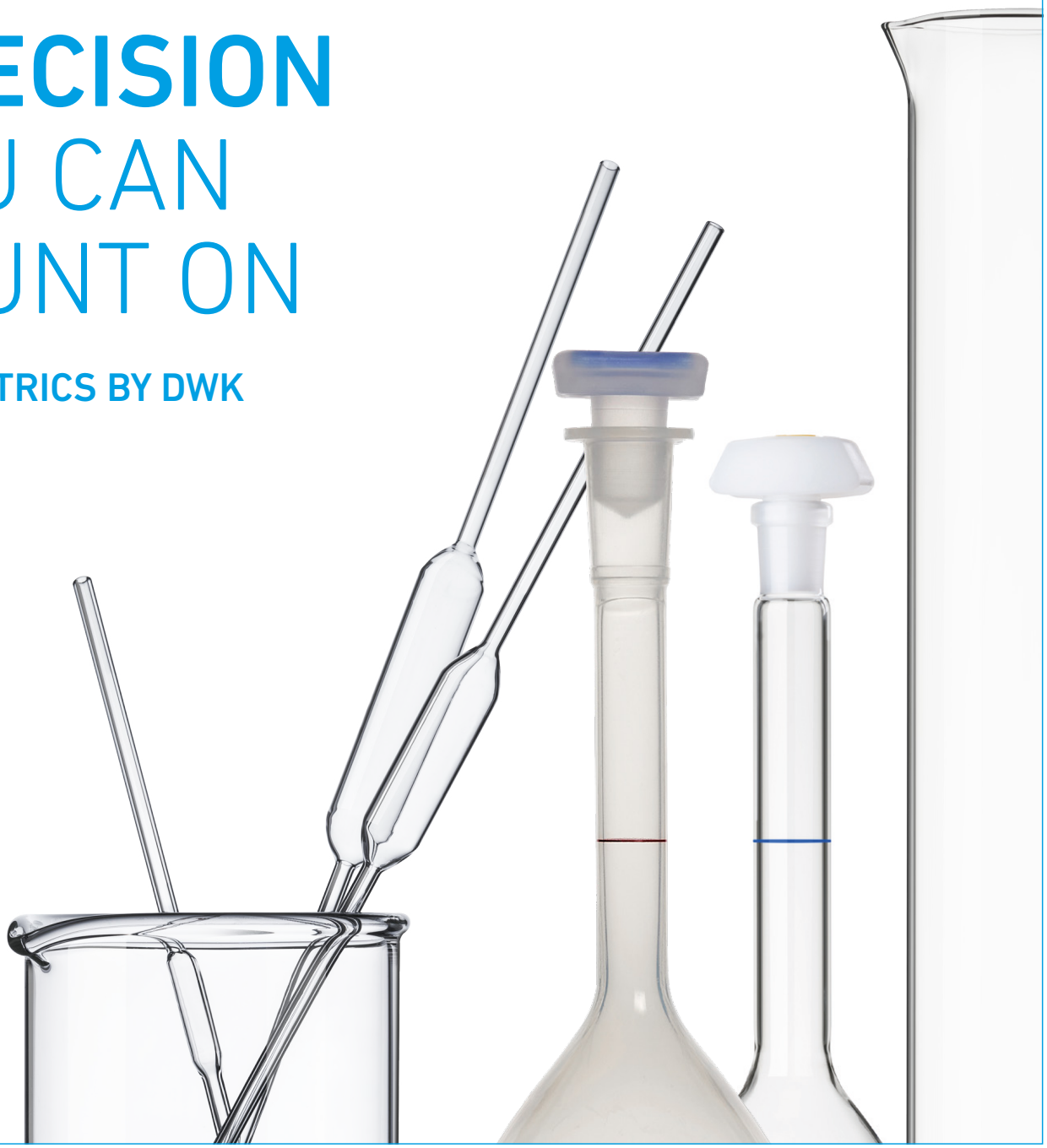
PRECISION
YOU CAN COUNT ON

VOLUMETRICS BY DWK



DWK LIFE SCIENCES
DURAN WHEATON KIMBLE

GAINING PRECISION FROM QUALITY

VOLUMETRICS BY DWK

Measuring exact volumes is an everyday routine task in the laboratory. This makes it even more important to ensure the long-term quality of the instruments required for this purpose, from volumetric flasks to stoppers, day after day, for every analysis.

