International Standard 5555

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Animal and vegetable fats and oils — Sampling

Corps gras d'origines animale et végétale — Échantillonnage

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Foreword

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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.

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It has been approved by the member bodies of the following countries :

Australia	Iran	Poland
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Chile	Israel	Tanzania
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Hungary	New Zealand	USSR
India	Philippines	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

France
Portugal

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Animal and vegetable fats and oils — Sampling

0 Introduction

Correct sampling is a difficult process and one that requires most careful attention. Emphasis cannot therefore be too strongly laid on the necessity of obtaining properly representative samples of fats and oils for analysis.

Practically all fats and oils are sold on the basis of a sample and on the result of analysis of the sample, and disputes are invariably settled by reference to the sample, so that careless or inaccurate sampling could lead to misunderstanding, delay and unwarranted financial adjustments.

The procedures given in this International Standard are recognized as good practice and it is strongly recommended that they be followed whenever practicable. It is recognized that it is difficult to lay down fixed rules to be followed in every case, and particular circumstances may render some modification of the methods desirable.

1 Scope and field of application

This International Standard describes methods of sampling crude or processed animal and vegetable fats and oils. It also describes the apparatus used for this purpose.

NOTES

1 Throughout this International Standard, the word "animal" is to be understood to include marine animals.

2 Methods of sampling milk and milk products, including milk fats, are specified in ISO 707, *Milk and milk products — Methods of sampling*.[1)]

2 Definitions

For the purpose of this International Standard, the following definitions apply :

2.1 consignment : The quantity of fat or oil dispatched at one time and covered by a particular contract or shipping document. It may be composed of one or more lots or parts of lots.

2.2 lot : A stated quantity of the consignment, presumed to be of uniform characteristics, and which will allow the quality to be assessed.

2.3 increment; primary sample; sub-sample : A quantity of fat or oil taken from one place in a lot.

2.4 bulk sample : The quantity of fat or oil 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.

2.5 laboratory sample; contract sample : The quantity of fat or oil, 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 weight per unit volume sample : The quantity of fat or oil obtained from points where the weight of fat or oil is to be calculated from the volume.

3 General

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

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

a) consignments in bulk, for example in land tanks, ships' tanks, tank wagons, tank cars;

b) consignments consisting of a number of packages, for example barrels, drums, cases, tins, bags.

4 Apparatus

4.1 General

The choice of sampling instruments for a particular purpose, 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 weight per unit volume.

1) At present at the stage of draft. (Revision of ISO/R 707-1968.)

4.2 Materials

Sampling instruments shall be made of materials which are chemically inert to the fat or oil being sampled, and they shall not catalyse chemical reactions. Copper or alloys containing copper shall not be used. Stainless steel, aluminium, glass and some non-softening plastics materials are suitable; glass shall be used only if alternative materials are not acceptable.

WARNING — If glass apparatus is used, great care shall be taken to avoid breakages, due to the danger of contamination of the sample, and the bulk, with broken glass.

4.3 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, easily cleaned and relatively easy to manufacture. They can be used for all the sampling operations described in this International Standard with all the types of fats and oils commonly found in commerce. Many of the alternative designs of instruments available have been designed to meet the special requirements of individual users.

Certain basic requirements are common to all sampling instruments, for example to take a representative sample from a required level or area and to preserve 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.

The instruments mentioned in 4.3.2.1 to 4.3.2.4 are made in various convenient sizes, and those mentioned in 4.3.2.6 and 4.3.2.7 can be made with small diameters for use through small access holes.

The types of apparatus mentioned below are illustrated and described in annex B. Dimensions given in the illustrations are not mandatory, but are intended to serve as a guide to manufacturers.

4.3.2 Sampling instruments

4.3.2.1 Sample bottle or can (see annex B, clause B.1 and figure 4).

4.3.2.2 Sampling tipping dipper (see annex B, clause B.2 and figure 5).

4.3.2.3 Valve sampling cylinder (sinker sampler) (see annex B, clause B.3 and figure 6).

4.3.2.4 Bottom samplers or zone samplers (see annex B, clause B.4 and figures 7 and 8).

4.3.2.5 Continuous average sampler (see annex B, clause B.5 and figures 9 and 10).

4.3.2.6 Sampling tubes (see annex B, clause B.6 and figure 11).

4.3.2.7 Valve sampling tube (see annex B, clause B.7 and figure 12).

4.3.2.8 Compartmented valve sampling cylinder (see annex B, clause B.8 and figures 13 and 14).

4.3.2.9 Sampling scoops (see annex B, clause B.9 and figures 15 and 16).

4.4 Ancillary apparatus

4.4.1 Water-finding instruments (see annex B, clause B.10 and figures 17 and 18).

4.4.2 Sampling tube withdrawal cleaner (see annex B, clause B.11 and figure 19).

4.4.3 Sample containers.

4.4.4 Adhesive and **tie-on labels** and **sealing apparatus** (see also clause 7).

4.4.5 Thermometers.

4.4.6 Measuring tape.

5 Sampling technique

5.1 All sampling operations shall be performed with clean hands or wearing gloves (clean plastic or cotton gloves may be used).

5.2 Only clean, dry apparatus and sample containers shall be used. The sampling instruments shall be washed with a hot solution of soap or detergent, and afterwards rinsed thoroughly with clean hot water. Before use, the washed apparatus shall be carefully dried, for example in an oven. If a supply of steam is available, the washed apparatus shall be held in a jet of the steam for a short time.

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

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

5.5 It is important that fats and oils are not overheated. It is recommended, in accordance with standard practice, that the

temperature of a bulk of fat or oil in a large tank should not be raised by more than 5 °C per day.

5.6 The temperature of the product during sampling shall be within the range indicated in annex A.

6 Methods of sampling

6.1 Types of container

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

— vertical cylindrical land tanks;

— ships' tanks;

— tank wagons or cars;

— horizontal land tanks;

— weigh tanks;

— pipelines;

— consignments in packages, for example barrels, drums, cases, tins, bags, bottles.

6.2 Sampling from vertical cylindrical land tanks

6.2.1 Preliminary operations

6.2.1.1 Presence of water

By means of a bottom sampler and a water-finding instrument, determine whether there is a sediment, a layer of oil of different composition, or a layer of water, at the bottom of the tank.

It is desirable, as far as possible, to remove any free water before sampling commences. This quantity of water shall be measured and reported to the buyer and seller or to their representatives.

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.

If the condition of the oil to be sampled (after any water has been removed) is not known, take a sample to provide this information using a continuous average sampler (4.3.2.5), or take an increment from the bottom of the tank, using a bottom sampler or zone sampler (4.3.2.4) or a valve sampling cylinder (4.3.2.3). Use this sample to ascertain whether the contents of the tank are homogeneous.

If oil layers of different composition are present, homogeneity can, in most cases, be obtained by heating; this shall be performed only when strictly necessary, and shall never take place by direct contact of steam with the product. It is recommended that the maximum temperature indicated in annex A should not be exceeded.

