+	+	+	0	-	-	-	-	-	-	-	-
Chlorobutane	+	+	+	+	+	+	0	-	0	-	0	-	0	-
Chloroform	+	0	+	+	+	0	0	-	-	-	0	-	0	-
Chloronaphthalene			+	+	+	+								
Chlorosulphonic acid	+	+	+	+	0	-								
Chromic acid, 10%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Chromic acid, 50%	+	+	+	+	+	+	0	0	0	0	+	0	+	0
Chromic-sulphuric acid	+	+	+	+	+	+	0	-	-	-	-	-	-	-
Copper sulphate	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Cresol	+	+	+	+	+	0	-	-	0	0	0	-	-	-
Cumene (isopropylbenzene)	+	+	+	+	+	+	-	-	0	-	+	0	0	-
Cyclohexane	+	+	+	+	+	0	-	-	0	-	0	-	0	-
Cyclohexanone	+	+	+	+	+	+	0	0	0	-	0	-	-	-
Cyclopentane	+	+	+	+	+	+	0	-	0	-	0	-	-	-
Decane	+	+	+	+	+	+	0		0		0	-		
1-Decanol	+	+	+	+	+	+	+		+		+			
Di(ethylene glycol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Dibenzyl ether	+	+	+	+	+	+	0		+		+			
Dibromoethane	+		+	+	0									
Dibutyl phthalate	+	+	+	+	+	+	+	0	+	0	0	-	0	-
Dichloroacetic acid	+	+	+	+	+	0	+	+	0	-	0	0	0	-
Dichlorobenzene	+	+	+	+	+	0	-	-	0	-	0	-	0	-
Dichloroethane	+	+	+	+	+	+	0	-	0	-	0	-	0	-
Dichloromethane (methylene chloride)	+	+	+	+	0	0	0	-	0	-	0	-	0	-
Diesel oil (heating oil)	+	+	+	+	+	+	0	-	+	0	+	0	0	-
Diethanolamine			+	+					0		0			
Diethyl ether	+	+	+	+	+	+	-	-	0	-	0	-	-	-
Diethylamine	+	+	+	+	+	0	0	0	0	-	0	-	-	-
1,2 Diethylbenzene	+	+	+	+	+	0	-	-	-	-	0	-	-	-
Dimethyl sulphoxide (DMSO)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Dimethylaniline	+	+	+	+	+	+								
Dimethylformamide (DMF)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
1,4-Dioxane	+	+	+	+	+	0	0	0	+	0	+	+	+	0
Diphenyl ether			+	+										
1,2 Ethanediol (ethylene glycol, glycol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ethanol (ethyl alcohol)	+	+	+	+	+	+	+	0	+	+	+	+	+	+
Ethanolamine	+	+	+	+	+	+			+					
Ethyl acetate (acetic acid ethyl ester)	+	+	+	+	+	+	0	-	+	0	+	+	+	+
Ethyl methyl ketone (MEK)	+	+	+	+	0	0	-	-	+	0	0	-	0	-
Ethylbenzene	+	+	+	+	0	0	-	-	-	-	-	-	-	-
Ethylene oxide	+	+	+	+	+	+	0	-	0	-	0	0	0	0
Fluoroacetic acid			+											

PC		POM		PA		SAN		PMMA		PS		PVC		MF	NR	SI	EPDM	FKM
20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	20 °C	20 °C	20 °C	20 °C
-	-	+	+	0		-	-	-	-	-	-	-	-		-	-	-	+
-	-	0	0	-	-	-	-	0	-	-	-	-	-	+	-	-	-	+
				-	-	-	-	-	-	-	-							
0	-	-	-	-	-	-	-	0	-	0	-	+	0		-	-	0	0
						-	-	-	-	-	-				0	-	+	-
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		-	-	0											-	-	-	0
-	-			0	-					-	-	-	-		-	-	-	0
-	-	+	+	+	+	-	-	0	-	-	-	0	-		-	-	-	+
-	-					-	-	-	-	-	-						0	
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-	-	-	-			-	-	-	-	-	-	-	-		-	-	-	-

Chemical stability of plastics

Medium	PFA/FEP		PTFE		ETFE		PMP		PP		HDPE		LDPE	
	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C
Formaldehyde, 40%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Formamide	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Formic acid, 98-100%	+	+	+	+	+	+	+	0	+	+	+	+	+	+
Gasoline (petroleum spirits)	+	+	+	+	+	+	0	0	0	0	+	+	0	-
Glycerine	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Glycolic acid, 70%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Heating oil (Diesel oil)	+	+	+	+	+	+	0	-	+	0	+	0	0	-
Heptane	+	+	+	+	+	+	0	0	0	0	0	0	0	-
Hexane	+	+	+	+	+	+	0	-	+	0	+	0	0	-
Hexanoic acid			+	+										
Hexanol	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid, 10%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid, 20%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid, 37%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrofluoric acid, 40%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrofluoric acid, 70%	+	+	+	0	+	+	+	0	+	0	+	0	+	-
Hydrogen bromide	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrogen peroxide, 35%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydroiodic acid	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Isoamyl alcohol (3-methyl-1-butanol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Isobutanol (isobutyl alcohol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Isooctane	+	+	+	+	+	+								
Isopropanol (2-propanol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Isopropyl ether	+	+	+	+	+	0	-	-	-	-	-	-	-	-
Lactic acid (2-hydroxypropionic acid)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lugol's solution (iodine/potassium iodide solution)	+	+	+	+	+	+	+	0	+	+	-	-	-	-
Mercury	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Mercury chloride	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Methanol	+	+	+	+	+	+	+	+	+	+	+	+	+	0
Methoxybenzene	+	+	+	+	+	+								
Methyl butyl ether	+	+	+	+	+	0	+	0	+	+	0	-	-	-
Methyl ethyl ketone (MEK)	+	+	+	+	0	0	-	-	+	0	0	-	0	-
Methyl formate (formic acid methyl ester)	+	+	+	+	+	+								
Methyl propyl ketone	+	+	+	+	+	+	0	0	+	0	+	+	+	0
Methylene chloride (dichloromethane)	+	+	+	+	+	+	-	-	0	-	0	-	0	-
Mineral oil (motor oil)	+	+	+	+	+	+	+	+	+	+	+	+	+	0
Monochloroacetic acid	+	+	+	+	+	+	+	0	+	0	+	+	+	+
Nitric acid, 10%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Nitric acid, 30%	+	+	+	+	+	+	0	-	0	-	0	-	0	0
Nitric acid, 70%	+	+	+	+	+	+	-	-	-	-	-	-	-	-
Nitrobenzene	+	+	+	+	+	+	-	-	-	-	0	-	-	-
Oleic acid	+	+	+	+	+	+								
Oxalic acid	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ozone	+	+	+	+	+	+	+	+	0	-	0	-	0	-
n-Pentane	+	+	+	+	+	+								
Peracetic acid	+	+	+	+	+	+								
Perchloric acid	+	0	+	+	+	+	0	-	+	-	+	-	+	-
Perchloroethylene	+	+	+	+	+	+	-	-	-	-	-	-	-	-