Volumetric instruments are integral pieces of laboratory glass- and plasticware with which the precise measurement of liquids is possible. All volumetric instruments from DWK Life Sciences are manufactured to the highest possible standards. Our range includes a variety of volumetric flasks and cylinders, pipettes, and burettes as well as accessories.

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VOLUMETRICS BY DWK

VOLUMETRIC GLASSWARE

DWK Life Sciences manufactures several brands of volumetric glassware. The majority are made from borosilicate glass, but some are made from soda-lime glass. Soda-lime glass is generally used for products where long-term exposure to chemicals is unlikely, such as markers and graduated pipettes.

Borosilicate glass has superior thermal and chemical resistance and is more suitable for glassware used to store solutions, e.g. volumetric flasks. The use of borosilicate glass for volumetric glassware means that accuracy is retained over a longer working life than its soda-lime glass equivalents.

With everyday use, volumetric glassware requires recalibration. Soda-lime glass items generally require twice as many recalibrations as borosilicate glass items. The international standards for calibration of laboratory volumetric glassware, ASTM 542 and ISO 4787, recommend that volumetric glassware be recalibrated at the following intervals (or sooner if chemical corrosion is observed) Borosilicate glass: 10 years; Soda-lime glass: 5 years.

GLASS STANDARDS

The glass products supplied by DWK Life Sciences are manufactured from different glass types which comply with the following international standards:

Standard	3.3 Expansion Borosilicate Glass	4.9 Expansion Borosilicate Glass (Clear)	5.4 Expansion Borosilicate Glass (Amber)	7.8 Expansion Soda-Lime Glass (Amber)	9.1 Expansion Soda-Lime Glass (Clear)
ASTM E-438	Type 1 Class A	Type 1 Class B	Type 1 Class B	Type 2	Type 2
US Pharmacopoeia (USP)	Type 1	Type 1	Type 1	Type 3	Type 3
European Pharmacopoeia (EP)	Type 1	Type 1	Type 1	Type 3	Type 3

All volumetric glassware is manufactured and calibrated in accordance with international ISO (Europe, Asia, rest of world) and ASTM (North and South America) standards to ensure very accurate determination and measurement of specific volumes. They are available in two accuracy classes: Class A/AS and Class B. The two classes differ in the accuracy of the measurement, with Class A/AS being the highest accuracy. Class B accuracy tolerances are twice those of Class A/AS. Class AS products are calibrated to the same high tolerances as Class A, but are designed to allow faster flow in burettes and pipettes.

All our volumetric glassware is marked with a set of inscriptions in accordance with the relevant ISO, e.g. ISO 1042 for volumetric flasks. These markings include:

- Tolerance: Class A/AS or Class B
- The standard to which the product conforms
- Graduations (in millilitres)
- Whether the item is calibrated IN (to contain) or EX (to deliver)
- The temperature (in degrees Celsius) at which the item was calibrated.

If the product is calibrated to Class A/AS accuracy tolerances, it is usually marked with a batch or individual serial number for identification and traceability.

CERTIFICATION

DWK Life Sciences offers a wide range of products with different types of certification. This certification includes specific volumetric calibration and conformity certificates, batch certificates, as well as other types of product specific certification.

VOLUMETRIC PRODUCT CERTIFICATION

Many of our volumetric products are available with conformity or traceability certification. Below is an overview of the certifications offered by DWK Life Sciences:

UKAS Certified Products

A range of volumetric flasks and measuring cylinders are available with individual UKAS (United Kingdom Accreditation Service) calibration certificates. As well as detailing the volume (at 20°C) and uncertainty of measurement, UKAS calibration certificates also include information on environmental conditions of the calibration laboratory (in which the product was calibrated) and the calibration equipment used.
For example, PYREX® cylinders are calibrated at five points on the graduated scale, i.e. a 250ml cylinder will be calibrated at 50, 100, 150, 200 and 250ml.

Individual Calibrated Certificate

Class A/AS volumetric products with individual certificates (volumetric flasks, measuring and mixing cylinders, burettes and pipettes) are marked with an individual serial number and supplied with a unique calibration certificate. Each certificate includes details of the actual volume, the estimated uncertainty for the calibration and the required tolerance for compliance.

