SLOVENSKI STANDARD
SIST ISO 8460:1995

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Instant kava - Ugotavljanje prostorninske mase s standardiziranima instrumentoma kot podatek pri prodaji instant kave v napolnjenih zabojnikih

Instant coffee -- Determination of free-flow and compacted bulk densities

Café soluble -- Détermination de la masse volumique sans tassement et après tassement

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67.140.20 Kava in kavni nadomestki Coffee and coffee substitutes

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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Instant coffee — Determination of free-flow and compacted bulk densities

Café soluble — Détermination de la masse volumique sans tassement et après tassement

Reference number
ISO 8460 : 1987 (E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8460 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Instant coffee — Determination of free-flow and compacted bulk densities

0 Introduction

A knowledge of the bulk density of instant coffee is essential to trade in that commodity for it determines the volume occupied by a given mass and hence is an important factor in filling containers correctly and for controlling the mass of instant coffee.

Bulk density is defined as the ratio of mass to volume. The volume of a given sample of instant coffee varies, according to its history of handling, due to compaction (reversible) and powder breakdown (irreversible) effects. Bulk densities can be expressed in two ways : free-flow density and compacted density.

Instant coffee is friable and subject to irreversible powder breakdown effects which may occur with repeated determinations of the compacted density. Because both bulk densities (and in particular the compacted density) depend so critically on the methods used for handling, it is particularly important that the methods adopted for their measurement be as simple and as independent of the human factors as possible. It is also important that any mechanical apparatus needed is standardized, cheap, and easily available throughout those parts of the world where instant coffee is produced, blended, reprocessed and packed.

1 Scope and field of application

This International Standard specifies two methods for the determination of the bulk density of instant coffee :

a) free-flow bulk density **(section one)** ;

b) compacted bulk density **(section two)**.

2 References

ISO 787-11, *General methods of test for pigments and extenders — Part 11 : Determination of tamped volume and apparent density after tamping.*

ISO 6670, *Soluble coffee in cases with liners — Sampling.*

Section one : Determination of free-flow bulk density

3 Definition

For the purposes of this International Standard, the following definition applies.

free-flow bulk density (of instant coffee) : The ratio of the mass of instant coffee to the volume it occupies (mass per unit volume) after it has been poured freely into a receptacle under the conditions specified in this International Standard.

It is conventionally expressed in grams per millilitre.

4 Principle

Pouring a sample through a specified funnel into a specified receptacle of known volume and weighing the contents of the receptacle.

5 Apparatus

5.1 Balance, accurate to 0,1 g.

5.2 Apparatus for determination of free-flow bulk density, having the dimensions shown in figure 1 and the arrangement shown in figure 2, and consisting of the following parts.

5.2.1 Funnel, made of stainless steel, firmly mounted on a support attached to a rigid base. The exact dimensions shall conform to those given in figure 1.

5.2.2 Measuring receptacle, cylindrical, made of stainless steel, of approximate capacity 205 ml.

The capacity of the receptacle shall be known to the nearest millilitre. The exact dimensions shall conform to those given in figure 1.

The distance between the bottom of the funnel and the top of the receptacle shall be kept constant at 40,0 ± 1,5 mm.

5.3 Spatula, or other suitable implement having a straight edge.

6 Sampling

See ISO 6670, in particular annex B.

7 Procedure

WARNING — On account of the hygroscopic character of instant coffee, the determination should not be carried out in a humid atmosphere, for example higher than 60 % relative humidity. The use of an effective dehumidification unit is therefore recommended.

7.1 Weigh the measuring receptacle (5.2.2) to the nearest 0,1 g. Pour the laboratory sample from its container into the funnel (5.2.1), allowing it to flow freely into the measuring receptacle (5.2.2) until the latter overflows.

Remove the excess instant coffee, using the spatula or other suitable implement (5.3) to form a plane surface level with the top of the measuring receptacle. Avoid moving, shaking or vibrating the measuring receptacle before the excess instant coffee has been removed.

Remove the measuring receptacle and weigh the measuring receptacle and its contents to the nearest 0,1 g.

7.2 Carry out two determinations on the same laboratory sample or on two different laboratory samples if the size of the laboratory sample available is insufficient to carry out two separate determinations.

8 Expression of results

8.1 Method of calculation and formula

The free-flow bulk density, expressed in grams per millilitre, is equal to

$$\frac{m_2 - m_1}{V}$$

where

m_1 is the mass, in grams, of the measuring receptacle;

m_2 is the mass, in grams, of the measuring receptacle full of instant coffee;

V is the capacity, in millilitres, of the measuring receptacle.

Take as the result the arithmetic mean of the values obtained in the two determinations (7.2), provided that the requirement for repeatability (see 8.2) is satisfied. If it is not, the determinations shall be repeated.

