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Animal and vegetable fats and oils — Sampling

Corps gras d'origines animale et végétale — Échantillonnage

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 5555 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 11, *Animal and vegetable fats and oils*.

This third edition cancels and replaces the second edition (ISO 5555:1991), which has been technically revised.

Annexes A and B of this International Standard are for information only.

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Animal and vegetable fats and oils — Sampling

1 Scope

This International Standard describes methods of sampling crude or processed animal and vegetable fats and oils (referred to as fats hereafter), whatever the origin and whether liquid or solid. It also describes the apparatus used for this process.

NOTE Methods of sampling milk and milk products, including milk fats, are specified in ISO 707.

2 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

2.1
consignment
quantity of fat delivered at one time and covered by a particular contract or shipping document

NOTE It may be composed of one or more lots or parts of lots.

2.2
lot
identified quantity of fat, presumed to have uniform characteristics

2.3
increment
quantity of fat taken at one time from one place in a lot

2.4
bulk sample
quantity of fat obtained by combining the various increments from a lot in amounts proportional to the quantities they represent

NOTE The bulk sample should be representative of the lot and should take account of any contractual requirements.

2.5
laboratory sample
quantity of fat, obtained from the bulk sample after suitable homogenization and reduction in size, which is representative of the lot and intended for laboratory examination

2.6
conventional mass per volume sample
“litre weight in air” sample
quantity of fat taken for the mass of fat to be calculated from the volume

3 General principles

The object of sampling and of preparing samples is to obtain from a consignment (which may be in lots) a manageable quantity of the fat, the properties of which correspond as closely as possible to the properties of the consignment sampled.

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The methods of taking samples described below are intended for the guidance of experts and may be used for

a) consignments in bulk, e.g. in land tanks, ships' tanks, tank wagons, tank cars and tank containers, and

b) consignments consisting of a number of packages, e.g. barrels, drums, cases, tins, bags and bottles.

4 Requirements for apparatus

4.1 General

For a particular purpose, the choice of sampling instruments and their suitability depend on the skill of the sampler in following the recommended procedures.

In all circumstances, it shall be borne in mind whether the sample is intended for preliminary inspection, for analysis, or for the determination of conventional mass per volume (“litre weight in air”).

4.2 Materials

Sampling instruments, ancillary apparatus and sample containers shall be made of materials which are chemically inert to the fat being sampled and they shall not catalyse chemical reactions.

For sampling instruments, stainless steel is the most suitable material. Aluminium may be used only when the acidity is low but not for the storage of samples.

Only plastics which meet the requirements of the first paragraph above, at the operating temperature conditions, may be used; polyethylene terephthalate (PET) satisfying food contact requirements is recommended.

Copper and copper alloys shall not be used nor any toxic material.

WARNING — If glass apparatus is used for a particular reason, great care shall be taken to avoid breakages. Under no circumstances is glass permitted inside tanks containing oils and fats.

4.3 Examples of types of sampling instruments

4.3.1 General

Many forms and types of sampling instruments exist, and the instruments described in this International Standard are only examples of those commonly used.

The instruments are all simple, robust and easily cleaned. They may be used for all the sampling operations described in this International Standard with all types of fats commonly found in commerce.

Certain basic requirements are common to all sampling instruments; for example they shall be capable of taking a representative sample from a required level or area, and of preserving the integrity of the sample until it can be transferred to a sample container. Ease of cleaning, practical size and ability to withstand rough usage are other essential characteristics.

Alternative designs of instruments to those described in this International Standard may be used, for example to meet the needs of individual users.

The instruments may be of various sizes according to the quantity of sample required and the accessibility of the fat.

4.3.2 Sampling instruments

The following types may be used.

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a) Simple weighted sample can, see B.1 and Figure B.1.

b) Weighted cage for sample bottle, see B.2 and Figure B.2.

c) Valve sampling cylinder (sinker sampler), see B.3 and Figure B.3.

d) Bottom samplers, see B.4 and Figure B.4.

e) Sampling tubes, see B.5 and Figure B.5.

f) Sampling scoops, see B.6 and Figure B.6.

4.4 Ancillary apparatus

The following may also be required.

a) Water-finding rule, see B.7 and Figure B.7.

b) Ullage rule, see B.8 and Figure B.8.

c) Labels, adhesive or tie-on, and sealing apparatus; see also clause 7.

d) Thermometers, see B.9.

e) Measuring tape and weight, see B.10.

4.5 Sample containers

Sample containers shall be made of the materials specified in 4.2.

5 Sampling technique

5.1 All sampling operations shall be performed by an operator with clean hands or wearing gloves (clean plastics or cotton gloves may be used).

5.2 The apparatus and sample containers shall be clean and dry prior to use.

5.3 Sampling shall be carried out in such a manner as to protect the samples, the fat being sampled, the sampling instruments and the sample containers from adventitious contamination with rain, dust, etc.

5.4 All extraneous material shall be removed from the outside of the sampling instruments before the instruments are emptied.

5.5 If heating is necessary to facilitate sampling, it is important that fats are not overheated. It is recommended, in accordance with usual practice, that the temperature of a bulk of fat in a storage tank should not be raised by more than 5 °C per day.

The area of heating coils should be large in relation to the volume of fat and their temperature should be kept as low as possible to avoid local overheating. Steam, at a maximum pressure of 150 kPa (1,5 bar) gauge reading (128 °C) or hot water (only if the heating coils are self-draining) should be used. Care is required to prevent contamination of the fat by steam or water.

The temperature of the fat during sampling should be within the range indicated in annex A.

5.6 After samples have been taken as specified in 6.1 to 6.8, as appropriate, laboratory samples shall be prepared as specified in 6.9.

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6 Methods of sampling

6.1 General

6.1.1 Containers for transport and storage of fats

A distinction is made between the following types of containers from which samples are taken and which might affect the method of sampling to be used:

a) vertical cylindrical land tanks (see 6.2);

b) ships' tanks (see 6.3);

c) tank wagons or cars (see 6.4);

d) horizontal cylindrical tanks including tank containers (see 6.4);

e) weigh tanks (see 6.5);

f) pipelines during transfer (see 6.6);

g) packages, e.g. barrels, drums, cases, tins, bags and bottles (see 6.8).

The procedure is also given for sampling for the determination of conventional mass per volume (“litre weight in air”) (see 6.7).

6.1.2 Water

Water may be present as free water at the bottom (i.e. separated water), as an emulsion layer or as water in suspension in the fat in any of the containers described in 6.1.1. However, during usual operations the fat is unlikely to remain static for sufficient time in weigh tanks and pipelines for the water to settle to the bottom.

Measurement of water is mostly conducted in vertical storage tanks (see 6.2), but the same principles apply to the containers listed other than pipelines.

The presence of water may be detected with a bottom sampler (B.4) and free water may be measured with a water-finding rule (B.7) and water-finding paste or paper, or by electronic means.

Whichever method is used, accurate determination of water content is often difficult because of the indistinct separation of free water and the emulsion layer and water in suspension, in the lower layers of the fat.

It can also be useful to determine whether the water is fresh or sea water.

