
**Cheese — Determination of fat content —
Butyrometer for Van Gulik method**

*Fromages — Détermination de la teneur en matière grasse —
Butyromètre pour la méthode Van Gulik*

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3432|IDF 221 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, and the International Dairy Federation (IDF). It is being published jointly by ISO and IDF.

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This second edition of ISO 3432|IDF 221 cancels and replaces the first edition (ISO 3432:1975), of which it constitutes a minor revision.

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Foreword

IDF (the International Dairy Federation) is a non-profit organization representing the dairy sector worldwide. IDF membership comprises National Committees in every member country as well as regional dairy associations having signed a formal agreement on cooperation with IDF. All members of IDF have the right to be represented at the IDF Standing Committees carrying out the technical work. IDF collaborates with ISO in the development of standard methods of analysis and sampling for milk and milk products.

Draft International Standards adopted by the Action Teams and Standing Committees are circulated to the National Committees for voting. Publication as an International Standard requires approval by at least 50 % of the IDF National Committees casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. IDF shall not be held responsible for identifying any or all such patent rights.

ISO 3432|IDF 221 was prepared by the International Dairy Federation (IDF) and Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*. It is being published jointly by IDF and ISO.

All work was carried out by the former Joint ISO/IDF/AOAC Group of Experts (E31-E301) which is now part of the Joint ISO-IDF Action Team on *Fat*, of the Standing Committee on *Main components in milk*.

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Cheese — Determination of fat content — Butyrometer for Van Gulik method

1 Scope

This International Standard specifies the characteristics of a butyrometer (including stoppers) for the determination of the fat content, in the range 0 % mass fraction to 40 % mass fraction, of cheese by the Van Gulik method and illustrates suitable devices for weighing and introducing the cheese test portion.

NOTE The Van Gulik method is specified in ISO 3433|IDF 222^[1].

2 Construction

2.1 Material

The butyrometer shall be made of clear glass as free as possible from visible defects and shall be resistant to the thermal shocks and the reagents encountered in the Van Gulik method.

2.2 Shape and dimensions

The butyrometer shall conform to the shape and dimensions shown in Figure 1.

The internal surface shall be smooth and free from any defects so that during the determination none of the fat is prevented from entering the graduated tube.

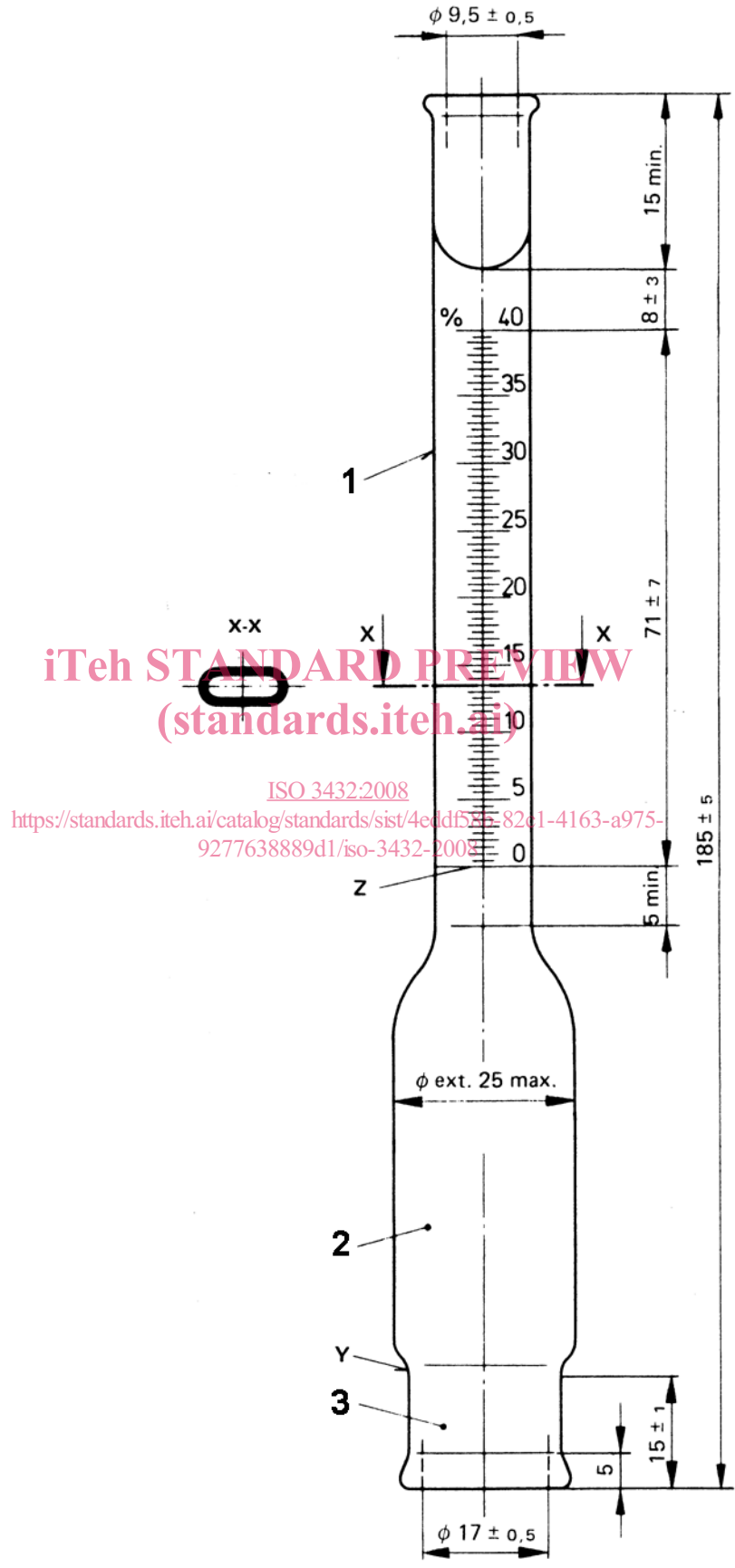
The outer surface shall be symmetrical about the axis and all changes in cross-section shall be smooth, particularly the transition between the body and the graduated tube.

