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JAPANESE INDUSTRIAL STANDARD

Testing method for size distribution of fine ceramic particles by liquid photosedimentation method

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Testing method for size distribution of fine ceramic particles by liquid photosedimentation method

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1. Scope This Japanese Industrial Standard specifies the testing method for size distribution of particles by a light transmission method after sedimenting fine ceramic particles from a state wherein they are homogeneously dispersed in a liquid phase.

Remarks: The following standards are cited in this Standard.

JIS R 1620	Testing methods for particle density of fine ceramic powder
JIS Z 8803	Viscosity of liquid - Methods of measurement
JIS Z 8804	Methods of measuring specific gravity of liquid
JIS Z 8820	General rules for the determination of particle size distribution by sedimentation in liquid

2. Principle of measurement In the testing method for size distribution of particles by a liquid photosedimentation method, particles are sedimented from a state wherein powders are homogeneously dispersed in a liqid phase, variation with time of the concentration is measured by the transmission amount of light to calculate the size distribution of particles. There are two cases wherein powders are sedimented in a gravitational field or they are forcedly sedimented in a centrifugal field to shorten sedimentation time.

This method is based on a fact that the relation between the transmission amount of light, the particle size, and the concentration of particles is represented by the following formula.

$$\log(I_I/I_0) = CL\sum_{i=1}^{n} k_i N_i x_i^2 \quad \cdots\cdots (1)$$

where, I_I : incident amount of light (cd)

I_0 : transmission amount of light (cd)

C : coefficient by the optical system of measuring instrument

k_i : absorptivity of particle

L : optical path length in cell (m)

x_i : diameter of particle of the i-th size (m)

N_i : concentration in the number of x_i particles (l/m^3)

i : index indicating the order in size of particle

3. Apparatus

3.1 Apparatus for measurement of size distribution of particles by liquid photosedimentation method An apparatus for measurement of size distribution of particles by liquid photosedimentation method (hereafter, referred to as "measuring apparatus") shall have a basic structure as exemplified in Figure 1, and shall conform to the following requirements.

(1) The sedimentation cell shall have a transparent wall face parallel to the sedimenting direction of particles.

(2) The measuring apparatus shall be equipped with a function wherein the sedimentation cell is made to transmit light vertically to the sedimenting direction of particles and the transmission amount of light is detected.

(3) Integrated distribution of particle size on mass basis shall be capable of being outputted from the detected transmission amount of light.