6.2 Sampling from vertical cylindrical land tanks

6.2.1 Preliminary operations

6.2.1.1 Sediment, emulsion and free water

Determine whether there is sediment or an emulsion layer or free water at the bottom of the tank by means of a bottom sampler and/or water detectors as described in 6.1.2.

The careful application of heat followed by standing assists the water in suspension to settle out (see 5.5).

It is desirable, so far as possible, to run off free water before sampling, subject to contractual requirements and the agreement of contract parties, and to measure the amount removed.

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6.2.1.2 Homogenizing

Before sampling begins, it is essential that the whole of the product is as homogeneous and as nearly liquid as possible.

Check the fat in the tank for uniformity by examining increments taken from various levels using a simple weighted sample can (B.1), a weighted cage for sample bottle (B.2) or a valve sampling cylinder (B.3), and from the bottom using a bottom sampler (B.4).

If layers of different composition are present, homogeneity can, in most cases, be obtained by heating as described in 5.5.

If heating is not permissible because of the nature of the fat, or if it is not necessary, or if heating has to be avoided for any other reason, the fat may be made homogeneous by blowing nitrogen through it.

If a fat is known to be inhomogeneous and nitrogen is not available, the parties concerned may agree to blowing dry air through the product, although this process is to be deprecated especially in the case of marine oils, because it may cause deterioration of the fat by oxidation. Details of such operations should be included in the sampling report sent to the laboratory.

6.2.2 Procedure

6.2.2.1 General

Sample each tank separately.

6.2.2.2 Inhomogeneous fats

If the contents of the tank are not and cannot be made homogeneous, a simple weighted sample can (B.1), a weighted cage for sample bottle (B.2) or a valve sampling cylinder (B.3) is generally used for sampling, plus a bottom sampler (B.4).

Take increments at depths of every 300 mm, from top to bottom, until the layer of different composition is reached. In this layer, take more increments (for example at depths of every 100 mm). Also take a bottom sample.

Mix appropriate increments to give

a) a sample of the clear oil, and

b) a sample of the separated layer.

Prepare a bulk sample by mixing samples a) and b) in proportion to the respective sizes of the two layers, taking care to ensure that the proportions are as exact as possible.

Prepare the number of bulk samples given in Table 1, preparing at least one bulk sample for each tank.

Table 1 — Number of bulk samples to be taken from each ship's tank or land tank

Mass of tank contents tonnes	**Number of bulk samples for each tank**
$\leqslant$ 500	1
$>$ 500 and $\leqslant$ 1 000	2
$>$ 1 000	1 for every 500 t or part thereof

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6.2.2.3 Homogeneous fats

If the contents of the tank are homogeneous, use one of the same sampling instruments as in 6.2.2.2, but in this case take at least three increments, “top”, “middle” and “bottom”.

The “top” increment should be taken at a level of one-tenth of the total depth from the surface, the “middle” increment should be taken at a level of one-half of the total depth, and the “bottom” increment should be taken at a level of nine-tenths of the total depth.

Prepare a bulk sample by mixing in the proportions of one part from each of the “top” and “bottom” increments and three parts from the “middle”.

Prepare the number of bulk samples given in Table 1, preparing at least one bulk sample for each tank.

6.3 Sampling from ships' tanks

The shape and disposition of ships' tanks make sampling more difficult than in vertical cylindrical land tanks. Usually, sampling is carried out during transfer as described in 6.6. If samples are to be taken from ships' tanks, use (as far as possible) the procedure described in 6.2, including the preliminary operations such as heating.

Sample each tank separately. Prepare the number of bulk samples indicated in Table 1. In preparing the bulk sample from increments taken from a tank, make allowance for the shape of the tank by mixing, as far as possible, the increments in the corresponding proportions.

Barge tanks should preferably be sampled as soon as they have been filled.

6.4 Sampling from tank wagons or cars and horizontal cylindrical tanks including tank containers

Samples should preferably be taken as soon as the tanks have been filled; i.e. before settling occurs possibly leading to fractionating or layering.

Take the increments by means of a simple weighted sample can (B.1), a weighted cage for sample bottle (B.2), or a valve sampling cylinder (B.3), by the procedure described in 6.2.2.

If the increments cannot be taken immediately after the tanks have filled, perform a preliminary test for the presence of free water as a bottom layer. If free water is present, and with the agreement of the parties concerned, remove it by opening the bottom tap. Measure the amount of water removed and report this to the buyer and seller or to their representatives.

Then make the contents sufficiently homogeneous by blowing nitrogen[1)] through and/or by heating until they are entirely liquid, provided that the particular fat being sampled will not suffer from such treatment.

If circumstances require that static liquid has to be sampled in a tank wagon or horizontal cylindrical tank, without mixing as indicated above, the greatest care is necessary in taking the correct proportion of sample relative to the liquid depth.

If a valve sampling cylinder is used to sample every 300 mm of depth of the tank wagon, reference should be make to Figure 1 to determine the proportions of the increments, from each 300 mm level, that should be mixed to form the bulk sample. This fairly simple method (of drawing to scale, on graph paper, the cross section of tanks of any shape or size) may be used to indicate the proportions of increments for mixing.

Inclined tanks shall be sampled by the methods described in 6.3 for ships' tanks. The tank-shape corrections described above are not applicable to inclined or irregular tanks.

Prepare bulk samples from the increments in proportion to the cross sections of the tanks.

1) See last paragraph 6.2.1.2.