PC		POM		PA		SAN		PMMA		PS		PVC		MF	NR	SI	EPDM	FKM
20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	20 °C	20 °C	20 °C	20 °C
+	0	+	+	+	0	+	+	-	-	-	-	0	-		0	0	+	0
		-	-	+											+		0	0
+	0	-	-	-	-	0	0	-	-	+	0	-	-	+	0	-	0	-
0	-	+	+	+		-	-	+		-	-	0	-	+	-	-	-	+
+	+	0	0	+	+	+	+	+	+	+	+	+	+	+	0	+	+	0
				-	-										+	+	+	0
-	-	+	+	+		-	-	0	-	-	-	0	-		-	-	-	+
+	0			+				0	-	-	-	-	-		-	-	-	+
-	-	+	+	+		+	+	0	0	-	-	0	-		-	-	-	+
								+										
								+							0	0	-	+
-	-	-	-	-	-	0	-	0	-	+	+	+		-	0	0	+	+
0	0	-	-	-	-	0	-	0	-	+	+	0		-	0	-	+	+
-	-	-	-	-	-	0	-	0	-	0	0	0	-	-	0	-	+	0
-	-	-	-	-	-	+	0	-	-	+	+	0	-	-	-	-	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
+	+	-	-	-	-					0	-				0	-	0	+
+	+	+	-	-	-	+	+	-	-	+	+	+	0	0	-	0	0	
																	+	+
		+	+												0	0	0	0
+	+	+	+			0	-	0	-	0	0	+	0		+	+	+	+
0				+		0	-			0	-				-	-	-	+
+	+	+	+	+		+	-	0	-	0	0	+	0		+	0	+	+
-	-			-	-					-	-	-	-		-	-	-	-
+	+	+	-	0	-	+	+	0	-	+	+	0	0		0	0	0	+
0	-	0	0			0	-	-	-	0	-	-	-		+	-	+	+
+	+	+	+	+		+	+	+	+	+	+	+	+		+	+	+	+
+	+	0	0	-	-	+	+	+	+	+	0	-	-		+	+	+	+
+	0	+	+	0		0	-	-	-	0	-	+	0		0	+	+	-
-	-	0				-	-	-	-	-	-				-	-	-	-
-	-	0				-	-	-	-	-	-	-	-		-	-	-	-
-	-	-	-			-	-	-	-	-	-	-	-		-	-	0	-
-	-	+				-	-	-	-	-	-				-	0	0	
-	-	+	+			-	-	-	-	-	-	-	-		-	-	0	-
-	-	-	-	0	-	-	-	-	-	-	-	-	-		-	-	-	0
+		+	+			+		+	+	+		+	+		-	0	-	+
0	-	-	-	-	-	-	-	0	-	0	-	+	0		-	-		0
+	0	-	-	-	-	+	0	+	0	-	-	+	0	-	-	-	0	0
+	0	-	-	-	-	0	-	0	0	-	-	0	-	-	-	-	-	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	0	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
				+		-	-	-	-	-	-				-	-	-	0
+	+	+	+	-	-	+	+	+	+	+	+	+	+		0	0	+	+
-	-	-	-	-	-	0	0	+	0	0	0	+	0		-	+	+	+
				+											-	-	-	+
-	-	-	-													-		
-	-	-	-	-	-	-	-	-	-	-	-	0	-		-	-	0	+
-	-	+	0	-	-	0	0	0	-	-	-	-	-		-	-	-	0