If heating is performed, it is preferable to use hot water passing through heating coils. If steam is used, the maximum steam pressure shall be 240 kPa gauge reading (138 °C).

If heating is not permissible because of the nature of the oil, or if it is not necessary, or if heating has to be avoided for any other reason, the oil can be made homogeneous by blowing nitrogen through it.[1] Alternatively, it may be possible to cause mixing by transfer to another tank.

6.2.2 Procedure

If the contents of the tank are not homogeneous, a valve sampling cylinder (4.3.2.3) is generally used, but a bottom sampler (4.3.2.4), used with a cord, is also suitable. 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) together with a bottom sample. Prepare three samples as follows :

a) a sample of the clear oil;

b) a sample of the separated layer;

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

If the contents of the tank are homogeneous, use the same sampling instrument as before, but in this case take at least three increments, from 'top', 'middle' and 'bottom'.[2] Prepare the bulk sample by mixing one part from each of the top and bottom increments with at least three parts from the middle.

6.3 Sampling from ships' tanks

The shape and disposition of ships' tanks make it difficult, if not impossible, to take samples properly. Usually, sampling is carried out during transfer as described in 6.6. If, however, samples are to be taken from ships' tanks, use as far as poss-

1) If an oil is known to be inhomogeneous and nitrogen is not available, the parties may agree to blowing dry air through the product, although this process is to be deprecated because it involves deterioration of the oil by oxidation. Details of such operations should be included in the sampling report sent to the laboratory.

2) 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.

ible, the method described in 6.2, including the preliminary operations, such as heating.

Sample each tank separately. Take the number of bulk samples indicated in table 1. If 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.

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

Mass of tank contents, t	Number of bulk samples to be taken
Up to and including 500	1
Over 500 up to and including 1 000	2
Over 1 000	1 for every 500 t or part thereof

6.4 Sampling from tank wagons or cars and horizontal cylindrical tanks

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

Take the increments by means of the valve sampling tube (4.3.2.7). Insert this open (it shall be of sufficient length to touch the bottom of the tank) so that it takes a sample throughout the whole depth of the liquid. Alternatively, use the valve sampling cylinder (4.3.2.3) by the procedure described in 6.2.2.

If the increments cannot be taken immediately after the tanks have been filled, perform a preliminary test, if necessary, for the presence of free water. If free water is present in substantial quantities, remove it by opening the bottom tap, accurately determine the mass 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 oil 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. Whereas one dip of the valve sampling tube would give a correct sample for freshly filled tanks, a correction for tank shape is necessary for static liquids in tanks of circular or elliptical cross-section. Make this correction by taking a second dip, of only about one-third of the mass of the first dip, from the middle layers of the tank. Mix the two dips to form the bulk sample.

Figure 1 shows the cross-sections of typical tanks. These are drawn on squared paper and marked off at 300 mm levels. Comparisons of the areas, and hence the volumes, of each 300 mm depth can be made by counting the squares; approximate values of the comparative areas are shown at the right of each diagram.

If sampling with bottle samplers or zone samplers, take increments from each level in the proportions of the comparative areas in order to form the bulk sample.

One and one-third dips of the valve sampling tube are required for cylindrical tanks, whilst one and slightly less than one-third are required for tanks of elliptical cross-section. In practice, the proportion of one and one-third dips is used for both shapes of tanks as the difference is insignificant. The most convenient method of taking the "tank-shape-corrected" sample, mentioned above, is as follows.

Take three dips in all. It is essential that the first two are full dips, the sampling tube reaching to the bottom of the tank and showing the depth of oil on the tube markings. For the third dip insert the instrument only to two-thirds of the depth from the surface, so that it holds only two-thirds of the amount of either of the first two dips. In all three cases, insert the valve sampling tube open, first clearing away any scum at the surface of the oil. In the first two cases, lower the instrument slowly throughout the whole depth, and, in the third case, drop it very rapidly through the first third and slowly through the middle third. This ensures that the increments are taken where required. (Whilst it is appreciated that the third dip can be made with the tube closed until it reaches the middle layer, confusion may arise with the two different methods employed and the procedure described is the established practice of bulk sampling.) Prepare the bulk sample by thoroughly mixing the three dips.

If a valve sampling cylinder is used to sample every 300 mm of depth of the tank wagon, the column at the right of each diagram in figure 1 shows 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) can 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.

An alternative procedure is to use a compartmented valve sampling cylinder (4.3.2.8), as described in annex B, clause B.8, for tanks, wagons, cars, or horizontal cylindrical tanks. The volume of each compartment is proportional to the volume of liquid in the tank at the level of that compartment.

6.5 Sampling from weigh tanks

Weigh tanks shall be sampled immediately after they have been filled, before settling occurs. Take the sample by allowing the sampling instrument (for example a zone sampler) to sink to the middle and fill it. Should unavoidable delay occur, which may result in the settling of sediment at 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 immediately after filling.

1) See the footnote to 6.2.1.

6.6 Sampling of oils during transfer

6.6.1 General

This method shall be used only if the product is entirely liquid, homogeneous and contains no components which could block the tap. Any water-containing emulsion, for example 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 removals of material from the flow at regular intervals when 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. Certain conditions, however, have to be carefully observed to ensure accurate sampling by this method, which is most suited to relatively homogeneous consignments of oil. The difficulties arising from the presence of free water and extraneous matter are obvious.

6.6.2 Taps or drip-cocks

The tap or drip-cock shall be fed from a nozzle of diameter not less than 9,5 mm, fixed in the centre 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 drip-cock 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 to 50 m of the pressure side of the pump. A pet-cock is not recommended. A suitable arrangement is shown in figure 2. The sampling line shall be of diameter not less than 9,5 mm and shall fall continuously to its outlet. The tap or drip-cock shall be of such design as to be easily and quickly cleaned in case of blockage.

6.6.3 Procedure

The rate of flow in the main pipeline shall be sufficient to ensure the turbulence necessary to effect complete mixing of the product in the pipeline and shall be maintained 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 drip-cock, after completion of the discharge, to form the bulk sample, from which the laboratory samples are to be taken.

Figure 3 shows a suitable tank for the collection and mixing of the bulk sample.

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

6.6.4 Minimum size of bulk sample

Bulk samples shall be taken during transfer from each tank, as indicated in table 2.

Table 2 — Minimum size of bulk sample

Mass of tank contents, t	Minimum size of bulk sample, litres
Up to and including 20	1
Over 20 up to and including 50	5
Over 50 up to and including 500	10

6.7 Sampling from tanks for determination of weight per unit volume

The mass of the contents of the tank can be determined from the product of volume and weight per unit volume of the contents of the tank.

Take a special sample for determining the weight per unit volume as follows.

For products 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.[1)]

Continue heating until the fat has completely melted. Avoid, however, heating to too high a temperature, as this may impair the quality of the fat. For the oils and 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.