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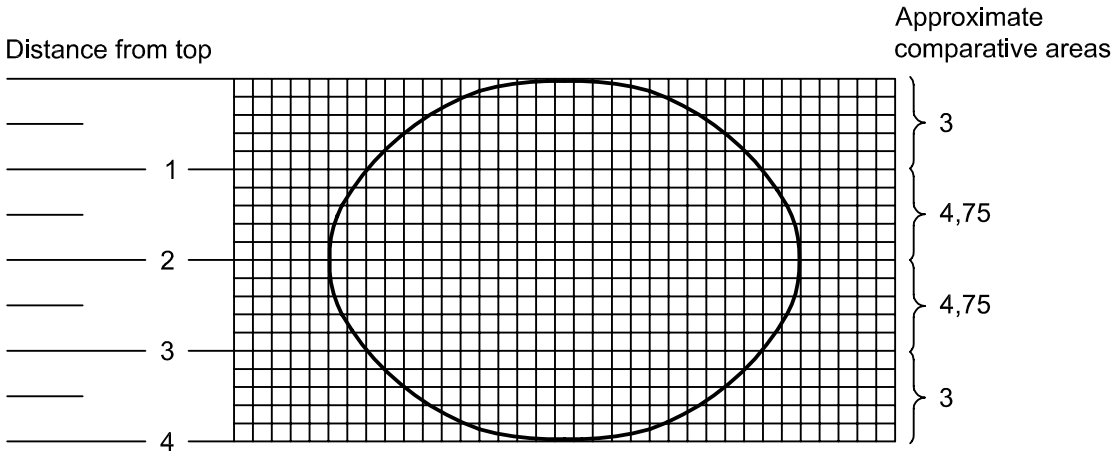
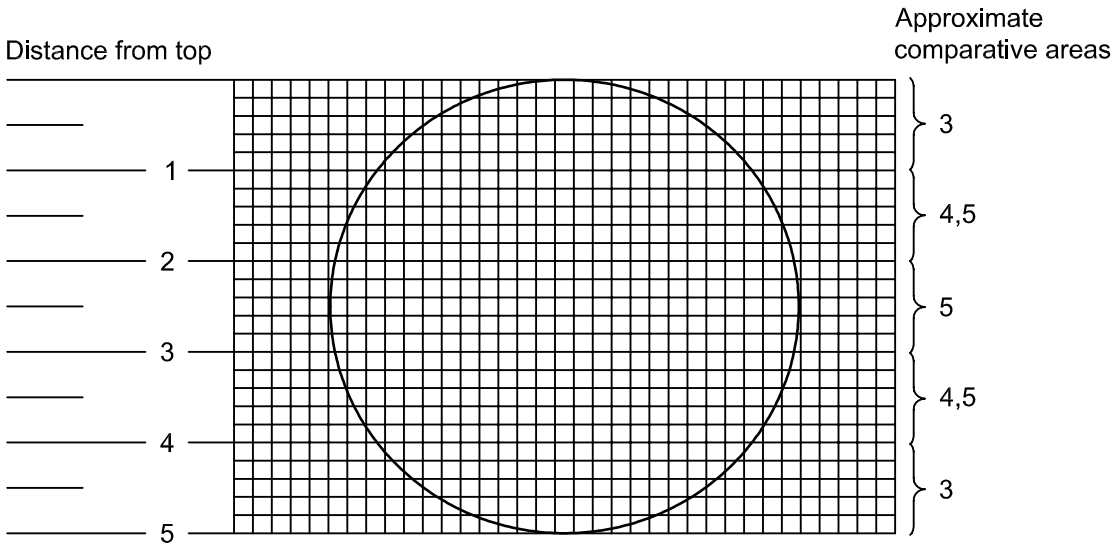


a) Elliptical cross section of horizontal tank



b) Cylindrical cross section of horizontal tank

Figure 1 — Cross sections of typical tanks

6.5 Sampling from weigh tanks

Weigh tanks should be sampled immediately after they have been filled, before settling occurs.

Take the sample by allowing a sampling instrument to sink to the middle and fill. If unavoidable delay occurs, which may result in the settling of sediment to the bottom of the tank, agitate the contents before sampling, or carry out sampling at depths of every 300 mm.

If the tank is closed, sample from a horizontal drip tap (as described in 6.6.2) immediately after filling.

Prepare bulk samples from the increments in proportion to the cross sections of the tanks.

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6.6 Sampling from pipelines during transfer

6.6.1 General

This method shall be used only if the fat is entirely liquid and contains no components which could block a tap or dripcock. Any water-containing emulsion (e.g. fore-pump oil) shall be drawn off, stored, sampled and weighed separately.

Samples from very large bulk quantities may be taken during transfer by means of frequent removal of increments from the flow at regular intervals while the tank is being emptied. This method is particularly easy to apply if the oil is transferred from a tank fitted with a weigh tank meter.

Alternatively, sampling may be carried out by means of a side or secondary stream tapped from the main stream, but it is difficult to ensure accurate sampling by this method.

6.6.2 Taps or dripcocks

The tap or dripcock shall be fed from a nozzle of diameter not less than 9,5 mm, capable of being inserted in the centre or at one-third diameter of the main discharge pipeline and facing the flow of liquid. Taps let into the side or bottom of the pipeline are not acceptable. The tap or dripcock shall be introduced, if possible, into a horizontal section of the main pipeline, as far from elbows and T-joints as possible, and preferably within 10 m to 50 m of the pressure side of the pump. A petcock is not recommended. The sampling line shall be of diameter not less than 9,5 mm and shall fall continuously to its outlet. The tap or dripcock shall be of such design as to be easily and quickly cleaned in case of blockage.

To allow the clearing of a pipeline blockage and the pigging of the main flow line, a means of withdrawing the small bore pipes should be provided.

Heating and insulation should be provided for fats of high viscosity or high melting point.

6.6.3 Procedure

Regulate the rate of flow in the main pipeline to ensure sufficient turbulence to mix completely the product in the pipeline. Maintain the rate of flow as constant as possible.

A cover shall be fitted over the whole apparatus and the sample containers to prevent adventitious contamination.

Carefully and immediately mix all the sample taken from the dripcock, after completion of the discharge, to form the bulk sample from which the laboratory samples are to be taken.

In view of the possibility of blockage of the dripcock, etc. by pieces of dirt, and of variations that inevitably occur in the flow, it is essential that an experienced sampler be present constantly throughout the sampling operation.

6.6.4 Minimum size of bulk sample

Prepare bulk samples during transfer from each tank of the minimum size specified in Table 2.

Table 2 — Minimum size of bulk sample when sampling from pipelines

Mass of tank contents tonnes	**Minimum size of bulk sample** litres
$\leqslant$ 20	1
$>$ 20 and $\leqslant$ 50	5
$>$ 50 and $\leqslant$ 500	10

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6.7 Sampling from tanks for the determination of conventional mass per volume ("litre weight in air")

6.7.1 General

The mass of the contents of the tank may be calculated from the product of the volume and the conventional mass per volume ("litre weight in air") of the contents of the tank.

Take a special sample for determining the conventional mass per volume ("litre weight in air") as described in 6.7.2 and 6.7.3.

6.7.2 Pretreatment of fats which are not completely liquid

For fats which are not liquid, or are only partially liquid, slowly heat before measuring and sampling, so that the contents of the tank are uniformly heated and local overheating is avoided (see also 5.5).

Continue heating until the fat has completely melted. However, avoid heating to too high a temperature, as this can impair the quality of the fat. For the fats listed in annex A, the temperature at the time of measurement and sampling should be kept within the limits indicated, unless otherwise agreed between the parties concerned.

After heating, allow the contents of the tank to stand until they are more or less free from air and there is little or no scum floating on the surface.

Once these requirements are fulfilled, the sample may be taken.

6.7.3 Procedure

Take increments at three levels, "top", "middle" and "bottom" (see 6.2.2.3), but not less than 100 mm from the bottom. Pour them into a sampling bucket in proportions one part "top", three parts "middle" and one part "bottom", and mix them to form the bulk sample.

If there is a great deal of sediment in the contents of the tank, take the increments at depths of every 300 mm in accordance with 6.2.2.

Measure the temperature at each of the three levels. Take the average of the values found as the temperature of the contents of the tank during sampling and measurement of volume.

6.8 Sampling from packages (small packing units) including consumer packs

6.8.1 General

If a consignment consists of a large number of separate units, for example barrels, drums, cases, tins (separate or packed in cartons), bottles or bags, it will often be difficult, if not impossible, to sample each separate unit.

In such cases, therefore, a suitable number of units shall be chosen entirely at random from the consignment to ensure, as far as possible, that together they represent the average properties of the consignment.

It is impossible to give any hard and fast rule for the number of units to be sampled, as this depends to a large extent on the uniformity of the consignment. It is therefore desirable that the parties concerned first agree on the number of units to be sampled.