Serialized Certificate

Class A Serialized volumetric products (KIMBLE® volumetric flasks, measuring and mixing cylinders, burettes and pipettes) are supplied with a Certificate of Accuracy or Certificate of Calibration.

Batch Certified Products

Batch certificates for Class A/AS volumetric articles (Class A volumetric flasks and measuring and mixing cylinders as well as pipettes) can be downloaded from the DWK Life Sciences Certificates website **cert.dwk.com**. The batch certificate contains detailed information on the specific production batch including average volume and standard deviation for the batch.

Individual or batch certification is not available for Class B accuracy volumetric products.

RECALIBRATION OF VOLUMETRIC GLASSWARE

In general, volumetric glassware only needs to be recalibrated after extensive or demanding use, which may have affected the original accuracy.

Recalibration is usually not required if:

- The glassware is new but has been stored for some time. Age does not affect accuracy.
- Glassware is only exposed to moderate temperatures, such as cleaning in a laboratory dishwasher or or sterilised in an autoclave at 121°C.
- Glassware has been used for less than 5 years without repeated use of corrosive chemicals or strong acids/alkalis.

Recalibration should be considered under the following circumstances:

- The glassware is made of soda-lime glass and has been in use for 5 years.
- The glassware is made from borosilicate glass and has been in use for 10 years.
- The glassware has been exposed to temperatures over 150°C.
- The glassware is frequently used with strong acids or bases.
- There is evidence of chemical corrosion, e.g. frosting of the internal glass surfaces.

CARE AND MAINTENANCE OF VOLUMETRIC GLASSWARE

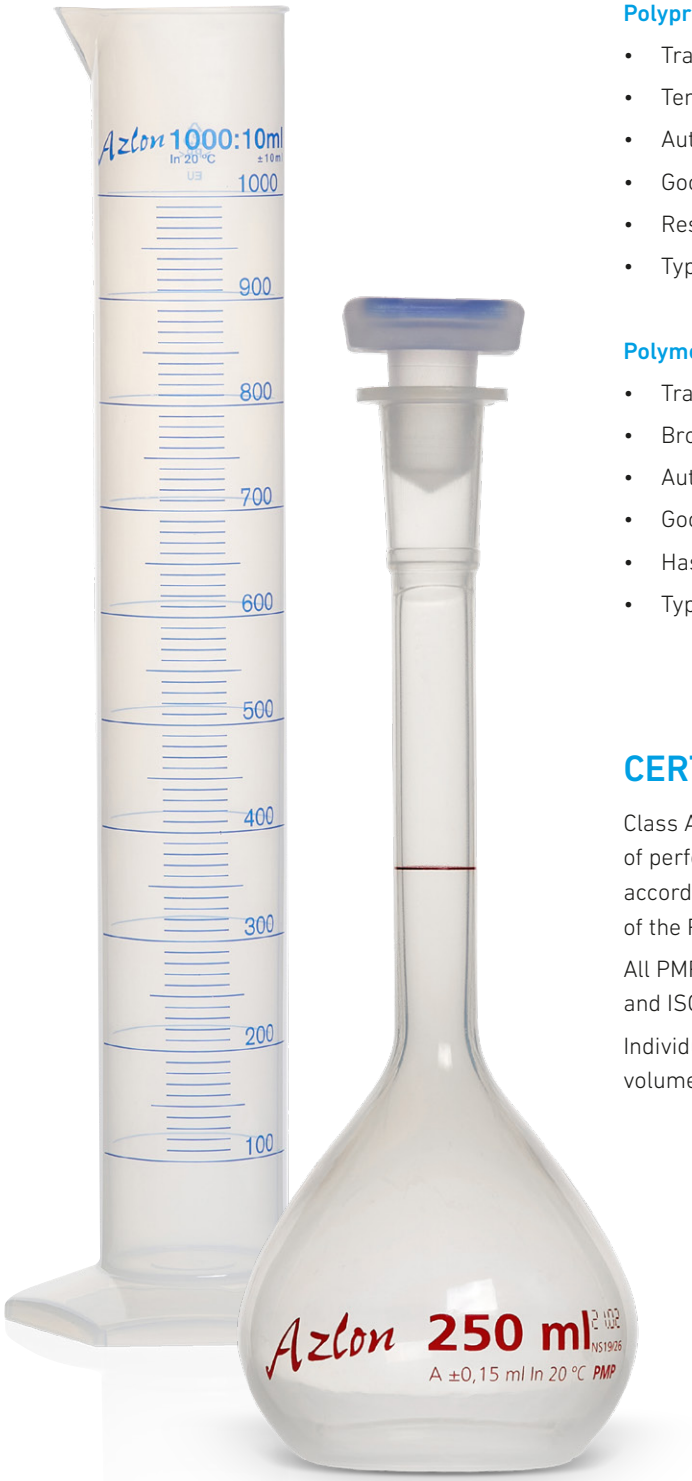
- Always ensure that volumetric glassware is kept scrupulously clean.
  Dirt, especially grease, can distort the shape of the meniscus and can also cause droplets of liquid to adhere to the walls of the vessel.
  Both seriously affect accuracy. (Good cleanliness is indicated by even wetting of the glass surface with distilled water).
- Never pipette by mouth. Always use a specially designed pipette filler.
- Autoclaving at 121°C and cleaning glassware in an automatic dishwasher will not affect the accuracy of volumetric products.
- All items should be held vertically when reading the meniscus. The meniscus should be at eye level to avoid parallax errors.
- When using highly corrosive acids, etc., choose volumetric products made of chemically resistant borosilicate glass.
- Never expose volumetric glassware to direct heat, such as hotplates and Bunsen flames, as this will affect accuracy,