Take increments, preferably at several points, at three levels ('top', 'middle', 'bottom'), but not less than 100 mm from the bottom. Pour them into a sampling bucket 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 6.2.1. Determine the temperature and volume of the contents of the tank immediately before and after sampling.

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

1) It is recommended, in accordance with standard practice, that the temperature of a bulk of fat or oil in a large tank should not be raised by more than 5 °C per day.

6.8 Sampling from packages (small packing units)

6.8.1 General

If a consignment consists of a large number of separate units, for example barrels, drums, cases, tins (loose or 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[1] 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. If there is no such prior agreement, a distinction shall be made between the following :

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

b) consignments which are known not to be uniform;

c) consignments about which nothing is known;

d) consignments, the quality of which 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 :

a) treat the consignment as one lot;

b) treat each quality, based on visual inspection, as one lot, the proportion of each lot being determined;

c) carry out preliminary investigation and reclassify as a) or b);

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

In the event of a single bulk sample representing the whole consignment being required, the increments taken from the different qualities shall be mixed together in the same proportions as exist between the masses of the different qualities.

If consignments 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.

Table 3 — Number of packages to be sampled

Size of package	Number of packages in the consignment	Number of packages to be sampled
Over 20 kg up to 5 t maximum	1 to 5	all
	6 to 50	6
	51 to 75	8
	76 to 100	10
Over 5 kg up to and including 20 kg	1 to 20	all
	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
	more than 32 000	108
Up to and including 5 kg	1 to 20	all
	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
	more than 170 000	108

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

To obtain increments from solid fats in drums, insert a sampling scoop (4.3.2.9, see figure 16) 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 "cylinder" of fat. Mix the samples taken from each drum thoroughly in a stainless steel or aluminium bucket and place this mixed sample in sample containers.

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

Sample soft pastes and semi-liquid products in drums in a similar manner, but using a sampling scoop (4.3.2.9, see figure 15) or a valve sampling tube (4.3.2.7). In this case, insert the scoop or tube open into the product, with the shutter closed, 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 and oils

Roll and turn over barrels and casks filled with liquid fat or oil and stir the contents well, by hand or mechanically, with a pad-

1) Tables of random numbers may be used, such as those described in clause 15 of ISO 2859/Add. 1, *Sampling procedures and tables for inspection by attributes — Addendum 1 : General information on sampling inspection, and guide to the use of the ISO 2859 tables.*

dle or stirrer. Take an increment from each container to be sampled using a suitable sampling instrument (see, for example, figures 11, 12 and 15), inserted through the bungholes of barrels or through convenient openings in other containers, 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.

6.8.3 Procedure for packages containing loose solid fats

If fats are in a loose lumpy condition, obtain a representative sample by collecting, from all different parts, sufficient amounts of all sizes of lumps, which may be broken into smaller pieces if necessary, and quarter the resultant sample to a suitable size.

By agreement between the parties concerned, the mixing and reduction of the increments to prepare the bulk sample may be carried out on a mixing table or bench proceeding as follows. (The mixing table or bench shall be at least 750 mm square and shall be covered with a sheet of plate glass, white tile or stainless steel.)

Empty the increments on to the mixing table and knead to a doughy homogeneous consistency. Mix with a large (250 mm) spatula 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. On no account shall heat be applied as this may cause loss of moisture by evaporation.

6.9 Preparation of laboratory (contract) samples

One homogeneous bulk sample shall be prepared for every 500 t or part thereof of the consignment (see table 1). According to the agreement between the parties concerned, the laboratory (contract) samples shall be prepared

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, the prepared samples shall be divided in order to obtain at least four laboratory samples of minimum size 250 ml in the case of oils or 250 g in the case of fats. They shall be put into clean dry containers with lids (new corks or caps), sealed and labelled (see clause 7).

NOTE — For certain purposes, a sample of 500 ml or 500 g, or even more, may be required.

7 Packing and labelling of samples

7.1 Packing

The samples shall be packed in clean, dry, airtight containers made of glass or other material (for example tin-plated steel) which will have no harmful effect on the sample. The sample 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 exerts a detrimental action on most oils. Unless otherwise agreed, the containers shall be closed and sealed. Glass bottles are recommended for oils and glass jars for fats. Rubber and flexible PVC stoppers shall not be used to close the containers. For oils of acidic character, metal containers or closures shall not be used.

Plastics containers are not recommended as they may absorb fat or oil or soften when heated.

All samples shall be protected from light and heat.

When the 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 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 attached and sealed where required to every sample container. The sample shall not be accessible without breaking the seal.

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

1) Ship or vehicle
2) From
3) To
4) Arrived
5) Quantity
6) Bulk/containers
7) Goods and origin
8) Identification mark
9) Bill of lading No. and date, or contract No. and date
10) Sampled by
11) Method of sampling (for example tank sampling)
12) Date of sampling
13) Place and point of sampling
14) Name of organization responsible for the terms of the contract

The information on the label shall be recorded in indelible ink.

It is recommended that, if paper labels are used, they should be of a suitable quality and size for the purpose. The eyelet hole in the label should be reinforced.

8 Dispatch of samples

Laboratory samples shall be dispatched as soon as possible, and only in exceptional circumstances more than 48 h after sampling has been completed, non-business days excluded.

The samples shall be kept cool and away from light as far as possible, unless only the determination of weight per unit volume is required.

9 Sampling report

The sampling report shall give the information listed in 7.2 and shall make reference to the condition of the fat or oil sampled. It shall also refer to the technique applied, if this differs from that described in this International Standard, and to all the circumstances that may have influenced sampling.

Annex A

Temperature limits

Table 4 shows the ranges of temperature within which individual fats and oils should be maintained at the time when the sample is taken.

Table 4 — Temperature limits

Product : Fat or oil from	Temperature, °C	
	min.	max.
Olive, maize, rape, safflower, sesame, soya, sunflower, linseed	15	25
Groundnut (arachis), tung	20	25
Cottonseed	20	30
Castor, palm olein, fish oils	30	35
Coconut	35	45
Palm kernel	40	45
Greases	45	55
Lard, palm oil, illipe, shea nut butter	50	55
Tallow	55	60
Palm stearin	55	65

The upper limits indicated in the table may be raised by 5 °C in order to facilitate handling, but only if agreed by the parties concerned and the temperature is given in the sampling report.

NOTE — The temperatures may need to be modified according to local climatic conditions.

In general, a bulk quantity of fat or oil should be held at a temperature 5 to 15 °C above its clear point. It should not be heated to a temperature higher than this as its properties may be changed, for example by oxidation. Overheating of samples obtained from the bulk quantity should also be avoided. If fats and oils are held at too low a temperature, however, crystals may form and settle, causing inhomogeneity.

