⟨811⟩ POWDER FINENESS

The particle size distribution should be estimated by *Particle Size Distribution Estimation by Analytical Sieving* ⟨786⟩ or by application of other methods where practical. A simple descriptive classification of powder fineness is provided in this chapter. For practical reasons, sieves are commonly used to measure powder fineness. Sieving is most suitable where a majority of the particles are larger than about 75 µm, although it can be used for some powders having smaller particle sizes where the method can be validated. Light diffraction is also a widely used technique for measuring the size of a wide range of particles.

CLASSIFICATION OF POWDER FINENESS

Where the cumulative distribution has been determined by analytical sieving or by application of other methods, powder fineness may be classified in the following manner:

x_{90} = particle dimension corresponding to 90% of the cumulative undersize distribution

x_{50} = median particle dimension (i.e., 50% of the particles are smaller and 50% of the particles are larger)

x_{10} = particle dimension corresponding to 10% of the cumulative undersize distribution

It is recognized that the symbol d is also widely used to designate these values. Therefore, the symbols d_{90}, d_{50}, and d_{10} may be used.

The following parameters may be defined based on the cumulative distribution. $Q_R(x)$ = cumulative distribution of particles with a dimension less than or equal to x where the subscript R reflects the distribution type.

R	Distribution Type
0	Number
1	Length
2	Area
3	Volume

Therefore, by definition:

1. $Q_R(x) = 0.90$ when $x = x_{90}$
2. $Q_R(x) = 0.50$ when $x = x_{50}$
3. $Q_R(x) = 0.10$ when $x = x_{10}$

An alternative but less informative method of classifying powder fineness is by use of the terms in the following table.

Classification of Powders by Fineness

Descriptive Term	X_{50} (µm)	Cumulative Distribution by Volume Basis, $Q_3(x)$
Coarse	>355	$Q_3(355) < 0.50$
Moderately Fine	180–355	$Q_3(180) < 0.50$ and $Q_3(355) \geq 0.50$
Fine	125–180	$Q_3(125) < 0.50$ and $Q_3(180) \geq 0.50$
Very Fine	≤125	$Q_3(125) \geq 0.50$