The wall thickness throughout shall be adequate to render the butyrometer sufficiently robust for the purpose for which it is intended; the wall thickness shall be at least 0,9 mm.

2.3 Openings

The openings shall be cylindrical, plain, and preferably strengthened at the outer end by an outside rim as illustrated in Figure 1. The external diameter of the neck shall not exceed 25 mm.

Dimensions in millimetres



- Key**
- 1 graduated tube
 - 2 body
 - 3 neck
 - X-X section
 - Y level Y
 - Z level Z

Figure 1 — Van Gulik butyrometer

2.4 Body

The capacity of the butyrometer, i.e. the volume delimited by levels Y and Z in Figure 1, shall be $(21,0 \pm 0,5)$ ml (measured without a weighing device in position).

2.5 Graduated tube

The graduated tube shall be of the flat-bore type shown in cross-section in Figure 1. The back surface of the tube shall not be frosted.

3 Graduation and numbering

3.1 Basis of graduation

1,354 ml¹⁾ at 20 °C corresponding to a mass fraction of 40 % fat.

3.2 Description of the scale and its graduation

The graduation shall be as follows:

Length of scale, mm	71 ± 7
Scale range, fat % mass fraction	0 to 40
Number of graduations	80
Graduated	at each 0,5 %
Graduation lines of intermediate length	at each 1 % i.e. at every 2 divisions
Full-length graduation lines	at each 5 % i.e. at every 10 divisions
Numbered	at each 5 % i.e. at every 10 divisions
Maximum deviation from the required volume (4.1) of the graduated tube between any two graduation lines	0,25 % ²⁾ i.e. half a scale division

3.3 Position of scale

The position of the scale of the flat-bore tube shall be such that the tube is uniform in cross-section, internally for at least 3 mm and externally for at least 5 mm, beyond each end of the scale.

3.4 Graduation lines

The graduation lines shall be clearly etched, of uniform thickness between 0,1 mm and 0,2 mm, and shall lie in planes perpendicular to the axis of the graduated tube and with no evident irregularity in their spacing. They shall be symmetrical about the centre line of the front of the tube.

Short graduation lines shall be of length 3 mm to 4 mm. Graduation lines of intermediate length shall project equally beyond the left and right of short graduation lines for a distance of at least 1 mm but their total length shall not exceed 6 mm. Full-length (numbered) graduation lines shall extend completely across the flat portion of the front of the graduated tube.

1) This is the volume of 18,34 g of mercury at 20 °C.

2) i.e. 0,25 g of fat for 100 g of sample.

3.5 Numbers

The numbers of the scale shall be permanent and clearly legible; each shall appear immediately above the graduation line to which it refers and to the right of the axis of the scale, when the butyrometer is vertical with its graduated tube uppermost and viewed from the front. The percentage symbol (%) shall be in front of the uppermost number, as indicated in Figure 1.

4 Inscriptions

The following inscriptions shall be permanently and legibly marked on the body of the butyrometer:

- a) "CHEESE Van Gulik 65 °C";
- b) "ISO 3432|IDF 221" or the number of the equivalent national standard;
- c) the maker's or vendor's name or mark.

