

IMMERSED BODY (PLUMMET) 10 and 100ml
DV5000

MANUAL

1 PRODUCT DESCRIPTION

The Plummet method (Immersed body or Density ball) is a universal instrument to determine the density of paints or related products. The method is based on 'Archimedes' principle. The upward force caused by immersing the plummet into the liquid is read from an analytical balance and expressed in grams/ml.

2 STANDARDS

According to DIN EN ISO 2811-2 (former DIN 53 217, part 2) and VDA 621-113
Read the standard(s) carefully before making the measurements.

3 SPECIFICATIONS

The Plummet consists of a spherical body made from stainless steel, material no. 1.4035, with holding rod and narrow neck section. The neck has a diameter of 1mm for the 10ml ball and a 3mm diameter for the 100ml ball.

The Plummet is available with a volume of:

10 ml \pm 0,005 ml at 20gr.C. Ball diameter: Approx. 26 mm and /or
100 ml \pm 0,05 ml at 20gr.C. Ball diameter: approx. 57 mm.

A stand to hold the Plummet is a needed part of the equipment (not included).

4 DETAILS

A fixed part of the equipment to make density measurements consists of a thermometer +10 to +50°C divided in 0,2 °C or better and a laboratory balance with an accuracy of 10mg. The test should be made in a temperature conditioned area.

5 PREPARATIONS

Clean carefully all components and be sure that conditions of test product, beaker or measuring glass, plummet and room have the right temperature.

6 PERFORMA MEASUREMENT

Fill a beaker with sufficient liquid, 400ml for the 100ml ball and 100ml for the 10ml ball. Use a thermometer to check the liquid temperature according to specifications. Place beaker or glass with contents on the weighing plateau of the balance and register the weight or tare the scale to zero. By use of the stand fit the plummet in such a way that free immersion in the liquid is possible. DON'T let the holding rod make contact with the beaker



rim. Immerse the plummet completely in the liquid up till the mid of the thin neck above the ball. Register the weight again in mg on the scale. See picture below.

(for coatings with highly evaporating solvents we recommend the standard ISO 2811-2)

The next equation is applied to calculate the specific density ρ of the specimen in g/ml at test temperature t:

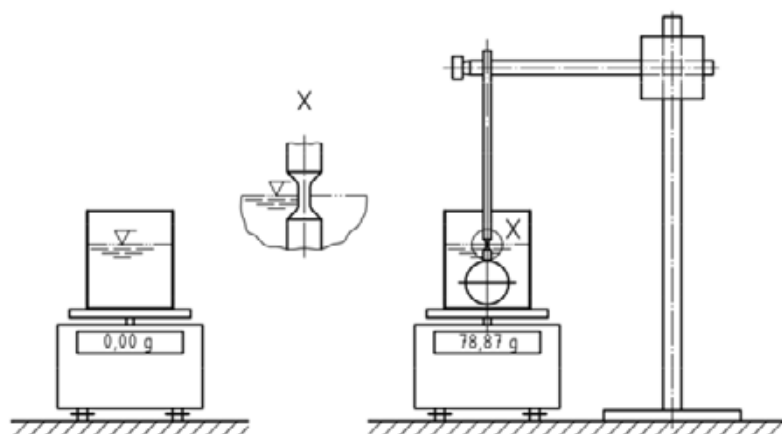
$$\rho = \frac{W2 - W1}{V} + \rho_L$$

W1: Weight in g of beaker with test material before immersion of the ball.

W2: Weight in g as shown on scale after immersion of ball.

V: Volume in ml of ball up till the middle of the thin neck just above the ball.

ρ_L : Air density = 0,0012 g/ml



The determined density should be specified to an accuracy of 0,001 g/ml; the reference temperature must be stated.

7 MAINTENANCE

- This instrument is precision-machined. Never drop it or knock it over.
- Always clean the instrument after use with a suitable solvent which leave no residue to overcome measuring errors.
- Never clean the instrument by any mechanical means such as a wire brush or abrasive paper. This may cause, just like the use of aggressive cleaning agents, permanent damage.
- Always keep the instrument in its case when not in use.

8 RELATED PRODUCTS

DV5000	Immersed body (plummet) 10ml, type X	Incl. works certificate
DV5001	Immersed body (plummet), 100ml, type C	Incl. Works certificate
DV5002	Stand for immersed body (plummet)	
VF0000	Calibration certificate	On request
VF0000	Thermometer +10 -+ 50°C	On request
DI1700	Weighing scale 0 – 1000gram	On request

9 TECHNICAL SPECIFICATIONS

Article	Type X	Type C
Diameter Ball	26 mm	57 mm
Volume	10 ml	100 ml
Diameter neck	1 mm	3 mm
Overall length	260 mm	260 mm
Working temperature	23°C	23°C

10 DISCLAIMER

The right of technical modifications is reserved.

The information given in this manual is not intended to be exhaustive and any person using the product for any purpose other than that specifically recommended in this manual without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at his own risk. Whilst we endeavour to ensure that all advice we give about the product (whether in this manual or otherwise) is correct we have no control over either the quality or condition of the product or the many factors affecting the use and application of the product. Therefore, unless we specifically agree in writing to do so, we do not accept any liability whatsoever or howsoever arising for the performance of the product or for any loss or damage (other than death or personal injury resulting from our negligence) arising out of the use of the product. The information contained in this manual is liable to modification from time to time in the light of experience and our policy of continuous product development.

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