DWK Life Sciences provides this technical information to the best of its knowledge for the safety of its customers.

VOLUMETRICS BY DWK

VOLUMETRIC PLASTICWARE

DWK Life Sciences offers a range of volumetric plasticware under the AZLON® brand.
They are manufactured from Polypropylene (PP) and Polymethylpentene (PMP) TPX.
Below are some of the characteristics and properties of these resins.



Polypropylene (PP)

- Translucent rigid polymer
- Temperature range -20 to +135°C
- Autoclavable at 121°C
- Good to excellent chemical resistance
- Resistant to fatigue making it tough
- Typically used for beakers, bottles, caps, and cylinders

Polymethylpentene (PMP) TPX

- Transparent rigid polymer
- Broad temperature range -180 to +145°C
- Autoclavable at 121°C
- Good to excellent chemical resistance
- Has a low density and a high clarity
- Typically used for beakers and cylinders

CERTIFICATION

Class A volumetric products are supplied with a Batch Control Certificate of performance. Final test values are at 20°C and the test is carried out according to ISO 4787. The standards used are in accordance with those of the PTB (Federal Institute of Physics and Metrology).

All PMP Class A volumetric cylinders are certified complaint to DIN 12681 and ISO 6706. All volumetric flasks are complaint to DIN EN ISO 5215.

Individual or batch certification is not available for Class B accuracy volumetric products.

CARE AND MAINTENANCE OF VOLUMETRIC PLASTICWARE

The following guidelines are provided to ensure that your plastic labware is kept in the best possible condition.

General Precautions

Chemicals can adversely affect the performance of laboratory plasticware, resulting in cracking, loss of strength and flexibility, etc.

When in doubt, note the type of polymer the product is made from, the chemical to be used, then check compatibility by checking against our chemical resistance chart (https://www.dwk.com/chemical-compatibility-calculator). Can't find the chemical you are looking for? Contact our plastics technical experts.

Heating

Never place plastic items in direct contact with a flame or on a hotplate. Most plastics allow the transmission of microwaves. However, as with any microwave container, make sure it contains a microwave-absorbing material, such as water, beforeabsorbing material, such as water, before placing it in the oven.

Washing and cleaning

Most laboratory plasticware can be easily cleaned in warm water with a suitable detergent and a soft cloth or sponge. Avoid the use of abrasive cleaners or scouring pads, which can scratch the surface. A low or non-alkaline detergent is suitable for cleaning most plastic items, but polystyrene and polycarbonate products are susceptible to alkaline attack and a neutral detergent is recommended.

When using an automatic laboratory dishwasher to wash plastic volumetric items such as volumetric flasks, use a wash temperature of less than 60°C as high temperatures can affect volumetric accuracy.
Ultrasonic baths can be used to clean plasticware, but care must be taken to ensure that the products do not come into direct contact with the transducer membrane.

Excellence in your hands

Contact us at **DWK.com**

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