Annex B

Examples of sampling instruments and ancillary apparatus[1)]

B.1 Sampling bottle or can

The sampling bottle (see figure 4) is suitable for sampling large vessels and tanks of liquid oil. It consists of a bottle or metal container, which may be weighted, attached to a handle long enough to reach to the lowest part of the bulk to be sampled. It has a removable stopper or top, to which is attached a suitable chain, pole or cord. This device is lowered to the various desired depths, where the stopper or top is removed and the container is allowed to fill.

B.2 Sampling tipping dipper

The sampling tipping dipper (see figure 5) consists of a cylinder approximately 150 mm long and 50 mm in diameter, carrying an extension with a hole at its closed end and a stout wire handle at the open end; the handle carries a small metallic catch and a rope. The cylinder is inverted in the position shown in figure 5, maintained in that position by the insertion of the catch into the hole, and then sunk into the oil in the tank. At the required depth, the rope is pulled to release the catch, whereupon the cylinder rights itself and becomes full of oil.

B.3 Valve sampling cylinder (sinker sampler)

The valve sampling cylinder (see figure 6) consists of an open-headed cylinder with a bottom valve which remains open owing to the pressure of the oil on the valve whilst the instrument is being lowered through the liquid, ensuring that an even flow of oil passes into the cylinder. When lowering is stopped, the valve closes and a sample of the liquid is taken from the depth reached by the instrument.

B.4 Bottom sampler or zone sampler

The bottom sampler or zone sampler is suitable for withdrawing bottom samples or zone samples at any level from tanks of liquid oil. Two types of instrument are illustrated.

B.4.1 The apparatus shown in figure 7 consists of a container fitted with a valve on a central spindle. To withdraw a bottom sample, the apparatus is attached to a cord or chain and lowered empty to the bottom of the tank, where the valve automatically opens and the container fills from the bottom. On withdrawal of the sampler, the valve automatically closes again. To withdraw a sample at a particular level, the apparatus is lowered empty to the required level and then, by means of an additional cord attached to the top of the central valve spindle, the valve is opened and the container allowed to fill. When the sampler is full, the valve is allowed to close and the container is withdrawn.

B.4.2 The apparatus shown in figure 8 comprises a wide-necked glass bottle provided with a screw cap of stainless steel. The cap carries two tubes, one of which is straight and the other is turned downwards, and also a ring for attachment of a cord or chain. The assembly is mounted in a corrosion-resistant metal support, which is weighted. The bent tube is extended by means of a short length of semi-rigid plastics tubing, and the straight tube by a fairly flexible plastics tube which is sufficiently long to enable the sampling assembly to reach the bottom of the tank to be sampled.

In use, the sampling assembly is lowered to the required depth, the upper end of the long tube being kept closed. The end is then opened to allow air to escape from the bottle and to allow the oil to fill the bottle completely. If necessary, a suction bulb can be fitted to the tube. When the assembly is raised, the plastics tubes empty themselves but the liquid cannot escape from the bottle nor become contaminated.

B.5 Continuous average sampler

The apparatus consists of a tube with a central spindle attached at the bottom to a piston which has holes in its periphery (see figures 9 and 10). According to the position of the piston, these holes may be blocked or open to allow liquid to enter the tube. An adjusting ring is fitted to allow the rate of entry to be controlled.

This instrument can be used to obtain an average sample in one operation, by lowering it at a constant rate through the liquid with the piston in the "open" position. The holes are automatically closed, and the piston is locked, when the instrument reaches the bottom of the tank; the tube is then withdrawn by means of a cord. For this use, it is essential that the rate of entry of liquid during the descent is such that the tube is not completely filled. This instrument can also be fitted with a device for remote control of the piston, enabling it to be used for bottom or zone sampling. It can also be used for ascertaining the average temperature of the tank.

1) Dimensions, where given, are included for information only. Copper should not be used in construction of the apparatus because it catalyses oxidation.

B.6 Sampling tubes

The sampling tube shown in figure 11 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; by turning the inner tube it becomes a sealed container.

The inner tube may be approximately 20 to 40 mm in diameter and may not be divided in its length. The two tubes are provided with V-shaped ports at their lower ends, so placed that oil contained in the instrument can be drained through them when the longitudinal openings are closed.

The sampling tube shown in figure 11 b) may be made of glass (see WARNING In 4.2) but can also be made in plastics material. 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.

B.7 Valve sampling tube

The instrument (see figure 12) consists of a metal tube, with a valve at the base connected by a central rod to a screwed handle at the top. When the handle is screwed down, the valve is kept closed. It should be inserted into the oil with the valve open, allowing the oil to enter as the tube dips below the surface while the displaced air passes through an air hole at the top of the tube. When the base of the tube touches the bottom of the container, the valve automatically closes. The handle is then screwed tight, keeping the valve shut, and the tube containing the sample is withdrawn. The outside of the tube is wiped clean, unless the cleaning device (described in clause B.11) is used.

Markings on the exterior of the valve sampling tube at intervals of length may be of help to sampling personnel, by showing the depth of liquid being sampled. This is especially useful in sampling horizontal cylindrical tanks (see 6.4).

Sampling tubes of various lengths are used, sufficiently long to reach the bottom and convenient for sampling tanks, wagons or cars. These tubes may be made of aluminium for lightness.

B.8 Compartmented valve sampling cylinder

The compartmented valve sampling cylinder (see figures 13 and 14) consists of a stainless steel cylinder, which is divided into a number of separate compartments by specially designed pistons fixed to a central spindle which can be rotated, raised or lowered in relation to the cylinder. The pistons are disposed at calculated intervals. Orifices, located in the cylinder wall of each compartment, can be opened or closed by lowering or raising the central spindle.

The compartmented valve sampling cylinder is completely immersed[1] in the tank with the orifices closed. These are then opened by rotating the central spindle and lowering it in relation to the cylinder. The orifices are then closed by the reverse procedure, and the sampling cylinder withdrawn.

A ring is provided to clean the outside of the cylinder and the sample is then transferred to a special container provided for the purpose.

The apparatus is so designed that the volume of the sample taken in each compartment is equivalent to the volume of liquid in the tank at the level of the orifices, i.e. the proportion of the total sample taken into one compartment is equal to the proportion of the total volume of the tank occupied by the oil at the level of the orifices of that compartment.

The accuracy of sampling is not affected if the tank is elliptical or if the apparatus is tilted inside the tank. The apparatus is suitable for sampling all types of fats and oils, even if extremely viscous.

B.9 Sampling scoops

The sampling scoop (trier) shown in figure 15 is of mild steel or stainless steel and is divided into compartments along its length. It is of D-shaped cross-section and is opened and closed by means of a shutter which moves up and down throughout the entire length. It may be from 25 to 50 mm in diameter.

The instrument is inserted closed, the shutter pulled out to admit oil, and the tube is then closed and withdrawn.

The sampling scoops or triers shown in figure 16 are open instruments and are intended for use with hard fats. They are of metal, of semi-circular or C-shaped cross-section, and will bore out a core of fat from the material.