It is recommended that representative sampling be carried out by agreement between contracting parties, particularly for fats processed and packed for retail. See, for example, the methods described in ISO 2859 (all parts) and ISO 3951.

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If there is no such prior agreement, a distinction shall be made between the following:

a) consignments which may be assumed to be more of less uniform;

b) consignments which are known not to be uniform;

c) consignments about which nothing is known;

d) consignments whose quality is suspect owing to the possible presence of foreign bodies in one or more of the units.

Treat each of these cases, respectively, as follows.

For a): treat the consignment as one lot.

For b): visually inspect the containers. Treat those that are visually similar (e.g. in shape or marking) as one lot, noting the number of containers and mass of fat in each lot. If a single bulk sample from all the lots is required, mix increments from each lot in the same proportions as between the individual lots.

For c): carry out a preliminary investigation and reclassify as a) or b).

For d): carry out an inspection to isolate the suspect packages and deal with these individually.

If a lot can be assumed to be reasonably homogeneous, the packages shall be sampled at random. Recommendations for the number of packages to be selected for sampling are given in Table 3.

6.8.2 Consignments in small tanks, drums, barrels and other small packages

6.8.2.1 Procedure for packages containing solid or semi-liquid fats

If water is present, make a hole through the fat to the bottom of the container and remove the water by suitable means.

For solid fats in drums, insert a sampling scoop (B.6) through the opening of the drum, probing the whole depth of the contents in as many directions as possible. Withdraw the scoop with a twisting motion, thus withdrawing a cylindrical increment of fat. Mix the increments taken from each drum thoroughly in a bucket and transfer this mixed sample to sample containers.

Sample soft pastes and semi-liquid products in drums in a similar manner, using a sampling scoop (B.6). Insert the scoop into the product and withdraw the increment. Prepare a mixed sample in the same manner as described above.

6.8.2.2 Procedure for packages containing liquid fats

Roll and turn over barrels and casks filled with liquid fat and stir the contents well, by hand or mechanically, with a paddle or stirrer. Take an increment from each container to be sampled by inserting a suitable sampling instrument (see, for example, B.5 and B.6), through the bunghole of a barrel or through a convenient opening in another container, in such a manner as to sample from as many parts of the contents as possible. Thoroughly mix equal portions of these increments to form the bulk sample.

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Table 3 — Recommendations for number of packages to be sampled

Size of package	Number of packages in the consignment	Number of packages to be sampled
$\geqslant$ 20 kg, up to 5 t maximum	1 to 5	all[a]
	6 to 50	6
	51 to 75	8
	76 to 100	10
	101 to 250	15
	251 to 500	20
	501 to 1 000	25
	$>$ 1 000	30
$\geqslant$ 5 kg and $\leqslant$ 20 kg	1 to 20	all[a]
	21 to 200	20
	201 to 800	25
	801 to 1 600	35
	1 601 to 3 200	45
	3 201 to 8 000	60
	8 001 to 16 000	72
	16 001 to 24 000	84
	24 001 to 32 000	96
	$>$ 32 000	108
$\leqslant$ 5 kg	1 to 20	all[a]
	21 to 1 500	20
	1 501 to 5 000	25
	5 001 to 15 000	35
	15 001 to 35 000	45
	35 001 to 60 000	60
	60 001 to 90 000	72
	90 001 to 130 000	84
	130 001 to 170 000	96
	$>$ 170 000	108

[a] See 6.8.1 for alternative treatments.

6.8.2.3 Procedure for packages containing loose solid fats

Take sufficient amounts to form a representative sample of all sizes of lumps, broken into smaller pieces if necessary, from all different parts. Quarter the resultant sample to a suitable size.

Knead the lumps until a homogeneous dough is obtained. Mix with a large spatula (e.g. 250 mm long), so that any particles of dirt and/or globules of moisture are evenly distributed throughout the mass. Reduce the resultant sample to the required size by quartering, using the spatula.

If the increments of fat are too hard for hand kneading, allow them to stand in a warm place until sufficiently softened, without direct heat as this can cause loss of moisture by evaporation.

The mixing and reduction of the increments to prepare the bulk sample may be carried out on a mixing table or bench at least 750 mm square, covered with a sheet of plate glass, white tile or stainless steel.

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6.9 Preparation of laboratory samples

When analysis for contamination is required, a sample from each tank shall be submitted as a laboratory sample. Otherwise, according to agreement between the parties concerned, prepare laboratory samples from bulk samples (see 6.2 to 6.8), as follows:

a) either after a weighted average sample has been prepared from the bulk samples; or

b) using each of the bulk samples (if agreed between the parties concerned, the laboratory may prepare a weighted average sample from the laboratory samples).

Whichever procedure [a) or b)] is followed, divide the prepared bulk samples in order to obtain at least four laboratory samples each of at least 250 g, ensuring that continuous agitation has prevented any settling of sediment.

NOTE For certain purposes, a laboratory sample of at least 500 g might be required.

7 Packing and labelling of laboratory samples

7.1 Packing

Pack the laboratory samples in clean, dry containers either of glass or of plastic which meets the requirements of 4.2. The containers shall be almost, but not quite, filled; a little air space shall be allowed at the top for expansion. This space shall not be too large, however, as air has a detrimental action on most fats.

Unless otherwise agreed, the container shall be closed either with new cork stoppers or screw-caps of metal or plastic separated from contact with the oil or fat by a metalized wad free of copper, zinc or iron, or a wad of plastic which meets the requirements of 4.2. Closures shall be sealed so that the sample is not accessible without evidencing breakage or tampering with the seal. Where it is not possible adequately to security seal the closure on the container, the container should be placed within a plastic bag which itself can be satisfactorily security sealed. Sealing wax shall not be used for primary containers.

WARNING — All samples shall be protected from light and heat.

When the laboratory sample is intended for particular tests, it may be necessary to take certain additional precautions in the choice of the method of packing to be used.

7.2 Information concerning laboratory samples

The full details of sampling, number of packages sampled, etc., shall be recorded, and a label bearing the particulars of the sample shall be securely attached to every sample container.

The label shall carry all information necessary for identification of the sample, including the following:

a) identification of ship or vehicle;

b) place of loading;

c) place of discharge;

d) date of arrival;

e) quantity represented, in kilograms or tonnes;

f) whether in bulk, tank containers or packages;

g) goods and origin;

h) identification mark;

i) bill of lading No. and date, or order No. and date;

j) identification of sampling operator/authority;

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k) method and purpose of sampling;

l) date of sampling;

m) place and point of sampling;

n) name of organization responsible for the terms of the contract.

NOTE Items a) to d) are not applicable to static tanks.

The information on the label shall be recorded with a permanent marker.

If paper labels are used, they should be of a suitable quality and size for the purpose. The eyelet hole in a tie-on label should be reinforced.

8 Dispatch of laboratory samples

If the labelled container is not securely sealed, it shall be placed in a close-fitting plastics bag and securely sealed therein.

Glass containers should be protected with a plastics foam sleeve surrounded by absorbent material sufficient to absorb the entire contents of the container and the whole placed in a strong rigid outer container.

The packaging should meet the requirements of the postal authorities or other organization(s) concerned with the transport of the sample in the country or countries involved.

