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**Measuring method for sphericity ratio of titanium and
titanium alloy powders**

钛及钛合金粉末球形率测定方法

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Measuring method for sphericity ratio of titanium and titanium alloy powders

1 Scope

This standard specifies the method for determining the sphericity ratio of titanium and titanium alloy powders.

This standard is applicable to the determination of the sphericity ratio of titanium and titanium alloy powders, which have particle sizes of $5\text{ }\mu\text{m} \sim 250\text{ }\mu\text{m}$. The determination of the sphericity ratio of titanium and titanium alloy powders or other metal powders of other particle sizes can also refer to this standard.

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 standard.

GB/T 5314 Powders for powder metallurgical purposes - Sampling

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Sphericity particle

The particle which has a ratio -- of the length of the major axis TO the length of the minor axis of the powder grain -- not greater than 1.2.

3.2

Sphericity ratio

The ratio -- of the number of sphericity particles to the total number of particles in the test powder.

4 Method principle

Use an optical microscope or scanning electron microscope to directly observe the particle morphology. Use vertical projection method or scanning imaging method, to measure the size of powder particles, to obtain the major axis length and minor axis length of the particles, respectively. Particles which have a ratio -- of major axis length to minor axis length -- not greater than 1.2, can be regarded as sphericity. Through statistics and calculation, the sphericity ratio of the powder can be obtained.

5 Reagents and materials

5.1 Reagents

Dispersant for optical measurement: Absolute ethanol.

5.2 Materials

5.2.1 Glass slide: 75 mm × 25 mm × 2 mm ordinary glass.

5.2.2 Conductive adhesive.

6 Instruments and equipment

6.1 Optical microscope: The magnification can reach 1000 times. It shall be calibrated by a qualified agency; the minimum calibration graduation is 0.01 mm.

6.2 Scanning electron microscopy.

7 Samples

The titanium and titanium alloy powder, which is used for measurement, shall be dry and free of foreign matter. Samples shall be taken according to the provisions of GB/T 5314; the number of samples shall meet the test requirements.

8 Test steps

8.1 Optical microscopy

8.1.1 Place the prepared powder sample on a clean glass slide. Then add a few drops of absolute ethanol with a dropper. Use another glass slide to scrape it. The scraper shall be uniform, so that the powder is well dispersed and shall not damage the powder particles.

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