B.10 Water-finding instruments

The instrument shown in figure 17 is made of stainless steel throughout and is approximately 300 mm long, 50 mm wide and 10 mm thick in its graduated length.

There is a holed flange at the top which enables a cord to be attached to the instrument so that it can be lowered to the bottom of the tank.

The instrument opens by means of three hinges, and a calibrated scale is provided in a hinged movable section under which water sensitive paper is inserted and held firmly in position when the hinged movable section is snapped to the lower section in the closed position.

When the instrument is closed, an opening is left throughout the whole length of the calibrated scale so that the water-sensitive paper can come into direct contact with the liquid oil

1) If the diameter of the tank is less than the length of the instrument, the instrument may be inclined at a suitable angle.

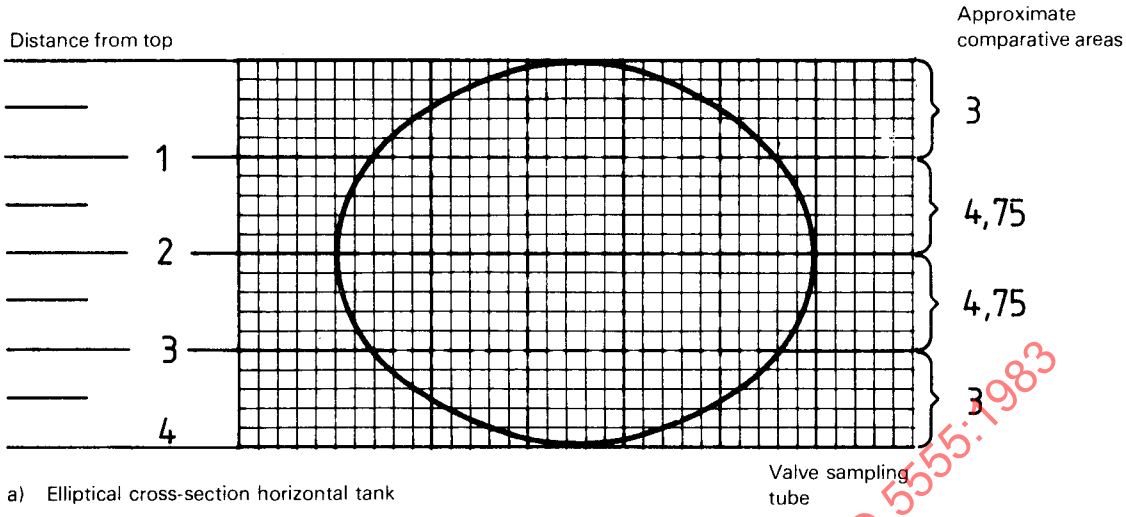
or fat and register, by means of a colour change, any water that may be present.

As an alternative to the water sensitive paper, water sensitive paste may be used.

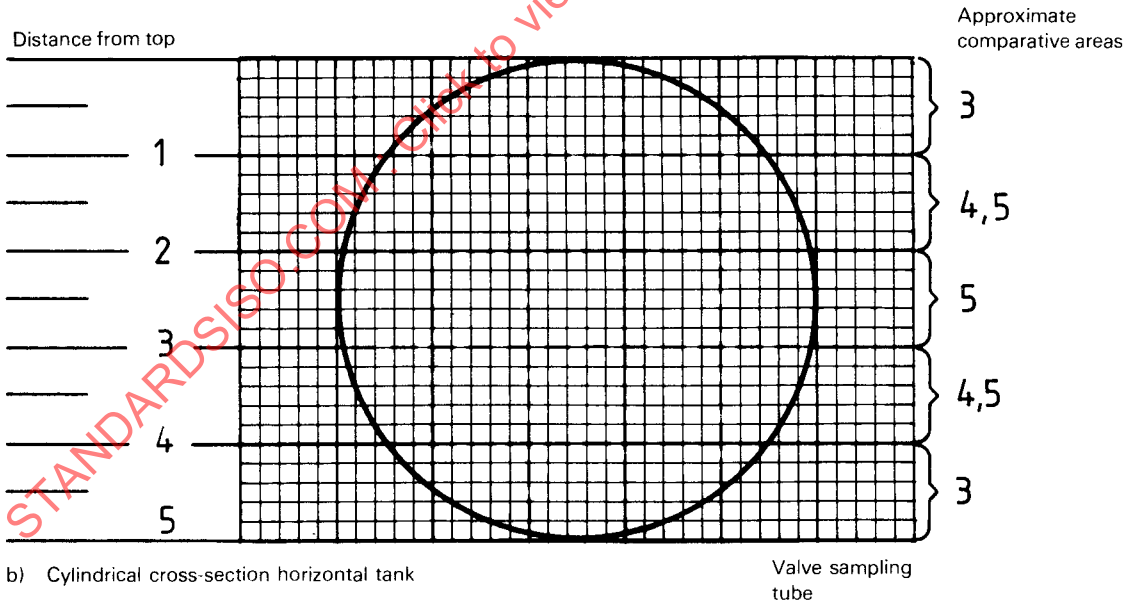
A simple means of detecting water at the bottom of a tank is shown in figure 18 a). A twin-core electric cable fitted with a two-pin connector is lowered into the oil, and the other end of the cable is connected to a low-voltage battery and lamp or a voltmeter. If a water layer is present in the tank, completion of the electrical circuit is indicated by the lamp or voltmeter.

B.11 Sampling tube withdrawal cleaner

The sampling tube withdrawal cleaner shown in figure 19 is a funnel-shaped metal cup designed to sit in the bunghole of a barrel or opening of a drum. It contains a fibre washer with a central hole through which can pass the sampling tube with which it is to be used. When a sample is taken, the tapered end of the cleaner is placed in the hole and the sampling tube inserted through the cleaner into the barrel or drum. When the tube is withdrawn, the excess oil on the outside is automatically wiped off, and runs back into the barrel or drum.