8.2 Repeatability

The difference between the values obtained in the two determinations (7.2), carried out in rapid succession by the same operator on the same laboratory sample (however, see 7.2) using the same apparatus, shall not exceed 2 % of the mean.

9 Test report

The test report shall show the method used and the results obtained. It shall also mention any operating details not specified in this International Standard, or regarded as optional, together with details of any incidents likely to have influenced the results.

The test report shall include all the information necessary for the complete identification of the sample.

Section two : Determination of compacted bulk density

10 Definition

For the purposes of this International Standard, the following definition applies.

compacted bulk density (of instant coffee) : The ratio of the mass of instant coffee to the volume it occupies (mass per unit volume) after it has been subjected to a fixed number of taps (usually 300) under the conditions specified in this International Standard.

It is conventionally expressed in grams per millilitre.

11 Principle

Determination of the volume of a given mass of instant coffee after a fixed number of taps (usually 300) in a tapping volumeter.

12 Apparatus

12.1 Balance, accurate to 0,1 g.

12.2 Tapping volumeter, as specified in ISO 787-11 (see also figure 3), comprising the following parts.

12.2.1 Graduated measuring cylinder, made of glass, of capacity 250 ml and graduated in divisions of 2 ml.

12.2.2 Holder, for the measuring cylinder (12.2.1), with a shaft.

12.2.3 Cam, which lifts the shaft of the holder and the measuring cylinder once per revolution and which has a frequency of rotation of 250 ± 15 min^{-1}.

12.2.4 Anvil, on which the raised shaft falls from a height of 3 ± 0,1 mm.

12.2.5 Counter, to count the number of revolutions of the cam.

12.2.6 Sleeve, to guide the shaft, constructed of a suitable material to give minimum friction.

13 Sampling

See ISO 6670, in particular annex B.

14 Procedure

WARNING — On account of the hygroscopic character of instant coffee, the determination should not be carried out in a humid atmosphere, for example higher than 60 % relative humidity. The use of an effective dehumidification unit is therefore recommended.

14.1 Set the tapping volumeter (12.2) to give 300 taps.

Weigh 25,0 g of the laboratory sample to the nearest 0,1 g and transfer to the graduated measuring cylinder (12.2.1). Attach the cylinder to the tapping volumeter by means of the holder (12.2.2), and allow the volumeter to tap 300 times. Read the volume of the instant coffee from the cylinder to the nearest 2 ml.

14.2 Carry out two determinations on the same laboratory sample.

14.3 In cases where it is suspected that the instant coffee may be subject to breakdown, the volume may be determined using a series of 50 tap sequences to establish whether there is a limiting minimum volume, or whether the volume diminishes continuously. In the latter case, record all the volumes measured. By agreement between the interested parties, the compacted bulk density may be recorded as that derived from the volume after the first 100 taps or any other number of taps.

15 Expression of results

15.1 Method of calculation and formula

The compacted bulk density, expressed in grams per millilitre, is equal to

$$\frac{m}{V}$$

where

m is the mass, in grams, of the test portion;

V is the volume, in millilitres, occupied by the test portion after compaction.

Take as the result the arithmetic mean of the values obtained in the two determinations (14.2), provided that the requirement for repeatability (see 15.2) is satisfied. If it is not, the determinations shall be repeated.

15.2 Repeatability

The difference between the values obtained in the two determinations (14.2), carried out in rapid succession by the same operator on the same laboratory sample using the same apparatus, shall not exceed 2 % of the mean.

16 Test report

The test report shall show the method used and the results obtained. It shall also mention any operating details not specified in this International Standard, or regarded as optional, together with details of any incidents likely to have influenced the results.

The test report shall include all the information necessary for the complete identification of the sample.

