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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Impermeable sintered metal materials and hard metals --
Determination of density
(English Translation)**

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1 Scope

This Standard specifies a method of determining the density of impermeable sintered metal materials and hardmetals.

NOTE: For the determination of density of permeable sintered metal materials, see ISO

2738:1999, Sintered metal materials, excluding hardmetals - Permeable sintered metal materials - Determination of density, oil content and open porosity.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this document.

ISO 4489 Sintered Hardmetals - Sampling and Testing

3 Principle

Weighing of a specimen, first in air and then in a liquid, and determine the density by calculation.

4.1 Balance

For specimen with weight no greater than 10g, the specimen weighing shall be accurate to ± 0.1 mg; for the specimen with weight greater than 10g, the specimen weighing shall be accurate to $\pm 0.001\%$ of the weighing. The counter poise shall be calibrated, and have a density of no less than 7g/cm³.

4.2 Arrangement of suspension rack or suspension wire

The measuring device shall refer to Figures 1 and 2. In general case, the suspension wire shall have a maximum diameter of 0.25 mm. A thicker suspension wire shall only be used if this is necessary to support the heavy specimen.

4.3 Vessel

The size of the vessel shall be appropriate, which shall be such that when placing the specimen with volume less than 10cm³ into the liquid, the rise in liquid level shall be no greater than 2.5 mm.

4.4 Liquid

The liquid may use the distilled or deionized water, and preferably use degassed water; to which 1 or 2 drops of a wetting agent have been added.

5 Specimen

5.1

Sampling shall be carried out according to the provisions of ISO 4489.

5.2

The volume of the specimen shall be no less than 0.5 cm³. When the volume of the specimen is less than 0.5cm³, several specimens may be combined together for testing; however, the volume of each specimen shall be no less than 0.05cm³.

5.3

The surface of the specimen shall be thoroughly cleaned from adhering foreign material, such as dirt, grease and oil.

6 Procedures

6.1

Place the specimen in the upper suspension rack (Figure 1) or suspension pan (Figure 2). The lower suspension rack shall be completely immersed into the liquid, and the

suspension wire shall be hanging freely from the suspension pan and partially immersed in the liquid. Remove all air bubbles and weigh the specimen (m_1).

6.2

Place the test piece on the lower suspension rack (Figure 1) or tie it by means of the metal wire (Figure 2). Then transfer into the vessel containing liquid; only the suspension wire is allowed to be exposed out of the liquid level. Remove all air bubbles and weigh.

6.3

For specimen with weight no greater than 10g, read to 0.1mg; for specimen with weight greater than 10g, read to 0.001% of the weighing.

6.4

The specimen, liquid and surrounding air shall be at the same temperature when weighing is carried out. The temperature of the liquid shall be determined. When distilled water is used, its density shall be taken from Table 1.

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