a) Elliptical cross-section horizontal tank



b) Cylindrical cross-section horizontal tank

Figure 1 — Cross-sections of typical tanks

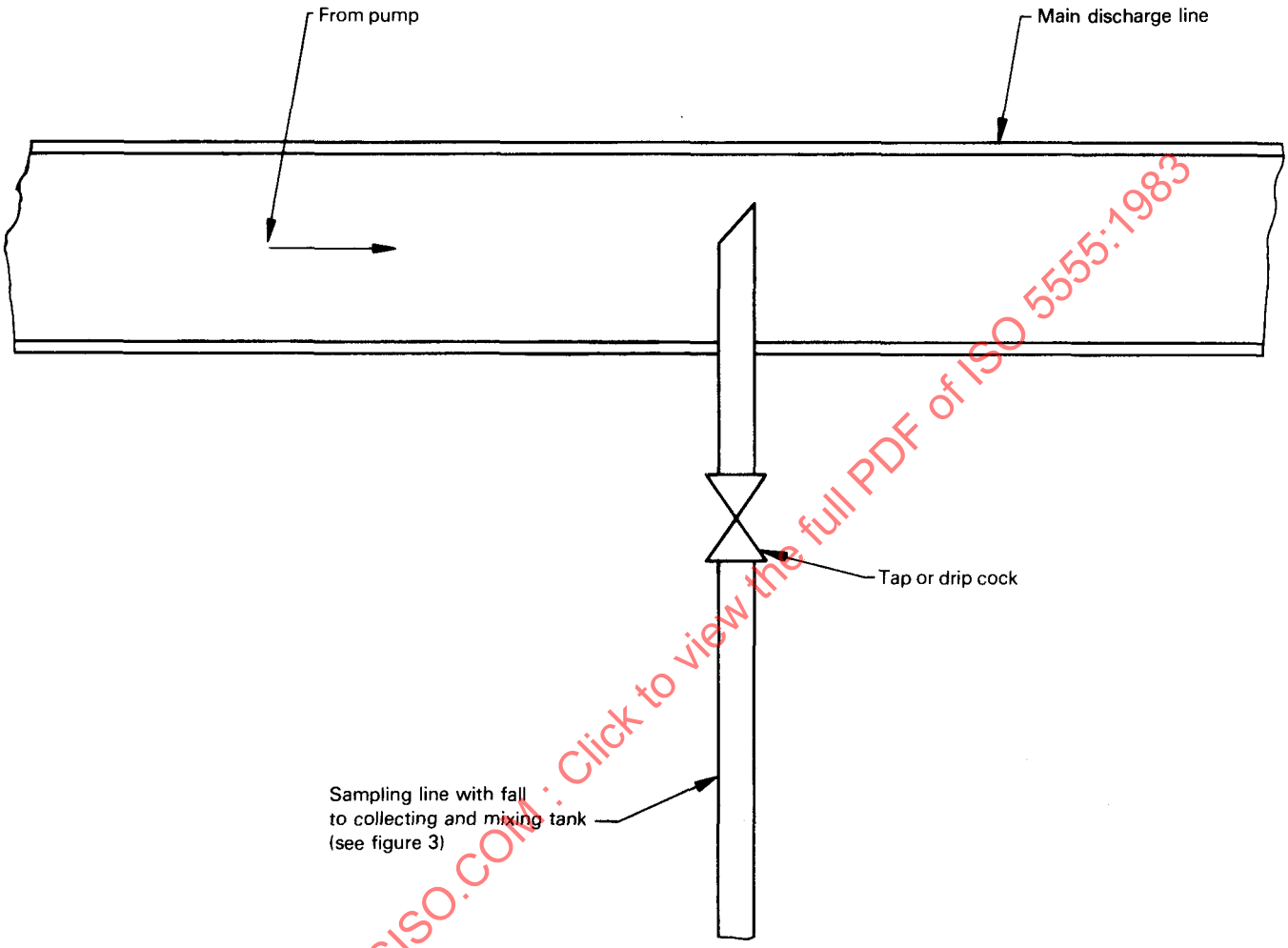


Figure 2 — Sampling line for flow sampling

NOTE — The sampling line should reach the centre of the main discharge line and be cut bevelled as shown.