Chemical stability of plastics

Medium	PFA/FEP		PTFE		ETFE		PMP		PP		HDPE		LDPE	
	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C
Petroleum	+	+	+	+	+	+	0	0	0	-	0	-	0	-
Petroleum ether	+	+	+	+	+	+							0	
Phenol	+	+	+	+	+	+	0	0	+	+	+	+	+	0
Phenylethanol	+	+	+	+	+	+			0		0			
Phenylhydrazine	+	+	+	+	+	+			0		0			
Phosphoric acid, 85%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Piperidine	+	+	+	+	+	+			+		+			
Potassium chloride	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Potassium dichromate			+	+										
Potassium hydroxide	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Potassium permanganate	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Propanol	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Propionic acid	+	+	+	+	+	0	+	0	+	0	+	0	0	-
Propylene glycol (propanediol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pyridine	+	+	+	+	-	-	+	0	0	0	+	0	+	0
Salicylaldehyde	+	+	+	+	+	-	+	+	+	+	+	+	+	+
Salicylic acid	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Silver acetate	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Silver nitrate	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sodium acetate	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sodium chloride	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sodium dichromate	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sodium fluoride	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sodium hydroxide	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sulphuric acid, 60%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sulphuric acid, 98%	+	+	+	+	+	+	+	+	-	-	0	-	0	-
Tartaric acid	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Tetrachloroethylene	+		+	+	0									
Tetrahydrofuran (THF)	0	0	+	+	+	0	0	-	-	-	0	-	0	-
Tetramethylammonium hydroxide	+	+	+	+	+	+								
Toluene	+	+	+	+	+	+	0	-	0	-	0	0	0	-
Tri(ethylene glycol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Tri(propylene glycol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Trichloroacetic acid	+	+	+	+	+	0	+	+	0	-	0	0	0	-
Trichlorobenzene	+	+	+	+	+	0	0	0	-	-	-	-	-	-
Trichloroethane	+	+	+	+	+	+	-	-	-	-	0	-	-	-
Trichloroethylene	+	+	+	+	+	+	-	-	-	-	0	-	-	-
Trichlorotrifluoroethane	+	+	+	+	0	-								
Triethanolamine	+	+	+	+										
Trifluoroacetic acid (TFA)	+	-	+	0										
Trifluoroethane	+	0	+	+										
Turpentine	+	+	+	+	+	+	0	0	-	-	0	-	0	-
Urea	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Xylene	+	+	+	+	+	+	0	-	-	-	0	-	0	-
Zinc chloride, 10%	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Zinc sulphate, 10%	+	+	+	+	+	+	+	+	+	+	+	+	+	+

PC		POM		PA		SAN		PMMA		PS		PVC		MF	NR	SI	EPDM	FKM
20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	50 °C	20 °C	20 °C	20 °C	20 °C	20 °C
0	0	+	+	+				+		-	-	+	-		-	0	-	+
		+	+	+				+		-	-	0	-		-	-	-	+
-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	0
				0														
															0	-	-	0
+	+	+	-	-	-	+	+	-	-	+	0	+	0	-	-	-	0	+
															-	-	-	-
+	+	+	+	+		0	0	+	+	0	0	+	0		+	+	+	+
				-	-										0	0	+	0
-	-	+	+	+		0	0	+	+	0	0	0	0	-	0	-	+	-
+	+	0	0	-	-	+	0	+	+	+	+	+	+		-	-	+	+
0		+	+	+	+	+	+	0		0		+	+		+	0	+	+
-	-	-	-	0	0					0	-	0	-		-	-	0	+
+	0	+	+	-	-	-	-	0	0	+	+	0	-		+	+	+	+
-	-	+	0	+		-	-	-	-	-	-	0	-		-	-	-	-
0	0					-	-			-	-	-	-					
		-	-	+		+	+			+	+	0	-		+	+	+	+
+	+	0	0			0	0	0	0	0	0	0	0		+	+	+	+
+	+	0	0	+		+	+	+	+	0	0	0	0		+	+	+	+
+	+	+	0	+		+	+	-	-	+	+	0	0		+	0	+	-
+	+	+	+	+		+	+	+	+	+	+	+	+		+	+	+	+
+	-	+	+	+		+	0	+	0	+	0	+	+		+	0	+	+
+	+	+	+	+		+	+	+	+	+	+	+	+		0	0	+	+
-	-	+	+	+	0	+	+			+	+	+	+	-	0	0	+	0
0	0	-	-	-	-	+	0	-	-	-	-	0	-		-	-	-	+
-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	+
+	+	+	+	0	0	+	+	0	0	+	+	+	+	-	+	+	0	+
				-	-										-	-	-	0
-	-	0	0	+		-	-	-	-	-	-	-	-	+	-	-	-	-
-	-	-	-														+	-
-	-	+	+	+		-	-	-	-	-	-	-	-		-	-	-	0
+	0	+	0			+	+	0	0	+	+	0	-		0	+	+	+
+	0	+	0			+	+	0	0	+	+	0	-		+	+		
0	-			-	-					0	-	0	-		0		0	-
-	-									-	-	-	-					
-	-	0	-	0		-	-	-	-	-	-	-	-		-	-	-	+
-	-	-	-	0		-	-	-	-	-	-	-	-		-	-	-	0
				0		-	-			-	-						0	
						-	-			-	-				0	-	0	-
		-	-			-	-			-	-							-
						-	-			-	-				-	-	-	+
-	-	+	+	+		0	0	+	+	-	-	+	+		-	-	-	+
-	-	+	+	+		+	+	+	+	+	+	0	-	+	+	+	+	+
-	-	+	+	+		-	-	-	-	-	-	-	-		-	-	-	0
+	+	+	0	-	-	+	+	-	-	+	+	+	0		+	+	+	+
+	+	0	-	-	-	+	+	0	0	+	+	+	0		0	+	+	+

Physical properties of plastics

Plastics	Max. temperature for use °C	Brittleness temperature °C	Microwaveability*	Density g/cm³
PFA	260	-200	yes	2,17
PTFE	260	-200	yes	2,17
FEP	205	-100	yes	2,15
ETFE	150	-100	yes	1,70
PMP	150	0	yes	0,83
PP	125	0	yes	0,90
PE-HD	105	-50	yes	0,95
PE-LD	80	-50	yes	0,92
PC	125	-130	yes	1,20
POM	130	-40	no	1,42
PA	90	0	-	1,13
SAN	70	-40	no	1,03
PMMA	65 - 95	-50	no	1,18
PS	70	-20	no	1,05
PVC	80	-20	no	1,35
MF	120	-80	yes**	1,50
NR	80	-40	no	1,20
SI	180	-60	no	1,10
EPDM	130	-40	-	-
FKM	220	-30	-	-

* Mind the chemical and temperature suitability!