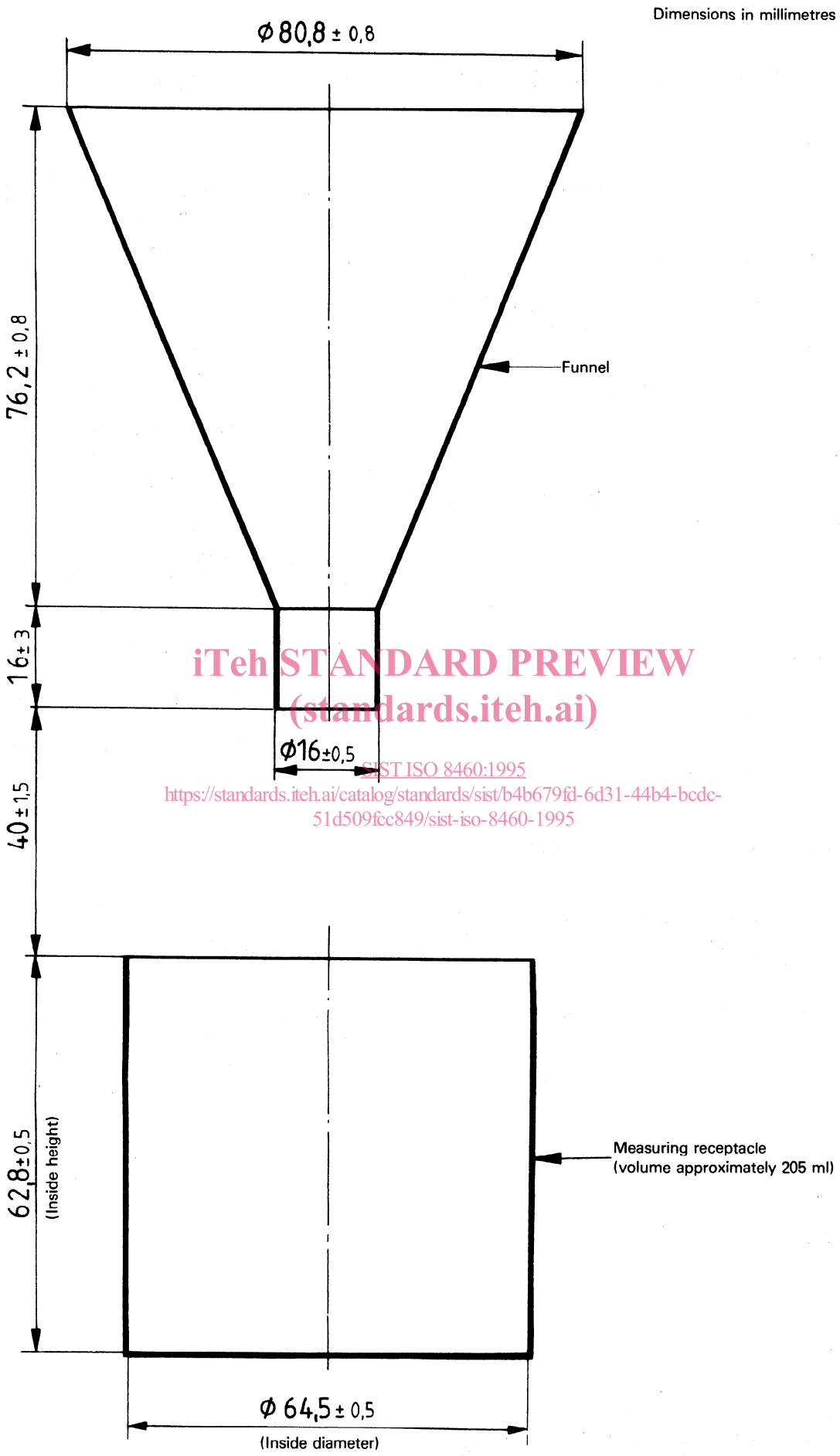

Figure 1 — Schematic diagram of the apparatus for determining free-flow bulk density

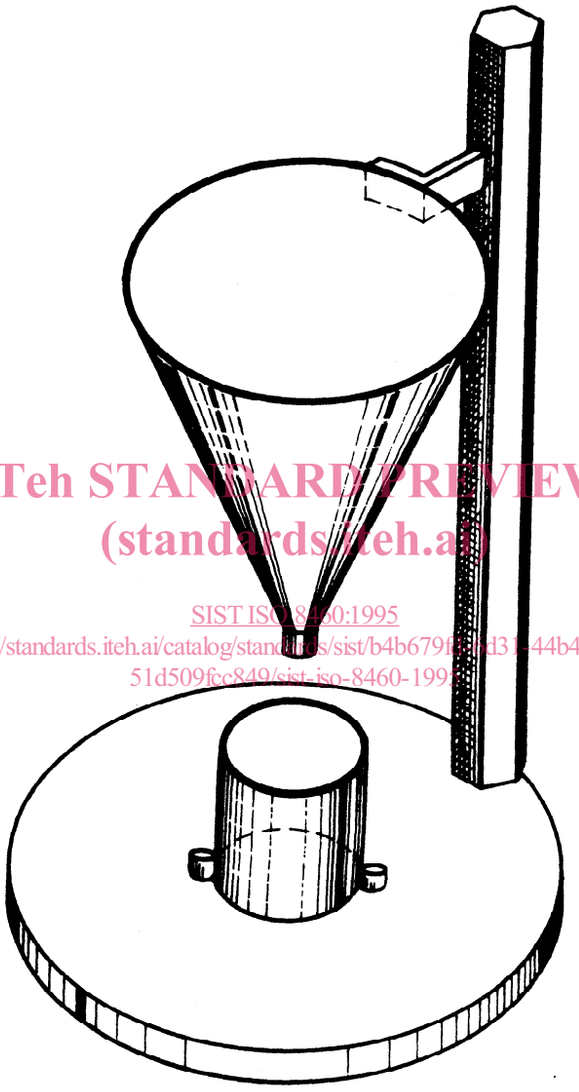

Figure 2 — Apparatus for determining free-flow bulk density