Dimensions in millimetres

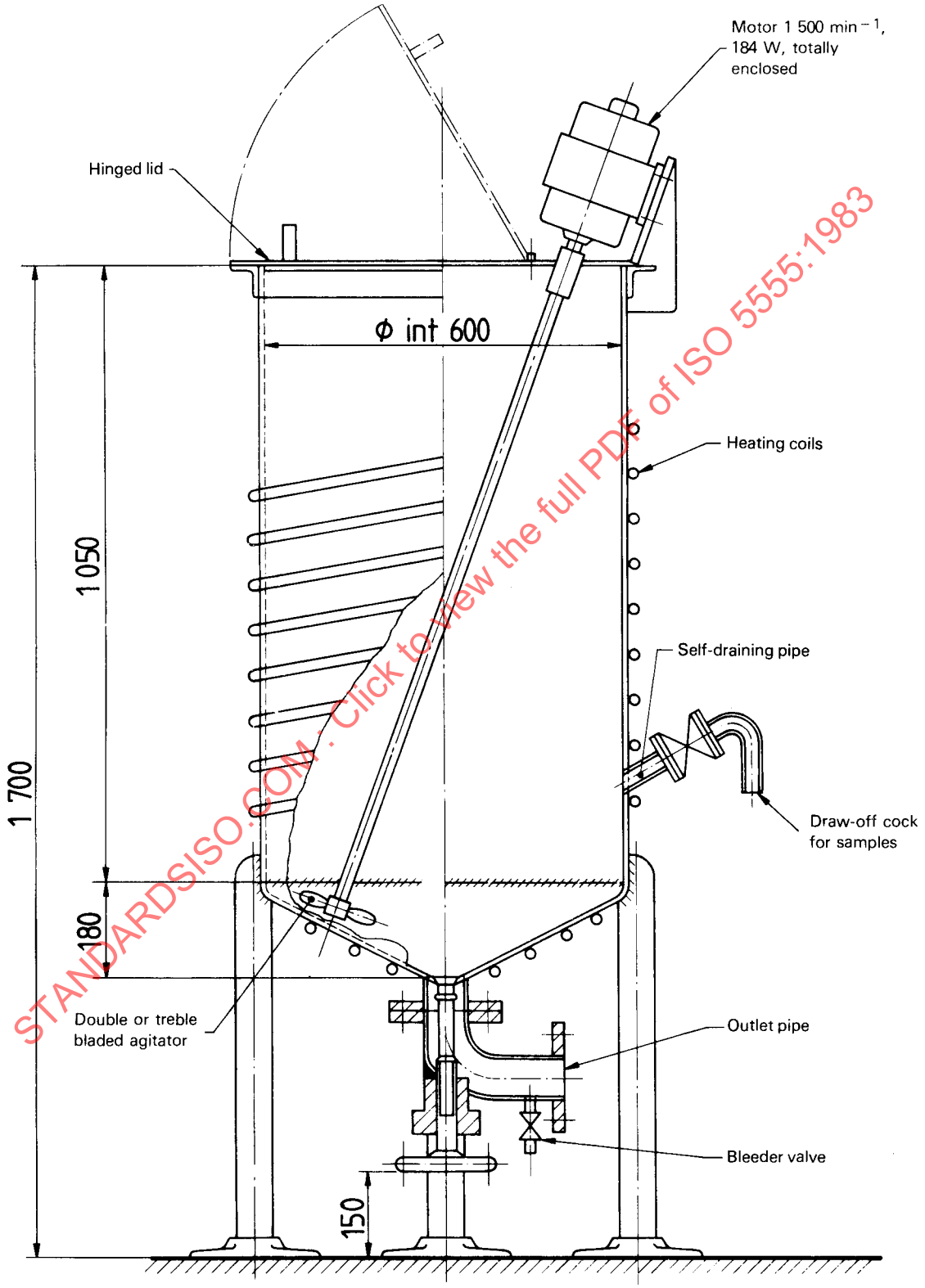


Figure 3 — Collecting and mixing tank for samples taken during transfer

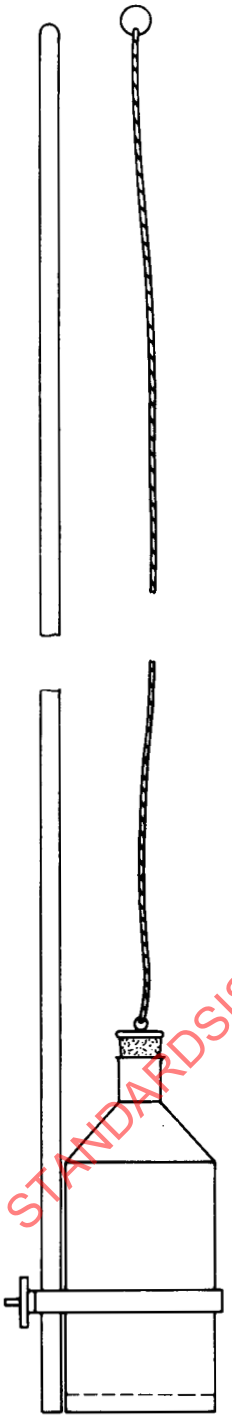


Figure 4 — Sampling bottle (B.1)

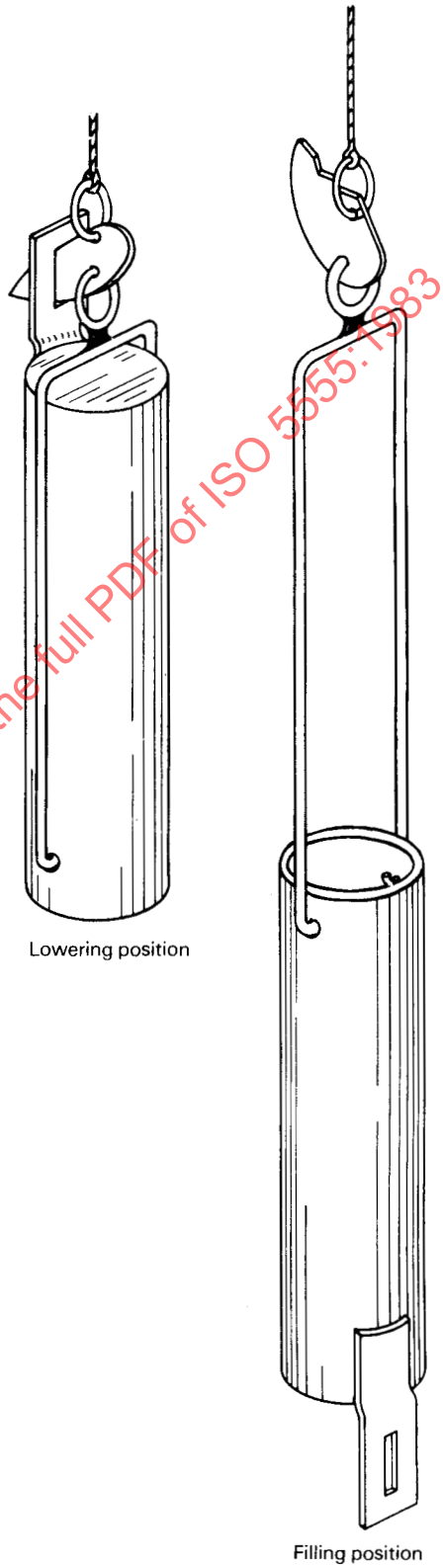


Figure 5 — Sampling tipping dipper (B.2)

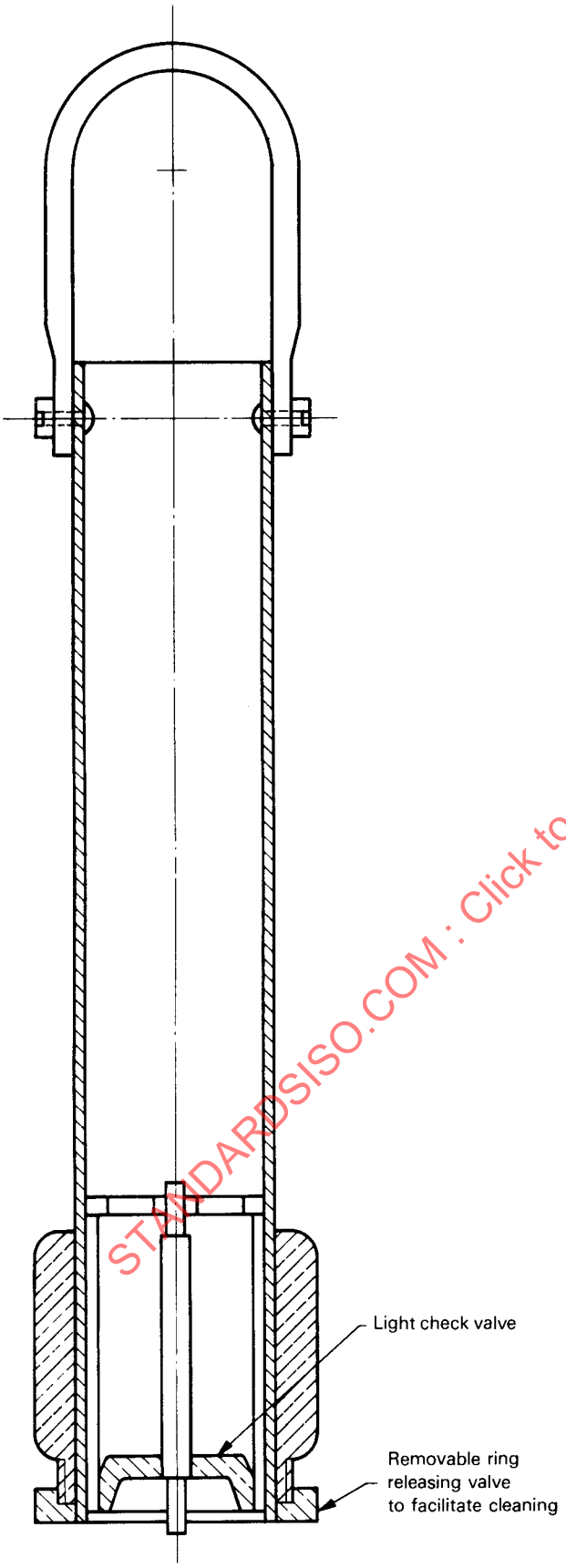


Figure 6 — Valve sampling cylinder (sinker sampler) (B.3)