** Caution necessary when used in a microwave oven: Heating can release amounts of melamine and formaldehyde that can be harmful to health!

Cleaning and maintenance of plastics

All polyolefins, such as PE-LD, PE-HD, PP and PMP, as well as the fluoroplastics PTFE, PFA, FEP and ETFE have water-repellent surfaces that are very durable and easy to clean. For cleaning, depending on the level of contamination, commercially available neutral or alkaline detergents can be used. Polycarbonate (PC) labware should not be cleaned with alkaline cleaning agents (> pH 7). Please note that no scrubbing agents or scouring pads should be used for labware made from plastics.

Cleaning with dishwashers

Labware made from the above-named plastics (except for PE-LD, due to the temperature limit) can be cleaned and dried in a laboratory dishwasher together with other apparatus. Machine cleaning with laboratory dishwashers is gentler to labware than cleaning in an immersion bath. The labware is exposed to the cleaning solution for relatively short rinsing periods when sprayed by the jet or injector nozzles. Due to their light weight, we recommend securing the apparatus to be washed with washing nets to prevent them from tumbling in the water jet. Labware is better protected against scratching when the wire baskets in the washing machine are plastic coated.

Cleaning in an ultrasonic bath

Plastic labware may be cleaned in an ultrasonic bath. However, direct contact with the acoustic membrane should be avoided.

Cleaning in trace analysis

To avoid contamination with cations and anions in trace analysis, plastic labware should be allowed to stand with a 1N HCl or HNO_3 solution for a maximum of 6 hours at room temperature, and be rinsed afterwards with purified distilled water. For trace analysis conducted in the concentration range of ng/g (ppb) or pg/g (ppt), containers made of the fluoroplastic PFA are particularly suitable, because they have a smooth surface, are easy to clean without carry-over (memory effects) and interaction with the container material.

Sterilisation of laboratory equipment made of plastics

Autoclaving

Recommended autoclaving protocol
20 minutes at 121 °C (2 bar),
according to DIN EN 285

Autoclaving (steam sterilisation) is defined as the destruction or irreversible inactivation of all reproducible microorganisms under exposure to "saturated steam at a minimum of 120 °C." (DIN 58946-1, 1987). DIN EN 285 specifies a minimum exposure time (t_e) of 20 minutes (killing time and safety margin) at a sterilisation temperature of 121 °C. For the correct sterilisation procedure, including biological safety (DIN EN 285), please contact your hygiene specialist.

Prior to autoclaving plastic labware, ensure that no soiling or residual contamination remains on the equipment. Otherwise, the residual contamination will bake on solidly during the autoclaving process. Even substances that have no effect on the plastic at room temperature can still lead to destruction of the plastic during the autoclaving process. Additionally, microorganisms might not be killed effectively if they are protected by the residual contamination.

Notes on autoclaving

- Containers with screw tops or stoppers must be **open** during autoclaving to allow for pressure equalisation
  ➡ Autoclaving of a closed container will lead to the deformation or destruction of the container
- Plastic labware should be **stood upright on a level surface** during autoclaving to avoid shape deformation.
  ➡ Plastic labware should not be laid on its side during autoclaving
- **No mechanical stresses** should be present during autoclaving
  ➡ For example, do not stack items
- Do not autoclave any container that contains residual contamination or even rinsing agent
- Not all plastics are resistant to steam sterilisation! For example, polycarbonate loses its tensile strength
  ➡ Mind the temperature limits for the plastics
  ➡ Autoclavable products are identified with a "121 °C" symbol in this catalogue

The surfaces of some plastics can be attacked by chemicals present during autoclaving, which can cause persistent clouding. Some transparent plastics can absorb minute quantities of steam, which can lead to reversible clouding. This clouding disappears upon drying, which can be accelerated through the use of a drying oven.

Note!
For gas sterilisation, dry heat, and prior to heating in a microwave oven, all closures and stoppers must be removed as well.

Heating plastics in microwave ovens

Many plastics are suitable for use in microwave ovens. More accurate information can be obtained from the Table "Physical Properties of Plastics" on page 148. In this connection, it is important to be mindful of the chemical and temperature stability of the various plastics, and to ascertain whether the particular article and its contents are compatible with the given temperature. When aggressive acids, alkalis, or solvents are to be heated, the use of fluoroplastics is recommended. It is very important to provide for adequate ventilation (e.g., fume hoods).

Prior to the use of plastic labware in a microwave oven, the closures and stoppers must be removed from the apparatus.

Sterilisation* of plastics

Plastics	Autoclave 121 °C, t_e 20 min according to DIN	Heated air 160 °C (dry)	Gas (Ethylene oxide)	Chemical (Formalin, ethanol)	β-/γ-radiation 25 kGy
PFA	yes	yes	yes	yes	no
PTFE	yes	yes	yes	yes	no
FEP	yes	yes	yes	yes	no
ETFE	yes	no	yes	yes	no
PMP	yes	no	yes	yes	yes
PP	yes	no	yes	yes	yes (limited)
PE-HD	no	no	yes	yes	yes
PE-LD	no	no	yes	yes	yes
PC	yes[1)]	no	yes	yes	yes
POM	yes[1)]	no	yes	yes	yes (limited)
PA	no	no	yes	yes	yes
SAN	no	no	yes	yes	no
PMMA	no	no	no	yes	yes
PS	no	no	no	yes	yes
PVC	no	no	yes	yes	no
MF	no	no	yes	no	no
NR	no	no	yes	yes	no
SI	yes	-	yes	yes	no
EPDM	yes	-	yes	yes	-
FKM	yes	-	yes	yes	-

* Before sterilisation, labware must be carefully cleaned and rinsed with distilled water. Always remove covers from containers!