Samples shall be dispatched as soon as possible, within 48 h, non-business days excluded.

The samples shall be kept cool and away from light as far as possible, unless only required for the determination of conventional mass per volume (“litre weight in air”).

9 Sampling report

The sampling report shall give the information listed in 7.2 and shall make reference to the physical state of the fat sampled. It shall also describe the sampling procedure used, if this differs from that described in this International Standard, and give details of any circumstances that may have influenced sampling.

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Annex A
(informative)

Temperature limits

Table A.1 shows the ranges of temperature which it is recommended should be maintained when increments are being taken.

The maximum temperatures recommended in Table A.1 may be exceeded by 5 °C in order to facilitate handling, but only if agreed by the parties concerned and if the temperature is given in the sampling report.

NOTE The temperatures might need to be modified according to local climatic conditions; e.g. in a hot climate the ambient temperature might be above the maximum given in Table A.1.

In general, a bulk quantity of fat should be held at a temperature of 5 °C to 15 °C above its clear point. It should not be heated to a temperature higher than this as its properties could be changed, for example by oxidation.

Overheating of samples obtained from the bulk quantity should also be avoided.

If fats are held at too low a temperature, however, crystals may form and settle, causing inhomogeneity.

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Table A.1 — Temperature limits

Product	Temperature, °C	
	min	max
Castor oil	30	35
Coconut fatty acids	45	48
Coconut oil	40	45
Cottonseed oil	20	25
Distilled fatty acids	45	48
Fish oil	25	30
Grapeseed oil	15	20
Grease	50	55
Groundnut oil	20	25
Illipe	50	55
Lard	50	55
Linseed oil	15	20
Maize oil	15	20
Oiticica oil	35	38
Oleo margarine	50	55
Oleo stearin	60	65
Olive oil	15	20
Palm acid oil	67	72
Palm fatty acid distillate	67	72
Palm kernel oil	40	45
Palm kernel olein	30	35
Palm kernel stearin	40	45
Palm oil	50	55
Palm olein	32	35
Palm stearin	60	70
Rapeseed oil (HEAR type)	15	20
Rapeseed oil (LEAR type or Canola)	15	20
Safflower oil	15	20
Sesame oil	15	20
Sheanut butter	50	55
Soya acid oil	45	50
Soyabean oil	20	25
Sunflowerseed oil	15	20
Sun/soya acid oil	49	55
Tallow	55	65
Teaseed oil	15	20
Tung oil	20	25

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Annex B
(informative)

Examples of sampling instruments and ancillary apparatus

B.1 Simple weighted sample can

The simple weighted sample can (see Figure B.1) is suitable for sampling at varying depths in all sizes of tanks. It consists of a cylindrical container (of capacity about 500 ml) made of stainless steel with a weighted base in a separate compartment and a conical neck.

Fitted to shoulders at the top is a wire loop with a ring at the apex through which a cord is passed which is then attached to a cork fitting the neck of the can.

The empty sampler with the cork inserted is lowered into the liquid fat to the required depth. The cord is jerked to remove the cork and the can is allowed to fill with product.

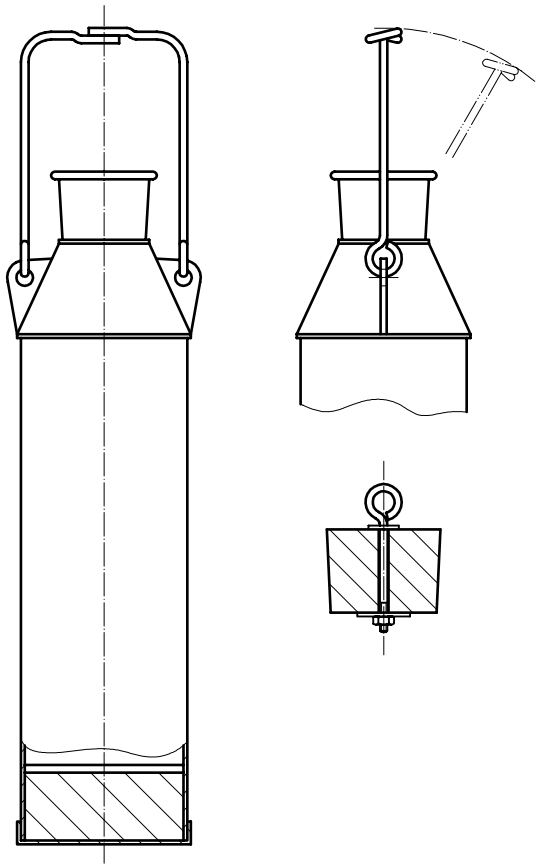

Figure B.1 — Simple weighted sample can

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B.2 Weighted cage for sample bottle

The weighted cage (see Figure B.2) is designed to contain a suitable plastic sample bottle as indicated in 7.1 (of capacity about 500 ml) and is suitable for sampling at varying depths in all sizes of tanks. It consists of a weighted base to which are attached three vertical straps with a retaining band at their upper end. Two of the straps are angled and to these is fixed a wire loop with a ring at the apex.

Also attached to these straps is a wire hoop which is secured to the third strap to retain the bottle in the cage. A cord passes through the ring of the wire loop and is attached to a cork fitting the neck of the bottle.

The sampler is operated in the same way as the weighted can (see B.1).

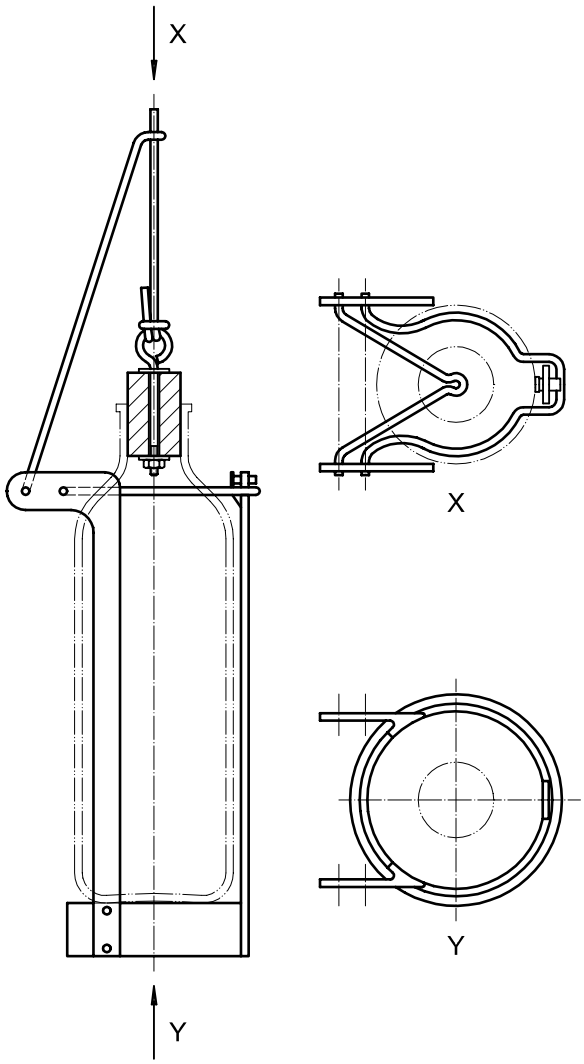

Figure B.2 — Weighted cage for sample bottle

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B.3 Valve sampling cylinder (sinker sampler)

The valve sampling cylinder (see Figure B.3) consists of an open-headed upper section and a lower section within which is a light dead weight valve seating on the base of the heavier outer screw-on unit, which secures the lower to the upper section of the sampler. The bottom valve remains open owing to the pressure of the fat on the valve whilst the instrument is being lowered through the liquid, ensuring that an even flow of fat passes through the cylinder. When lowering ceases, the valve closes and a sample of the fat is drawn from the depth reached by the instrument.

