

### 18.3.5 Sample preparation

#### **In-laboratory processing**

The selection, removal, and preparation of the test (or analytical) portions from the laboratory sample.

Note: The processing may include a reduction in the size of the unit(s) (division) and in particle size (reduction), as well as mixing to achieve homogeneity.

#### **Mixing**

The combining of components, particles, or layers into a more homogeneous state.

#### Notes:

- (1) The mixing may be achieved manually or mechanically by shifting the material with stirrers or pumps or by revolving or shaking the container. The process must not permit segregation of particles of different size or properties.
- (2) Homogeneity may be considered to have been achieved in a practical sense when the sampling error of the processed portion is negligible compared to the total error of the measurement system.

#### **Reducing**

Decreasing the size of the laboratory sample or individual particles, or both.

Note: Division of the size of the laboratory sample may be accomplished manually by *coning and quartering* or by *riffling* or mechanically by rotary dividers. Reduction of particle size may be accomplished by *milling* or *grinding*. Simultaneous division and reduction may also be achieved with mills having stream diverters.

#### **Coning and quartering**

The reduction in size of a granular or powdered sample by forming a conical heap which is spread out into a circular, flat cake. The cake is divided radially into quarters and two opposite quarters are combined. The other two quarters are discarded. The process is repeated as many times as necessary to obtain the quantity desired for some final use (e.g., as the laboratory sample or as the test sample).

Note: If the process is performed only once, coning and quartering is no more efficient than taking alternate portions and discarding the others.

## **Riffling**

The separation of a free-flowing sample into (usually) equal parts by means of a mechanical device composed of diverter chutes.

## **Milling/grinding**

The mechanical reduction of the particle size of a sample by attrition (friction), impact, or cutting.

### Notes:

- (1) The required particle size of a sample is related to the size of the test portion and the number of particles required to ensure homogeneity among test portions.
- (2) The reduction in particle size may sometimes result in particles of different hardness and density, which produces inhomogeneity during the preparation of the test sample or during the withdrawal of the test portion.