[1)] Frequent autoclaving may reduce mechanical stability!

Suitability of plastics for foodstuffs

The marked products comply with the lawful regulations of the German Consumer Goods Ordinance and/or Directives (EC) No. 1935/2004, (EC) No. 975/2009 and (EC) No. 10/2011 as amended.

In the testing for compliance with the threshold values for the global migration (or respectively, the specific migration threshold values), no determinations exceeded the allowed values. In addition, sensory testing found no olfactory and flavour-related impairments. The testing was implemented according to the 82/711/EEC and 85/572/EEC Guidelines by an independent, accredited institute.

All source materials used in the manufacturing of the products are listed in the German Consumer Goods Ordinance as at 20.12.2006, or respectively, Directive (EC) 10/2011, in accordance with the present attestation. Therefore, they represent permissible source materials in accordance with food law and may be used in the production of food commodities in accordance with the specified restrictions concerning migration threshold values and permissible residual content in the end product.

Marked PP products are suitable for contact with all foodstuff categories providing that a contact period of 24 hours and a contact temperature of 40 °C are not exceeded. Marked SAN products are suitable for contact with all aqueous, alcoholic and fatty foods, providing that a contact period of 24 hours and a contact temperature of 40 °C are not exceeded.

Disposal and Recycling of Plastics

If the disposal of a piece of plastic labware is unavoidable, regional laws and regulations must be observed. Recycling centres can be found in many cities, which are designed for the disposal of recyclable materials. To simplify the task of sorting in these recycling centres, the majority of labware from VITLAB can be easily identified and presorted by using the engraved or imprinted recycling code. Prior to disposal, plastic labware must be cleaned, and sterilised if necessary, according to the currently valid regulations.

To simplify the separation of plastics for recycling, so that these can later be reused as raw material for manufacture, plastic identification labels (number 01-07) have been introduced. This identification scheme was published in 1988 under the title "SPI resin identification coding system" by the Society of the Plastics Industry (SPI). For coding, the commonly used shorthand for plastics according the DIN 7728 is also used.

SPI number 07 stands for "other". This is used to indicate other plastics such as PMP, PFA, PTFE etc. VITLAB doesn't use the "0"; rather, it identifies the specific raw material with the abbreviation according to DIN 7728 to simplify identification of the plastic for the end user.

CE mark / CE-IVD Guidelines

IVD Guidelines of the EU

On 7 December, 1998, the EU "Guidelines for In Vitro Diagnostic Devices" (IVD Guidelines) were published in the Official Journal of the European Communities, and thus came into force. The Guidelines were transposed into German National Law on 1 January, 2002, as a corresponding modification of the German Medical Devices Act (MPG). Consequently, in vitro diagnostic devices are considered medical devices.

Definition: Medical devices*

Medical devices are all instruments, apparatus, devices, materials, or other objects including software that are intended by the manufacturer for use in humans:

- for the purpose of detection, prevention, monitoring, treatment, alleviation or compensation of diseases, injuries or disabilities;
- for the purpose of investigation, replacement or modification of the anatomy or of a physiological process;
- for the purpose of control of conception. Pharmacologically or immunologically active agents are excluded, as these are regulated by the German Pharmaceuticals Law.

Definition: In vitro Diagnostic Devices (IVD)*

"In vitro diagnostic devices" are medical devices that are used for in vitro investigations of samples derived from the human body, including donated blood and tissue. Included are reagents, calibration substances or devices, control substances or devices, equipment, instruments, apparatus, systems ,or also sample containers, if they are specifically intended by the manufacturer for use in medical tests. "In vitro diagnostic devices" serve mainly to provide information on:

- physiological or pathological conditions;
- congenital anomalies;
- monitoring of therapeutic measures.

CE Mark

With the CE mark on a product, the manufacturer affirms that the product complies with the requirements for products of that type established by the EU Guidelines and, as necessary, has undergone the required testing. The manufacturer applies this mark to the product and additionally produces a Conformity Declaration that certifies the conformity of the product with the cited guidelines and standards.

The medical products supplied by VITLAB are all included in the class of in vitro diagnostic (IVD) devices.

This includes, for example:

- VITLAB® micropipettes
- Pipette tips
- Urine bottles
- Microtubes

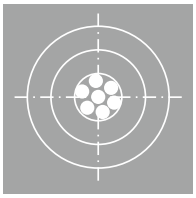
* See the definitions according to MPG § 3 (Definition of Terms)

Accuracy

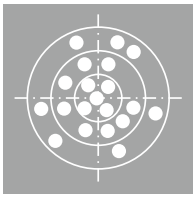
What do "tolerance, accuracy, coefficient of variation, and precision" mean in volumetric measurements?

Graphic illustration of precision and accuracy

The dart board simulates the volume range around the centred nominal value, the white dots simulate the different measured values of a specified volume.

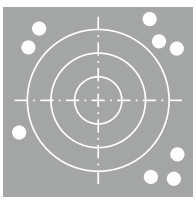


Good accuracy: All hits are near the centre, i.e., the nominal value.
Good precision: All hits are close together.
Result: The manufacturing process is well controlled by an accompanying quality assurance program. Minimal systematic deviations and a narrow variance in products. The permissible limits are not exceeded. There are no rejects.



