



**Exercises**

1. Have a look at the technical terms in bold and translate them.
2. Copy all sentences in the passive voice and translate them.
3. Choose three of the sentences in the passive and transfer them into the active voice.
4. Write an instruction for a titration on the basis of this text.

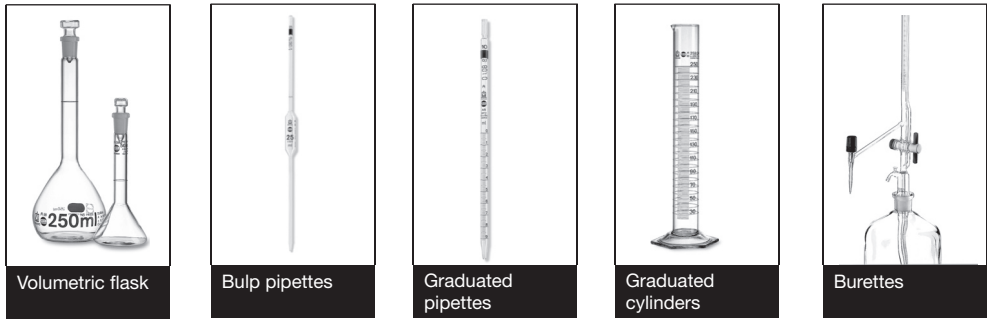
**10.3.2 Volumetric measurements**

(Learning the basics – how to work with Volumetric Measuring Instruments)

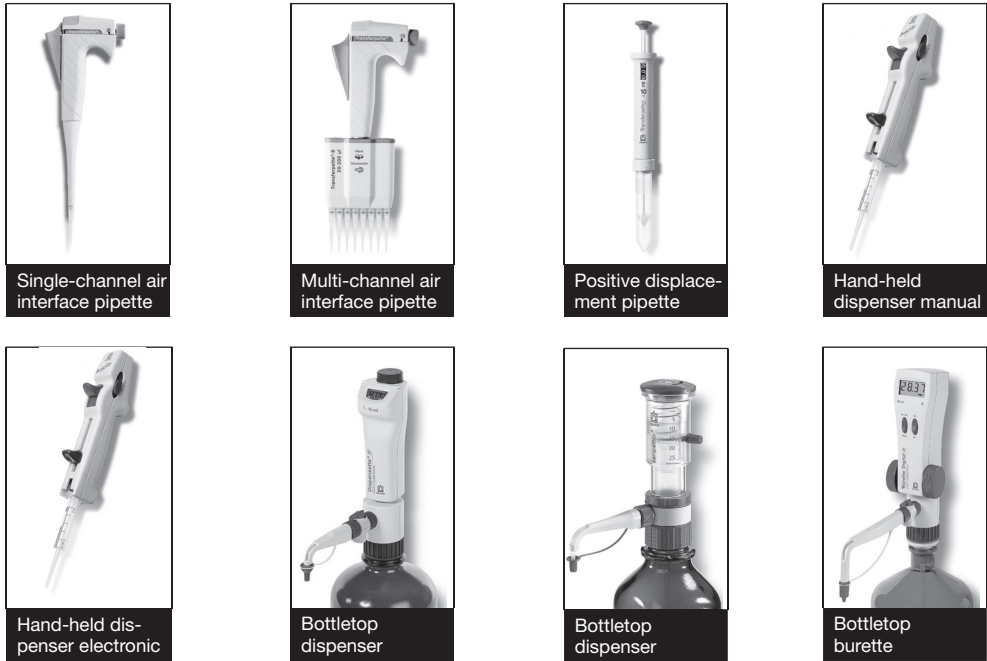
**Volumetric instruments – an overview**



**Volumetric glassware.** The volumetric measurement of liquids is a routine operation in the laboratory. Therefore, volumetric instruments made of glass, such as volumetric flasks, bulb pipettes, graduated pipettes, graduated cylinders and burettes are standard equipment. Many suppliers offer volumetric instruments in varying qualities. A selection of high-quality volumetric instruments by BRAND is illustrated below:



**Liquid Handling Instruments.** To meet the ever growing demands on volumetric measuring in the lab, such as testing in series, new devices are constantly being developed, e.g., for dispensing, pipetting and titrating. Usually,



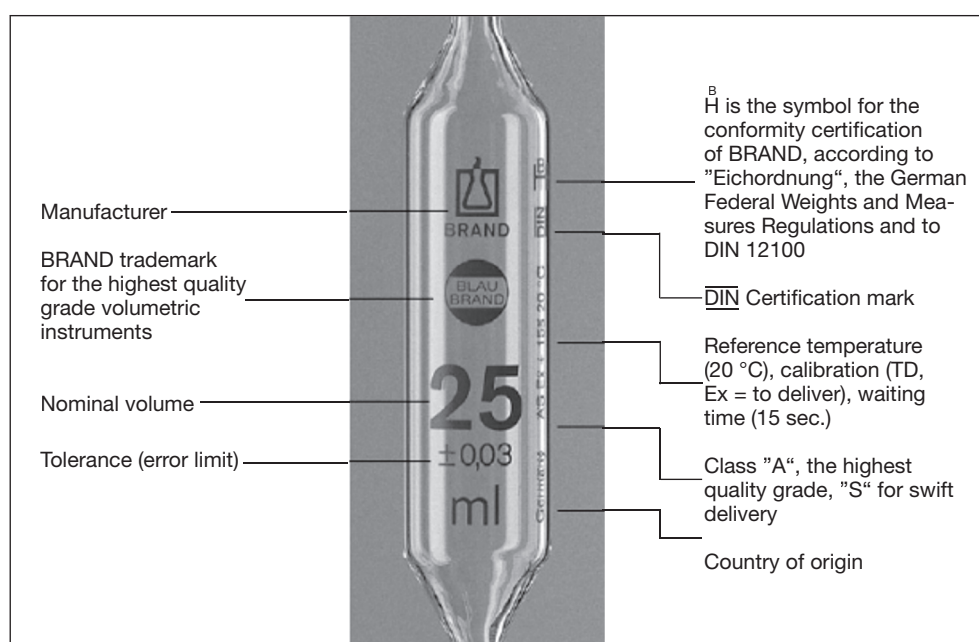
the instruments designed by different manufacturers for a particular purpose are more or less similar in function. However, you may find major differences when it comes to manufacturing quality, attention to detail, and design. This selection of Liquid Handling Instruments by BRAND illustrates the range of instruments available.

### Imprints on the finished instrument

For accurate volumetric measurements in the laboratory, only high-quality volumetric instruments should be used which are manufactured, according to DIN standards, from chemically resistant glass. The calibration conditions must be adhered to meticulously. Inscriptions and graduations must be clearly legible and permanent.

The German Institute for Standardization (DIN) stipulates the following information to be marked on volumetric instruments:		The following information may also be added:
<ul style="list-style-type: none"> <li>• Manufacturer</li> <li>• Nominal capacity</li> <li>• Unit</li> </ul>	<ul style="list-style-type: none"> <li>• Calibration</li> <li>• Class</li> <li>• Calibration temperature</li> </ul>	<ul style="list-style-type: none"> <li>• Country of origin</li> <li>• Error limit</li> <li>• Brand name (here: BLAUBRAND®)</li> <li>• Certification body, e.g., DIN</li> <li>• Batch number</li> </ul>

### Inscriptions on a BLAUBRAND® Bulb Pipette



### Accuracy classification of volumetric instruments

Volumetric instruments are generally available in two accuracy classes:

**Class A/AS.** This is the highest grade of accuracy, generally achieved only by volumetric instruments made of glass. An exception are specific plastic graduated cylinders made of PMP, e.g., by BRAND; these were designed to meet the highest requirements and conform to Class A. All values for error limits, accuracy and coefficient of variation are within the limits defined by DIN and ISO. Class A and Class AS have the same error limits, but differ in