Some samplers of this type and function incorporate a light flap valve at the head which closes off the cylinder when the filled sampler is raised.

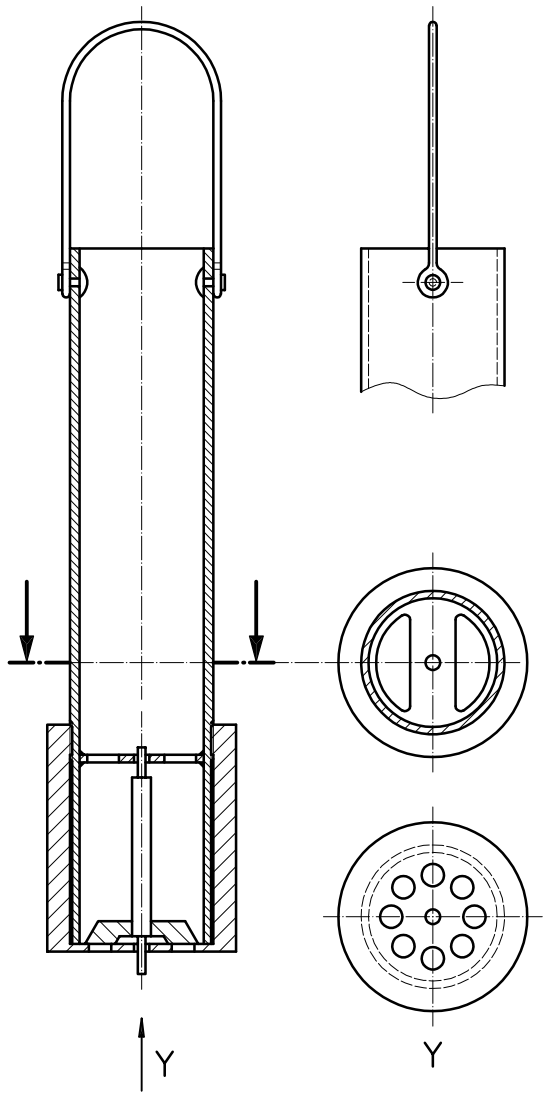

Figure B.3 — Valve sampling cylinder (sinker sampler)

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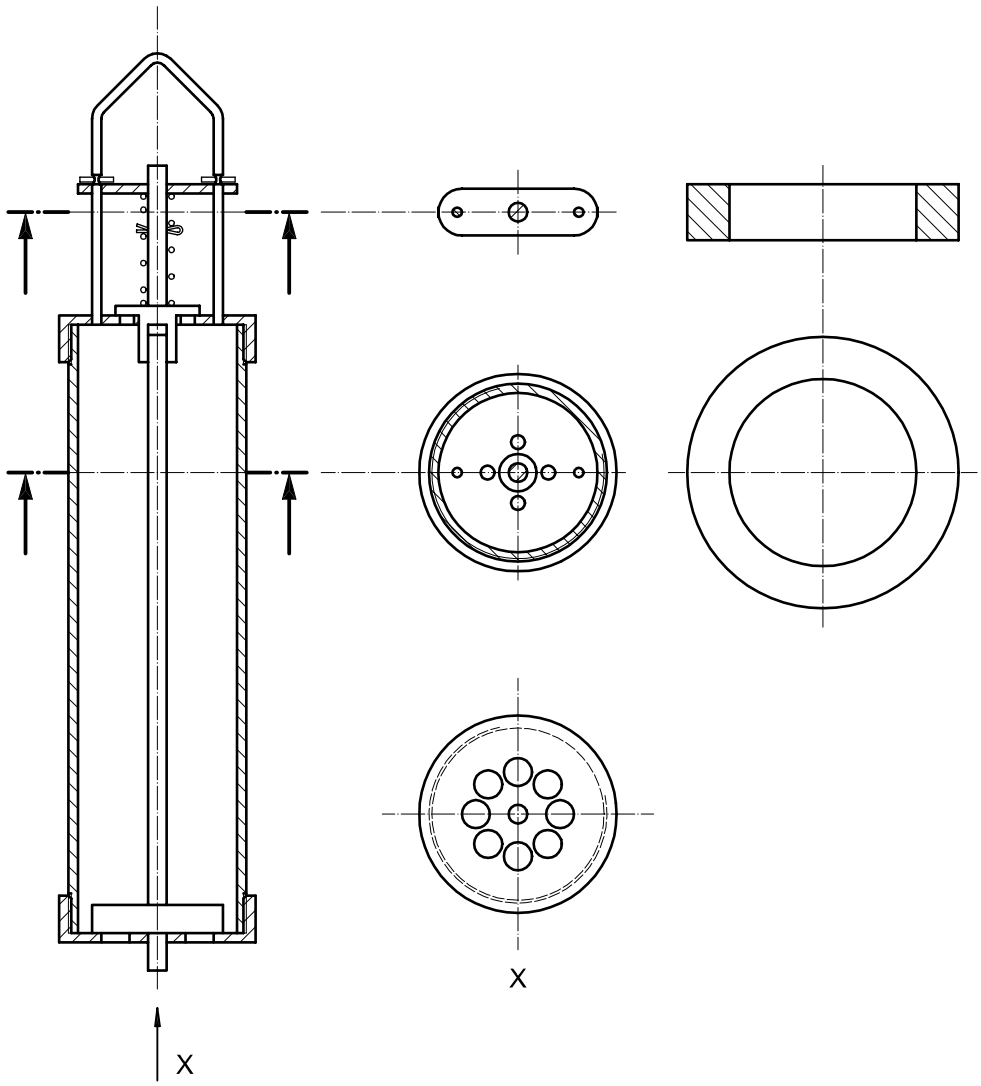
B.4 Bottom sampler

B.4.1 With spring-loaded valve

This bottom sampler [see Figure B.4a)] is constructed of stainless steel. It comprises a cylindrical body (of capacity about 500 ml) with a screw-on base incorporating a disc valve to permit entry of the product into the bottom of the sampler and a screw-on top also incorporating a disc valve to permit release of air from the sampler. Attached to the screw-on top is a fixed hoop which serves to suspend the sampler from a cord and provides a bridge guide and spring retainer for the central valve spindle. The valve spindle projects below the bottom of the sampler and when this grounds on the tank bottom the spindle is pushed up into the cylinder against the light spring, opening first the valve in the base, followed after a short delay by that at the top, this being effected by the small gap in the sleeve at the upper part of the cylinder. The purpose of this short delay between opening of the inlet and outlet valves is to ensure that the product first enters through the base thus causing a slight increase in pressure inside the vessel to prevent product entering at the top when the upper valve opens.

