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JAPANESE INDUSTRIAL STANDARD

Volumetric Glassware

⑤ JIS R 3505-1983

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1. Scope

This Japanese Industrial Standard specifies volumetric glassware, hereinafter referred to as the "volumeters".

2. Types and Grades

2.1 Types The volumeters shall be classified into 8 types described below.

- (1) Buret
- (2) Measuring pipette
- (3) One-mark pipette
- (4) One-mark flask
- (5) Graduated measuring cylinder
- (6) Conical measuring glass
- (7) Measuring beaker
- (8) Measuring beaker with handle

2.2 Grade The volumeters shall be classified into two grades below by the heat resistance temperature and alkali soluble quantity of material glass.

- (1) Hard quality
- (2) Medium quality

3. Common Conditions

The common conditions required are as described below.

- (1) The volume of volumeter shall be determined with water and represented in cubic meters or litres.
- (2) The volumeters shall be scaled at the standard temperature of 20 °C.

Remark: The volume may be scaled at a temperature different from 20 °C, subject to agreement between the parties concerned. In this case, the temperature shall be expressly noted.

- (3) In determining the volume of volumeter, the meniscus shall be sighted in accordance with Fig. 1, 2 or 3.

Fig. 1. Horizontal Sighting

(Front View) (Side View)

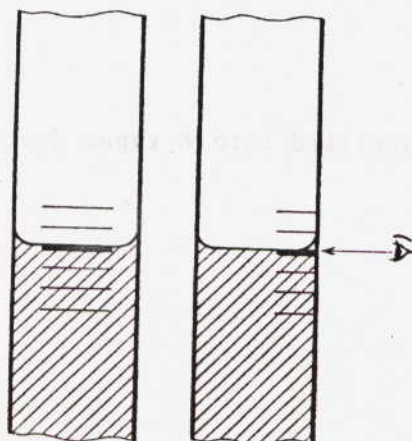
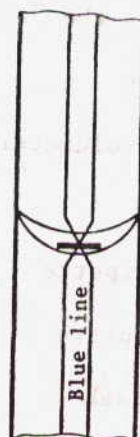


Fig. 2. For Blue-lined Volumeter

(Front View)



(Take the point of the blue line where it looks narrowest by being refracted at the meniscus as the bottom of meniscus.)

Fig. 3. Sighting for Conical Article

(Front View)

(Side View)



The position of eye rises a little

(Since the horizontal light rays from the bottom of the meniscus refract at the glass wall, position the eye on the track of the refracted rays.)

4. Quality

4.1 Glass Material of Volumeters The quality of glass material of the volumeters shall meet the requirements given in Table 1, when tested in accordance with JIS R 3502.

Table 1

Item \ Grade	Hard quality	Medium quality
Heat resistance temperature °C	180 min.	70 min.
Alkali soluble quantity mg	0.1 max.	2.5 max.
Wall thickness	To be even.	
Shape	To be correct and free from flaw.	
Function	To be perfectly useful to intended purposes.	
Base material	To be free from unresolved materials and foreign matter, and to be transparent except for a material for special purposes. Also, to be free from bubbles and striate affecting serviceability.	
Strain	Remarkable interference pattern shall not be observed under test with an interferometer.	

Remark: The inspection for wall thickness, shape, function and base material shall be made by the naked eye.

Reference: The interferometer is an instrument used to find and observe the strain in glass.

In the method, the strain is inspected by observing the polarized light rays that are produced by means of a polarizing plate or suitable reflecting plate and led through the glass under test, using a polarizing plate or an substituting equipment therefor.

4.2 Volumeter The quality of volumeter shall be as specified below.

- (1) The scaled part shall be free from bubbles that may affect the sighting of meniscus.
- (2) The graduation line shall be horizontal, shall have a thickness within 0.1 to 0.4 mm and not more than 1/3 the line spacing, and shall be not less than 0.8 mm long. However, measuring beakers and conical measuring glass are to have the thickness of graduation line within 0.1 to 0.6 mm.

- (3) The top of volumeter shall be horizontal and smooth.
- (4) The axes of the bodies of one-mark volumetric flask, graduated measuring cylinder, conical measuring glass and measuring beaker with or without handle shall be vertical to the horizontal plane, with an allowance less than $1/30$ inclination. The stability shall be good.
- (5) An article of coloured material shall be able to exhibit fully its effectiveness and shall facilitate easy sighting of the meniscus.
- (6) In an article that has a blue line in the base material, the line shall be clear with sharp sides and parallel to the axis of the article.

5. Volume, Shape, Dimensions and Limit of Volumetric Error, and Delivering Time

The volume expressed by the volumeter (nominal capacity), and the shape, dimensions and limit of volumetric error, and the delivering time of the volumeter shall be as specified in Attached Tables 1 to 8.

6. Test Methods

6.1 Testing of Glass Material The testing of glass material shall comply with JIS R 3502.

6.2 Testing of Volumeter The testing of volumeter shall be conducted in the following ways:

- (1) Methods of Measuring Volumes The methods of measuring volumes shall comply with the Measurement Law.
- (2) The qualities stated in 4.2 shall be inspected by the naked eye.

7. Marking

The volumeters shall be clearly marked with the following particulars:

- (1) Nominal capacity
- (2) Manufacturer's name its abbreviation