International Standard ISO 3923/2

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Metallic powders — Determination of apparent density — Part 2 : Scott volumeter method

Poudres métalliques — Détermination de la masse volumique apparente — Partie 2 : Méthode du volumètre de Scott

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

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It has been approved by the member bodies of the following countries :

Austria	Germany, F. R.	Romania
Bulgaria	India	South Africa, Rep. of
Canada	Italy	Spain
China	Japan	Sweden
Czechoslovakia	Korea, Rep. of	United Kingdom
Egypt, Arab Rep. of	Norway	USA
France	Portugal	USSR

No member body expressed disapproval of the document.

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Metallic powders — Determination of apparent density — Part 2 : Scott volumeter method

1 Scope and field of application

This part of ISO 3923 specifies the Scott volumeter method for the determination of the apparent density of metallic powders. It is applicable to powders that will not flow freely through a 5 mm orifice (see ISO 3923/1).

Part 3 of this International Standard specifies the oscillating funnel method for the determination of apparent density of such powders, and this is preferred since it gives better precision, but it cannot be used in cases where the powder may change its properties due to the vibration action applied to the powder during testing.

2 References

ISO 3923/1, *Metallic powders — Determination of apparent density — Part 1 : Funnel method.*

ISO 3923/3, *Metallic powders — Determination of apparent density — Part 3 : Oscillating funnel method.*

3 Principle

Measurement of the mass of a certain quantity of powder which in a loose condition exactly fills a cup of known volume.

The loose condition is obtained, when filling the cup, by cascading the powder over a series of inclined plates in a Scott volumeter (see figures 1 and 2).

The ratio between the mass and the volume represents the apparent density.

4 Symbols and designations

Symbol	Designation	Unit
ϱ_a	Apparent density of metallic powders (general term)	g/cm^3
ϱ_{as}	Apparent density obtained by the Scott volumeter method	g/cm^3
m	Mass of the powder	g
V	Volume of the cup	cm^3

5 Apparatus

5.1 Scott volumeter, comprising :

5.1.1 Funnel, having a large and a small conical section separated by a cylindrical section and incorporating a brass sieve of aperture size 1,18 mm.

5.1.2 Baffle box, having a square section, and containing four glass baffles which may be located and retained by grooves in opposite sides of the box and may thus be removed for ease of cleaning. The baffles are arranged so that the powder falls on to each of them in turn, thereby breaking the fall and reducing the velocity of the stream of powder. It is important that none of the powder can pass between the upper edge of the glass baffles and the sides of the baffle box. It is also important that the lower edges of the glass baffles are either in line or slightly overlap in a vertical plane.

A typical design of Scott volumeter is shown in figures 1 and 2. Dimensions given with tolerances are mandatory. The other dimensions represent those most frequently used and may vary slightly, provided that the principle requirements previously mentioned are maintained.

5.1.3 Stand and horizontal vibration-free base, to support the cup, box and funnel coaxially at the heights indicated in the figures.

5.2 Cylindrical cup, having a capacity of 25 ± 0,05 cm^3 and an internal diameter of 30 ± 1 mm.

NOTE — The cup and funnels should be made of non-magnetic, corrosion-resistant metallic material having sufficient wall thickness and hardness to avoid distortion and excessive wear. The inner surfaces of the cup and funnels should be polished.

5.3 Balance, of sufficient capacity, permitting weighing to an accuracy of ± 0,05 g.

6 Sampling

6.1 The test sample shall be of at least 100 cm^3 volume to allow the determination to be carried out on three test portions.