Buoyancy may be overcome by adding weights in the form of stainless steel annular rings which are slipped over the body of the sampler and held in place by the screwed base.



a) With spring-loaded valve

Figure B.4 — Bottom samplers

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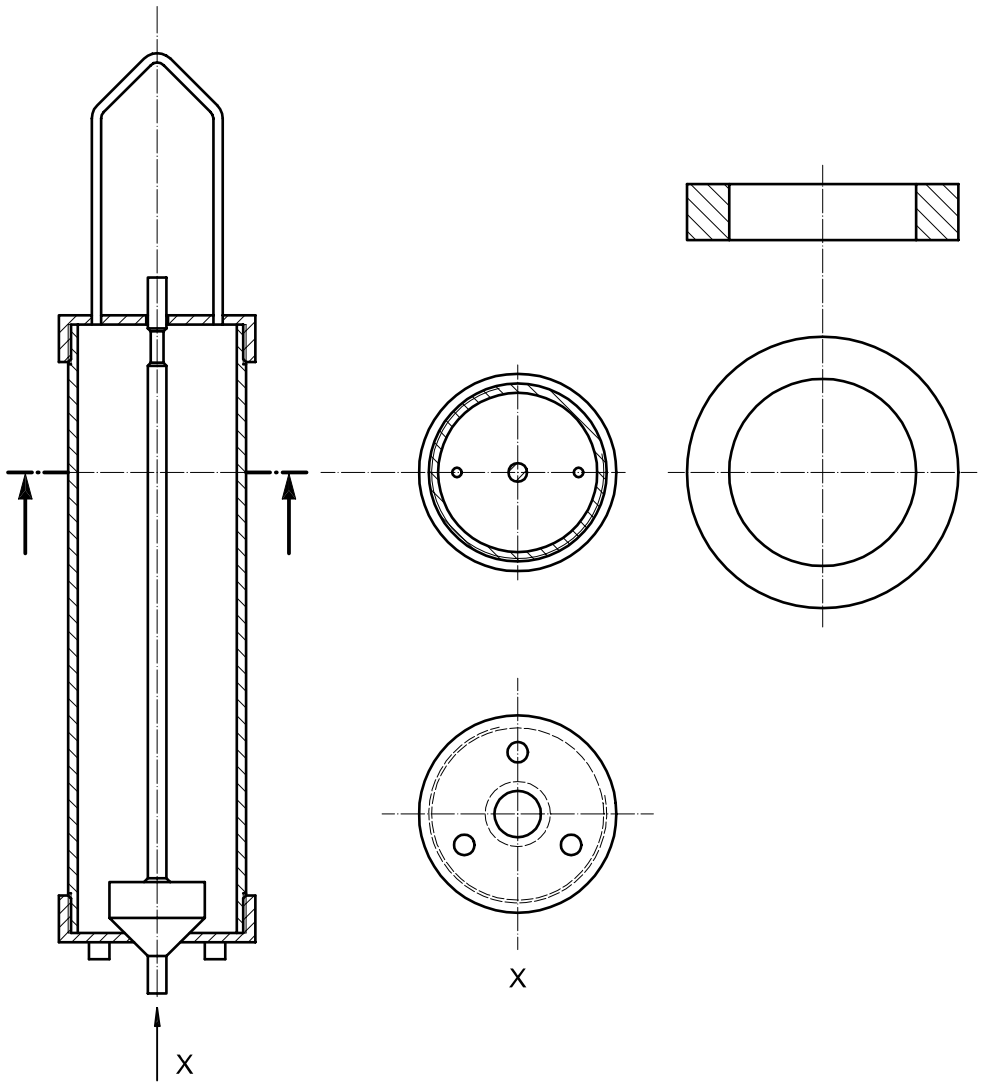

b) With deadweight valve

Figure B.4 — Bottom samplers

B.4.2 With deadweight valve

This bottom sampler [see Figure B.4 b)] is basically similar to the bottom sampler with spring-loaded valve (B.4.1) in design and operation, except that the lower valve is kept closed by deadweight and the release of air is through a reduced section of the valve spindle at its upper end.

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B.5 Sampling tubes

The sampling tube shown in Figure B.5 a) is a stainless-steel instrument consisting of two concentric tubes closely fitted into each other throughout their entire length, so that one tube can be rotated within the other. Longitudinal openings are cut in each tube. In one position the tube is open and admits the oil and by turning the inner tube it becomes a sealed container.

The inner tube is 20 mm to 40 mm in diameter and undivided in its length. The two tubes are provided with holes to be aligned when emptying, so placed that the oil contained in the instrument can be drained through them when the longitudinal openings are closed.

The sampling tube shown in Figure B.5 b) may be made of stainless steel or aluminium, or plastic which meets the requirements of 4.2. It is inserted either closed by the finger at the top or open, as desired. It is then allowed to fill, the finger being moved to open the top if necessary. It is then closed by the finger and withdrawn.

It may be used for taking samples at various levels from drums by keeping the top closed until the depth to be sampled is reached.

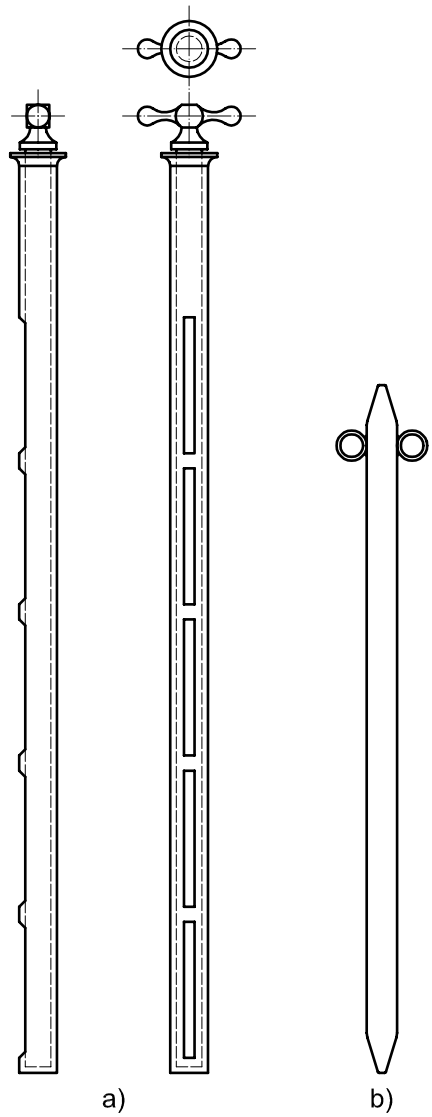

Figure B.5 — Sampling tubes

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B.6 Sampling scoops

Sampling scoops (see Figure B.6) are intended for the sampling of hard fats. They are made of stainless steel and are of semicircular or C-shaped cross section. When inserted into a fat with a twisting movement, a core of fat is obtained.