An identification number may be added if required.

5 Weighing device

If required, a weighing device may be used for the test portion. Suitable types are illustrated in Figure 2.

NOTE Other weighing devices, such as those made from plastics sheet, may be used provided that they do not influence results.

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6 Stoppers

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6.1 Material

The stoppers shall be made from a suitable grade of material having a hardness of (38 ± 5) IRHD.

6.2 Shape and dimensions

The stoppers shall conform to the shape and dimensions shown in Figure 3. The optional central hole indicated will only be required when a weighing device of the type shown in Figure 2 is used.

Dimensions in millimetres

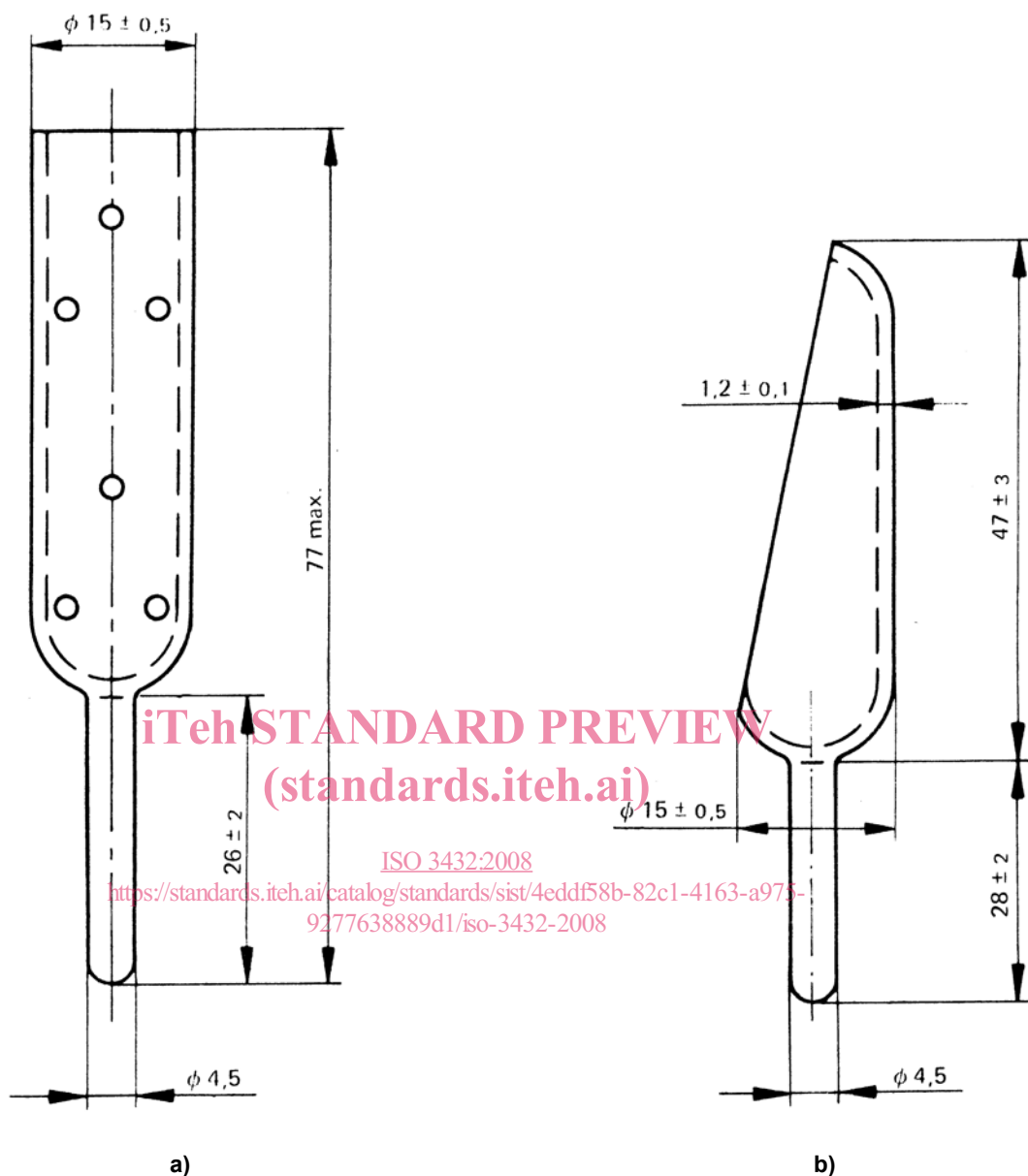


Figure 2 — Suitable weighing devices for the Van Gulik butyrometer