Good accuracy: On average, the hits are evenly distributed around the centre.
Poor precision: No substantial errors, but hits widely scattered.
Result: All deviations are "equally probable". Instruments exceeding the permissible tolerance should be rejected.

Poor accuracy: Although all hits are close together, the centre (nominal value) is still missed.
Good precision: All hits are close together.
Result: Improperly controlled production, with systematic deviation. Instruments exceeding the permissible tolerance should be rejected.



Poor accuracy: The hits are far removed from the centre.
Poor precision: The hits are widely scattered.
Result: These volumetric instruments are of inferior quality.

Calculation formulae

The accuracy of glass volumetric instruments is commonly defined by "Tolerance Limits", whereas for liquid handling instruments the statistical terms "Accuracy [%]" and "Coefficient of Variation [%]" have been established.

Tolerance

$$\text{Tol.} \geq | V_{Ist} - V_{Soll} |$$

The term "tolerance" (tol.) in the corresponding standards defines the maximum permissible deviation from the nominal value.

Accuracy

$$R[\%] = \frac{\bar{V} - V_{Soll}}{V_{Soll}} \cdot 100$$

Accuracy (A) indicates the closeness of measured mean volume to the nominal value, i.e., systematic measurement deviation. Accuracy is defined as the difference between the measured mean volume ($\bar{V}$) and the nominal value ($V_{nom.}$), related to the nominal value in percent.

Coefficient of Variation

$$VK[\%] = \frac{s \cdot 100}{\bar{V}}$$

The coefficient of variation (CV) indicates the closeness of values from repeated measurements, i.e., random measurement deviation. The coefficient of variation is defined as standard deviation in percent, related to the mean volume.

Partial volumes

$$R_T[\%] = \frac{V_N}{V_T} \cdot R_N\%$$

(analogous to CV_T %)
Generally, A and CV are based on the actual volume ($V_{act.}$). These data in percent must be converted to partial volumes ($V_{part.}$). By contrast, there is no conversion for partial volumes if A and CV are stated in volume units (e.g. ml).

Tolerance from A and CV

$$\text{Tol.} \geq \frac{| R\% | + 2VK\%}{100\ \%} \cdot V_N$$

To a good approximation, the tolerance, e.g. for the actual volume ($V_{act.}$), can be calculated from the accuracy and coefficient of variation.

Precision

If the variance in the individual measurement results about the mean volume $\bar{V}$ is given in units of volume, this relates to precision.

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General Terms and Conditions of VITLAB GmbH

1. General

1.1. (Applicability) These General Terms and Conditions only apply to contractual relations with entrepreneurs (Sec. 14 German Civil Code).

1.2. (Conflicting business conditions, written form and contract language) These General Terms and Conditions shall apply to all contracts, including all future contracts with the Customer. Other conditions shall not become a part of the contract even if we do not expressly object to such conditions. Customer may claim validity of additional agreements only before or upon conclusion of the contract and only on our immediate written confirmation. Renunciation of the written form is only possible in writing. The contract language shall be German or English.

1.3. (Offers, right to make changes) Our offers are subject to confirmation. We reserve the right to make technical improvements to our products.

1.4. (Recording of data) We may store and process relevant contract data in our EDP systems.

1.5. (Offset and retention) The Customer shall not be entitled to offset his claims against any other claims but those which are acknowledged, uncontested or final. Furthermore the Customer may offset counterclaims based on a right to refuse performance (Sec. 320 German Civil Code) if those claims are for the payment of a sum of money.

1.6. (Rush orders/small orders) Orders having a value of less than 100 euros are subject to a minimum order surcharge of 20 euros. Delivery is normally in packing units as per our valid price list. For deliveries effected within five working days or for order values up to 500 euros, we reserve the right to ship and invoice immediately waiving the requirement for an order confirmation.

1.7. (Place of jurisdiction) The place of jurisdiction shall be the court responsible for our domicile in Aschaffenburg, Germany. We are also entitled to appeal to the court responsible for our Customer's domicile. Furthermore, we as Plaintiffs have the right to call upon the arbitral tribunal at the Chamber of Industry and Commerce in Frankfurt am Main. In this case, the arbitral tribunal conclusively decides the legal dispute in accordance with the ICC Rules of Arbitration excluding the due legal process. The initiation of legal dunning proceedings does not imply the exercise of our right to choose the plan of jurisdiction. It is in no way admissible.

1.8. German law is applicable, to the exclusion of the 'UN Convention on Contracts for the International Sale of Goods', CISG, and the rules of Conflict Laws.

2. Delivery

2.1 Place of performance shall be our factory in Grossostheim, Germany. Customer assumes all responsibilities and all risks shall be deemed to be transferred to the Customer when the shipment leaves the ramp in our factory. This shall also apply to partial deliveries, deliveries to a consignment location and all deliveries where we have agreed to provide additional services such as freight forwarding, packing, exportation and installation.

2.2 Should we have accepted a call or blanket order, the Customer shall be obligated to request delivery of the entire order quantity within 6 months from the order date.

2.3 Should there be any delay in the Customer's acceptance of a shipment we may, at our own discretion, have the products stored at Customer's expense or, after providing a warning and setting a deadline, sell the products for the Customer's account.

3. Delivery period, Delay

3.1 Indicated delivery periods are ex works. Delivery deadline shall commence upon Customer's receipt of our order confirmation and after settlement of all technical questions and after we have received all necessary documents, such as diagrams, permits, Customer required releases and all previously agreed upon advances and payments. The delivery deadline is deemed to have been met if the shipment has been declared ready for delivery prior to the expiration of the delivery deadline. All deliveries are subject to the punctual delivery of required materials from our suppliers.

