A 2 b - Powder Bulk Volume

GEA NIRO® Method No. A 2 b

Revised: January 2024

1. Definition

The bulk volume of a powder is the volume of the powder divided by the weight, normally expressed in ml/100g powder.

2. Scope

The method is to be used for milk powders and all other dried milk products.

3. Principle

100 g sample is filled into a glass cylinder and tapped in a Stampf-volumeter. The results of bulk density must be identified as loose, tapped 100 times or tapped 1250 times.

4. Apparatus

4.1 Balance - sensitivity 0.1 mg.

4.2 200 ml measuring glass cylinder.

4.3 Stampf-volumeter, e.g. made by Engelsmann, Germany (Fig. 1).

4.4 Brush.

5. Reagents

None.

6. Procedure

6.1 Weigh out exactly 100 g of powder, and transfer it to the measuring cylinder. Avoid shaking or tapping the cylinder.

6.2 Level off the surface of the powder with the spatula.

6.3 Record the volume (v_1). The volume of the powder indicates "*loose/poured bulk volume"*.

6.4 Tap the cylinder 100 times in the Stampf-volumeter.

6.5 Record the volume (v_2). The volume of the powder indicates "*tapped powder bulk volume"*.

6.7 Continue tapping the sample further 1150 times in the Stampf-volumeter.

6.8 Record the volume (v_3). The volume of the powder indicates "*tapped to the extreme powder bulk volume"*.

7. Result

The results are expressed as:

- Loose/poured bulk volume - tapped 0 times.
- Tapped bulk volume - tapped 100 times.
- Tapped to the extreme bulk volume - tapped 1250 times.

Bulk Volume (BV) = v_x

8. Reproducibility

± 5 ml/100 g for loose bulk volume.

± 2 ml/100 g for tapped 100 and 1250 times.

Unless other is stated, bulk density is made as single determination.

9. Remarks

9.1 Bulk density depends on water content and particle size. Avoid adsorption or desorption of water before determination.

9.2 To obtain reliable results, make sure the powder has room temperature when analysing.

9.3 Powder bulk volume can easy be converted into powder bulk density by use of the formula:

$$\text{Bulk density (BD)} = \frac{100}{BV} \quad [g/ml]$$

;

BV = bulk volume of 100 g powder in ml/100g 100

= weight of powder sample in g

Calculate the result to 2 decimal places.

10. Literature

- GEA Niro Research Laboratory
- IDF Standard 134A:1995 - Dried milk and dried milk products -Determination of bulk density.
- Svarovsky L., Powder Testing Guide: Methods of measuring the physical properties of bulk powders. ISBN 1851661379, Elsevier Science (1987).

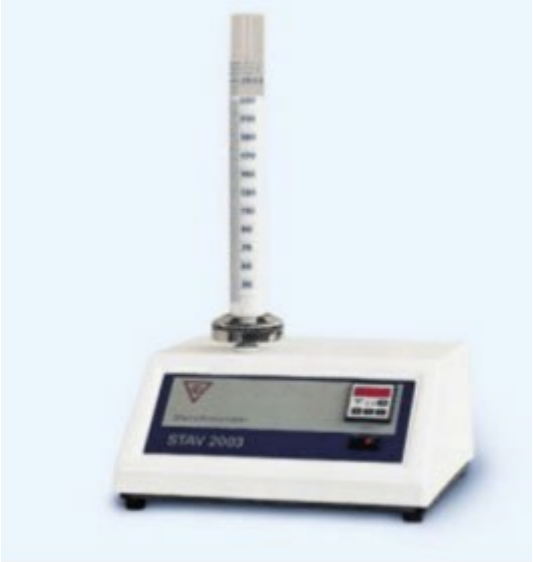

Fig. 1 Stampf-volumeter