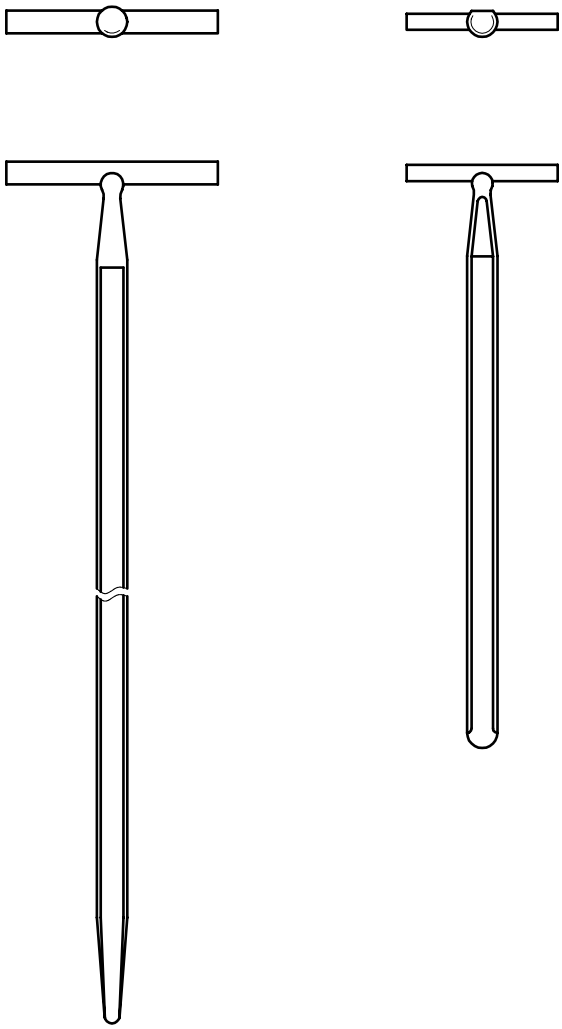

Figure B.6 — Sampling scoops

B.7 Water-finding rule

The water-finding rule (see Figure B.7) is a stainless-steel bar about 305 mm long and about 30 mm × 10 mm in cross section. It is calibrated from 0 mm to 300 mm in 1 mm graduations, marked every 10 mm. It has two spring-loaded sliding clips to retain a water-finding paper strip.

Water-finding paste complying with 4.2 may be applied directly to the face of the rule.

A water-finding rule (B.7) and an ullage rule (B.8) may be combined in a single rule with clips and calibrated on one side for water-finding and on the other side for ullaging.

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B.8 Ullage rule

The ullage rule (see Figure B.8) is a stainless-steel bar about 305 mm long and about 30 mm × 10 mm in cross section. It is designed for use only with steel tapes which are combined with their dip weights and the zero graduation on the bar should be about its mid-point. From there the rule is calibrated down to its lower extremity 0 mm to 150 mm in 1 mm graduations, marked every 10 mm. See also B.7.

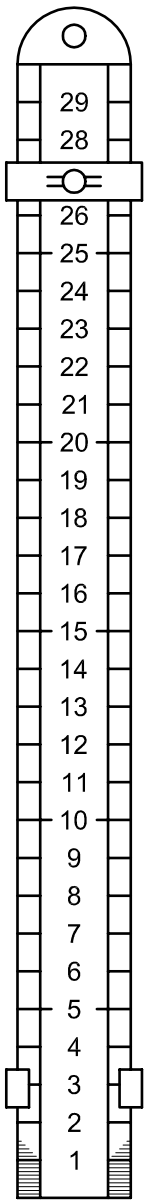

Figure B.7 — Water-finding rule

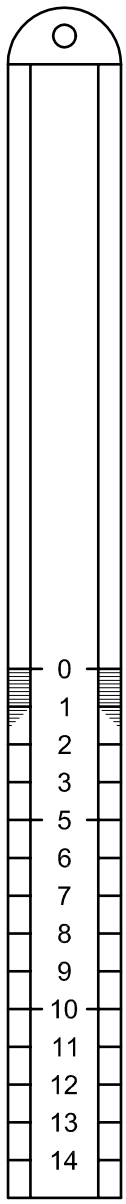

Figure B.8 — Ullage rule

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B.9 Thermometers

Where liquid-in-glass thermometers are used, special attention must be paid to the WARNING in 4.2. A similar warning applies to the liquid contents of this type of thermometer. A suitable alternative is a digital thermometer with stainless-steel probe, which is recommended.

B.10 Measuring tape and weight

Measuring tapes should be made of steel fore-shortened to be integral with dipweights and are provided with a stainless-steel swivel hook to attach the weights or rules.

The tape may be wound onto a frame winder or contained within a suitable case. Tapes should be of the required length and graduated and marked to suit the calibration of the tanks in which products are to be measured. Weights should be made of stainless steel combined with the tape and graduated in the same way as the tape, to provide continuity of measurement from zero.

B.11 Additional information

The design of the sampling instruments and ancillary apparatus described in B.1 to B.8, which all comply with the criteria of 4.2, has been kept as simple as possible. In most cases the instruments can be made in any engineering workshop from easily available materials. In some countries there may be commercial suppliers. Some examples of suppliers are given below[1)].

a) **Suppliers of sampling instruments**

SGS Depauw & Stokoe NV, Haven 407, Polderdijkweg 16, B-2030 Antwerp, Belgium.

SGS Redwood (UK) Ltd., Rossmore Business Park, Ellesmere Port, South Wirral, L65 3EN, UK.

Petrochem Supplies, 8 Northbury Road, Great Sutton, South Wirral, L66 2QY, Cheshire, UK.

Wragg Bros (Metal Fabrications) Ltd., Robert Way, Wickford Industrial Estate, Wickford, SS11 8DQ, Essex, UK.

Zone Devices Inc., 3449 Ocean View Boulevard, Glendale, CA 91208, USA.

b) **Suppliers of measuring apparatus**

Petrochem Supplies, 8 Northbury Road, Great Sutton, South Wirral, L66 2QY, Cheshire, UK.

SGS Depauw & Stokoe NV, Haven 407, Polderdijkweg 16, B-2030 Antwerp, Belgium.

SGS Redwood (UK) Ltd., Rossmore Business Park, Ellesmere Port, South Wirral, L65 3EN, UK.

Wragg Bros (Metal Fabrications) Ltd., Robert Way, Wickford Industrial Estate, Wickford, SS11 8DQ, Essex, UK.

c) **Suppliers of water-finding material**

Vecom BV, Mozartlaan 3, 3144 NA Maassluis, Holland.

Paterson Group International, Stafford Park 1, Telford, Shropshire, TF3 3BT, UK.

Petrochem Supplies, 8 Northbury Road, Great Sutton, South Wirral, L66 2QY, Cheshire, UK.

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1) These are some examples of commercial suppliers. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of these suppliers.

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[1] ISO 707:1997, *Milk and milk products — Guidance on sampling*

[2] ISO 2859 (all parts), *Sampling procedures for inspection by attributes*

[3] ISO 3951:1989, *Sampling procedures and charts for inspection by variables for percent nonconforming*

[4] ISO 3534-1:1993, *Statistics — Vocabulary and symbols — Part 1: Probability and general statistical terms*

[5] ISO 3534-2:1993, *Statistics — Vocabulary and symbols — Part 2: Statistical quality control*

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