3.2 Force Majeure, strikes, lockouts, operating breakdowns, shortages of raw materials or means of production for which we are not responsible, including delayed deliveries or failure to deliver by upstream suppliers, shall extend the delivery period accordingly and shall release us from our obligation to deliver if delivery becomes impossible as a result thereof. We are considered not to be responsible for the aforementioned circumstances, even where they occur during an existing delay. The same applies in case of additional or amended services requested by the Customer.

3.3 Our deliveries shall not be deemed to be in default unless the Customer has provided us with a written warning and after an indicated reasonable grace period has elapsed.

3.4 In the case of requested damages for delivery delays, our liability for damage compensation shall be limited to 10% of the value of our delayed delivery or service. The limitation does not apply in the case of wilful intent, gross negligence and/or damage to life, body or health. The Customer shall be obligated to promptly notify us in writing of any consequences of delay in delivery or service.

4. Prices, Terms of Payment

4.1 Prices quoted shall be ex works and do not include VAT, if applicable. Charges for packaging, freight and insurance shall be at the Customer's expense. All prices are understood to be exclusive of costs for returning, recycling and disposal of used equipment returned to us for disposal.

4.2 Invoices shall be paid in full, without deductions and must be credited to our bank account in EURO (€) immediately or by the due date indicated on the invoice. Receipt of payment is applicable. We shall accept bills of exchange or checks only on account of performance and at the Customer's expense.

4.3 We retain, at our sole discretion, the right at any time to deny any extension of credit to either new or existing customers and/or to request payment in full in advance of any shipment.

4.4 If the period between conclusion of the contract and delivery is longer than four months, we reserve the right to demand an extra charge at our discretion, corresponding to our cost increase.

4.5 Duly authorized returns of products free of defects are subject to an inspection- and processing fee of 15% of the invoiced value (10 euros minimum).

4.6 Should the Customer be in default of our payment terms, payment of all of our receivables shall be immediately due in full and we shall not be obliged to make any further deliveries regardless of the terms prescribed in current delivery contracts.

4.7 Should the Customer be in default of payment, default interest on arrears at a rate legally applicable shall be due and payable. The assertion of a higher claim for damages caused by default remains unaffected.

4.8 We reserve the right to offset accounts payable to the Customer, such as credit notes, against our claims against the Customer.

5. Retention of Title and Assignment of Future Claims

5.1 Products delivered shall remain our property until the complete and unconditional payment of all of our claims against the Customer. Should there exist any further claims against the Customer, we reserve our proprietary rights until Customer's complete payment of these claims.

5.2 The Customer shall neither consume products nor merge nor inseparably connect products subject to retention of title with other objects, which a third party may have rights to. If products subject to retention of title, however, become a component of a new object (e.g. through the connection with other objects), then we shall be a direct proportional co-owner of this object even if it constitutes a new legal entity. Our proportion of co-ownership shall be based on the relation of the invoice value of the conditional products to the value of the new object at the time of the connection.

5.3 The Customer may resell the products subject to retention of title in his due course of business as long as his claims from the resale have not been assigned, hypothecated or otherwise encumbered.

5.4 The Customer shall herewith assign to us in advance as collateral any claims against his customers from the resale of the products subject to retention of title (see clause 5.3) and/or new objects (see clause 5.2) in the amount of our invoice for the products subject to retention of title. If the Customer is not in default of payment for the products subject to retention of title, he may collect the assigned claims in his due course of business. However, he may only use the proportional proceeds for the payment of our products subject to retention of title.

5.5 Upon the Customer's request, we shall release collateral at our sole discretion, if and to the degree that the nominal value of the collateral exceeds 120 percent of the nominal value of our open debt claims against the Customer.

5.6 The Customer is required to immediately inform us of any distress, confiscation or any other disposition of a third party with regard to the products subject to retention of title or the products co-owned by us.

5.7 If any monetary instrument should be returned to us for insufficient funds, if debit requests or direct debit authorizations are not carried out or are retroactively cancelled, or if the Customer or the end user becomes insolvent, Customer shall lose all rights as per clause 5.3 above. The Customer must immediately notify any subsequent purchaser of our extended retention of title. He may only use the proportional proceeds, which are based on the assignment, for the payment of the products delivered.

5.8 In case of default of payment or those cases covered in clause 5.7, we shall be authorized to withdraw from the contract, and/or to demand the return of any products subject to retention of title being in the possession of the Customer and/or to directly collect the assigned claims (see clause 5.4). In order to determine our rights, we reserve the right to have the Customer's documents and books concerning our reserved rights examined by a person who is subject to the professional duty of confidentiality.

6. Warranty, Limitation of Liability

6.1 We warrant that our products are free from defects in materials and workmanship (under normal conditions of use and service) at the time of the transfer of risk. The required characteristics, shelf life and use of our products are based solely on the written contractual specification, product description and/or operating instructions. Any information beyond this and in particular in preliminary discussions, advertisement and/or referenced industrial standards shall only become a part of the contract if they are expressly referenced in writing.

6.2 If the Customer requires the products for purposes other than those agreed, Customer must check before use if the products are especially suitable for such purposes - including all aspects pertaining to product safety - and Customer is required to ensure that products comply with all relevant technical, legal and official regulations and requirements. We shall not be liable for the fitness of our products for any application not expressly confirmed by us in writing. Further we shall not be liable for the accuracy of designs, specifications or materials furnished or specified by the Customer and thus have no particular testing obligation.
The observation of safety-related and occupational health regulations depends on the place and conditions of the product's use. The observation of these regulations is, therefore, the responsibility of the Customer.

6.3 The consequences of normal wear and tear of wearing parts such as pistons, seals, valves, and the breakage of glass, plastic or ceramic parts are excluded from this warranty. The warranty does also not apply for the consequences of improper handling, use, servicing or operation of the products or the consequences of chemical, electrochemical or electrical influences or the failure to follow the instructions in the operating instructions.

6.4 The exclusive initial remedy of Customer in the event of a justified deficiency claim is the replacement or repair (at our sole discretion) of any defective product. Any additional warranty claims shall only exist due to rejection, impossibility or failure of said subsequent performance. Additional expenses, resulting from the fact that the goods have been relocated from the initial place of delivery, shall be borne by the Customer.

6.5 The Customer shall be obliged to promptly and carefully check incoming products - also for product safety - and to notify us of any apparent deficiencies in writing, and of any hidden defects as soon as they become apparent. The Customer must notify the carrier immediately of any transport damage. Non-observation of the obligation to check and give notice of defects will void any and all warranty claims for those deficiencies.

6.6 Our liability for slight negligence is limited to claims owing to injury to life, the body or the health, to claims from product liability as well as claims from the culpable breach of essential contractual duties, through which the contract is endangered. Incidentally, our liability for slightly negligent breach of essential contractual duties is limited to the typically incurring damages which we could have foreseen when the contract was concluded.

6.7 If the Customer uses the delivered products with materials that are harmful to the environment, poisonous, radioactive or dangerous in any other way, Customer shall be obliged to clean them prior to any return shipment. All cleaning, decontamination, and disposal costs shall be the sole responsibility of Customer.

7. Warranty period, Limitation of Actions

The warranty period for all our products shall be one year and starts at the time of delivery of products to the Customer. The same shall apply to claims for damages irrespective of legal basis. The period of limitations of Sec. 438, paragraph 1, no. 1 and 2, Sec. 479, paragraph 1 and Sec. 634a, paragraph 1, no. 2 of the German Civil Code remain unaffected.
Any of the above limitations and or exclusions of remedies or damages shall not apply to claims according to malicious non-disclosure of a defect, to product liability and for damages from injury to life, the body or the health and for other damages, which are due to wilful intent or gross negligence.

8. Software use

8.1 As far as software is contained in the delivery, the Customer will be granted the non-exclusive right to use the software delivered including its documentation. Use of the software on more than one system is prohibited.

8.2 The Customer may only copy, transfer or translate the software in a legally acceptable scope (Sec. 69a ff. German Copyright Law (UrhG)) or convert from the object code into the source code. The Customer is obliged to not remove our and/ or the Software Supplier's instructions, especially copyright entries, or to change them without our prior permission.

8.3 All remaining rights to the software and the documentation thereof, including copies, remain with us and/or Software Supplier. Granting of sublicenses is strictly forbidden.

9. Installation

9.1 Installation costs shall be invoiced monthly. Fixed installation prices shall apply to the installation work as agreed upon.In other cases our actual price list for installation and service shall apply.

9.2 As far as required the Customer shall be responsible for providing the following at his own expense: lighting, motive power, compressed air, water, electrical power for welding, heating including any required connections, electrical installations for the connection of the products delivered by us, the required devices (e.g., hoisting equipment), a lockable room for storing material, tools and clothing during the installation.

10. Spare Parts, Maintenance/Repair and Calibration

10.1 For spare parts, maintenance, repair and calibration services our current repair and replacement price list shall apply.

10.2 In case we have an obligation to maintain/deliver spare parts, the obligation shall be limited to a period of five years from the date of delivery of the products. As far as spare parts are not manufactured by us or are no longer available on the market, e.g. electrical components, or as far as raw materials required for spare part production are no longer available, our obligation to supply spare parts shall be void.

10.3 For calibration and servicing normally disposables from our production lines shall be used.

10.4 Any servicing and/or calibration service shall only be performed upon presentation of a proper and duly signed declaration on the absence of health hazards.

10.5 For service values up to 50 Euros we reserve the right to service/repair without providing a seperate cost estimate.

11. Legal reservation, Industrial proprietary rights, secrecy

11.1 We reserve ownership in any of the tools, moulds, samples, diagrams, commercial or technical documents produced or provided by us as well as all copyrights, proprietary and intellectual property rights in any such item. This also applies if the corresponding costs are wholly or partly borne by the Customer. The Customer may use any of the above only as agreed to in writing. The Customer may neither manufacture nor have manufactured subjects of this agreement without our prior written approval.

11.2 If we deliver products according to designs or other requirements specified by the Customer (models, samples etc.), the Customer shall be liable by default for eventual infringements of industrial property rights or other rights of third parties by manufacturing and delivery of such products. He shall be obligated by default to provide compensation for all damages resulting from such legal infringements.

11.3 All information acquired through the business relationship with us which is not deemed to be public knowledge shall be deemed proprietary and may not be disclosed to any third party.

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Banking details	**Account numbers**		**IBAN**	**SWIFT-BIC**
Sparkasse Aschaffenburg	31 5	BLZ 795 500 00	DE91 7955 0000 0000 0003 15	BYLA DE M1 ASA
Postbank Frankfurt	40 00 16 06	BLZ 500 100 60	DE71 5001 0060 0040 0016 06	PBNK DE FF
Commerzbank AG	30 99 40 40 0	BLZ 790 800 52	DE63 7908 0052 0309 9404 00	DRES DE FF 790
Deutsche Bank AG	01 05 61 9	BLZ 508 700 05	DE49 5087 0005 0010 5619 00	DEUT DE FF 508