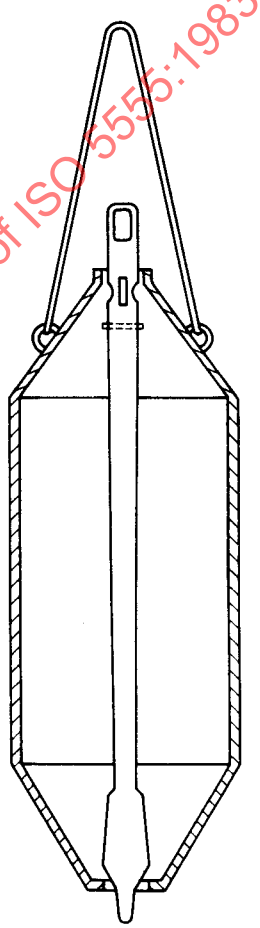


Figure 7 — Bottom sampler or zone sampler (valve type) (B.4) (cross-section)

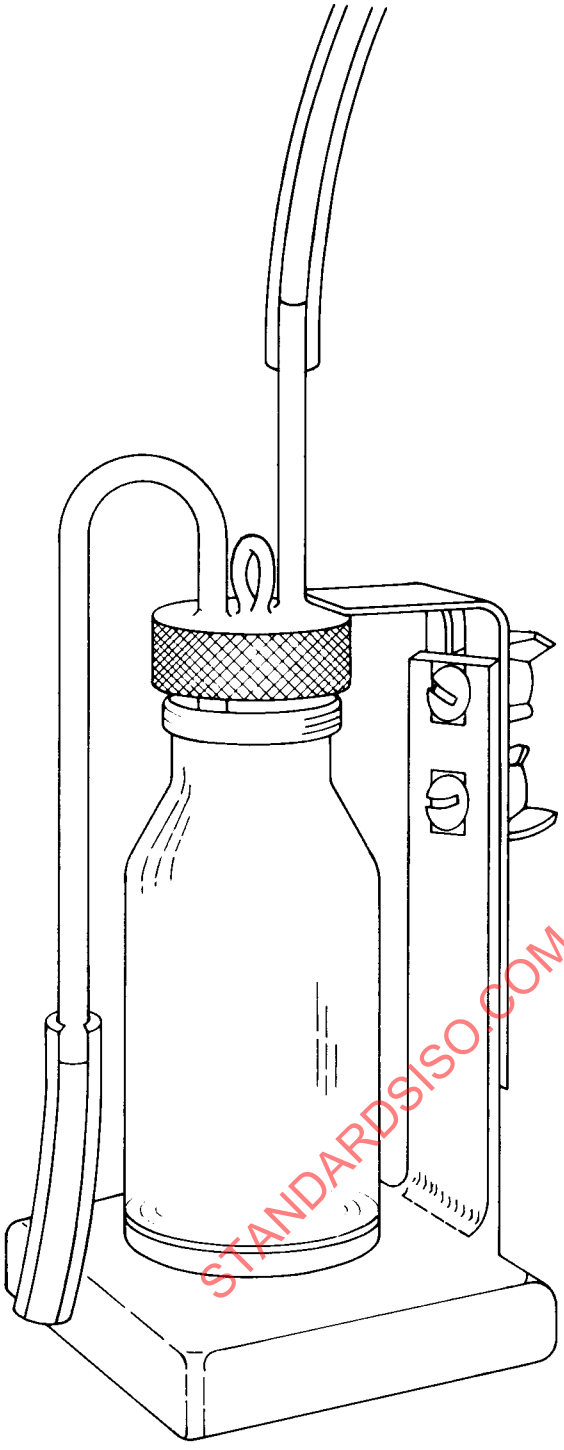
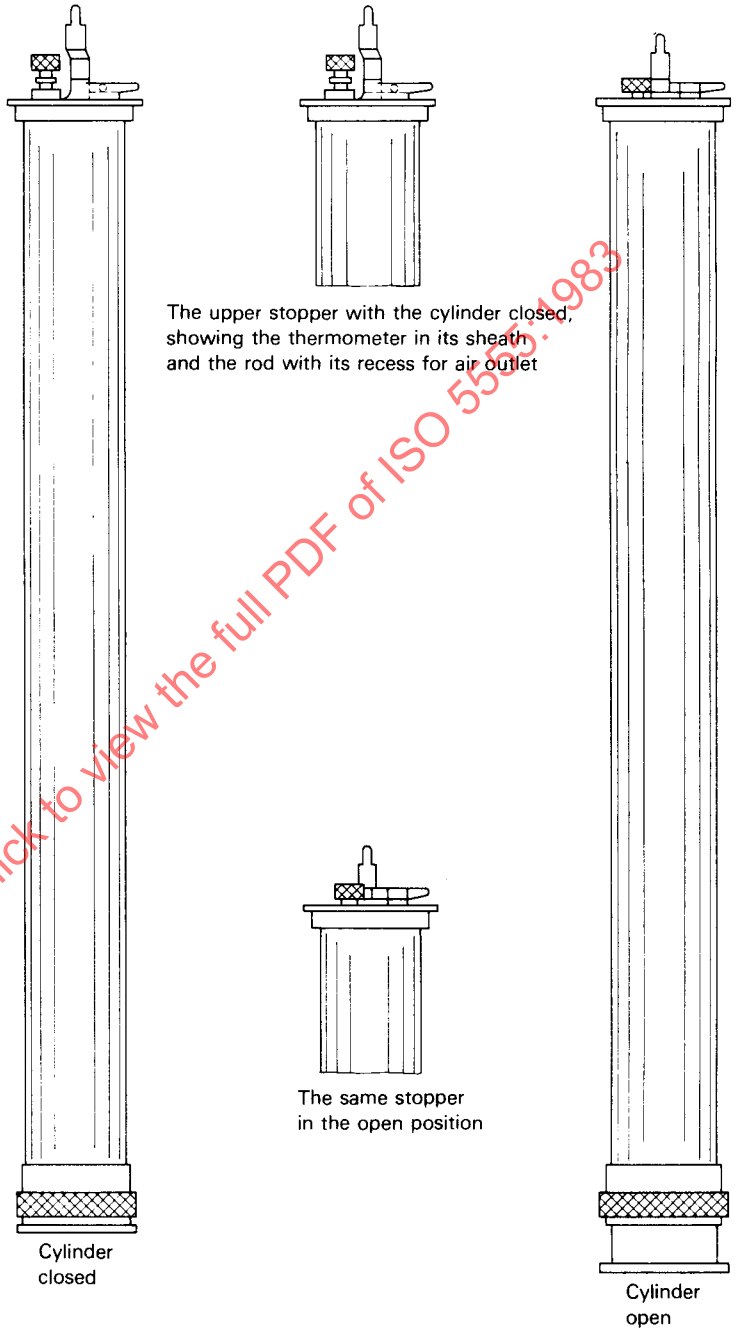


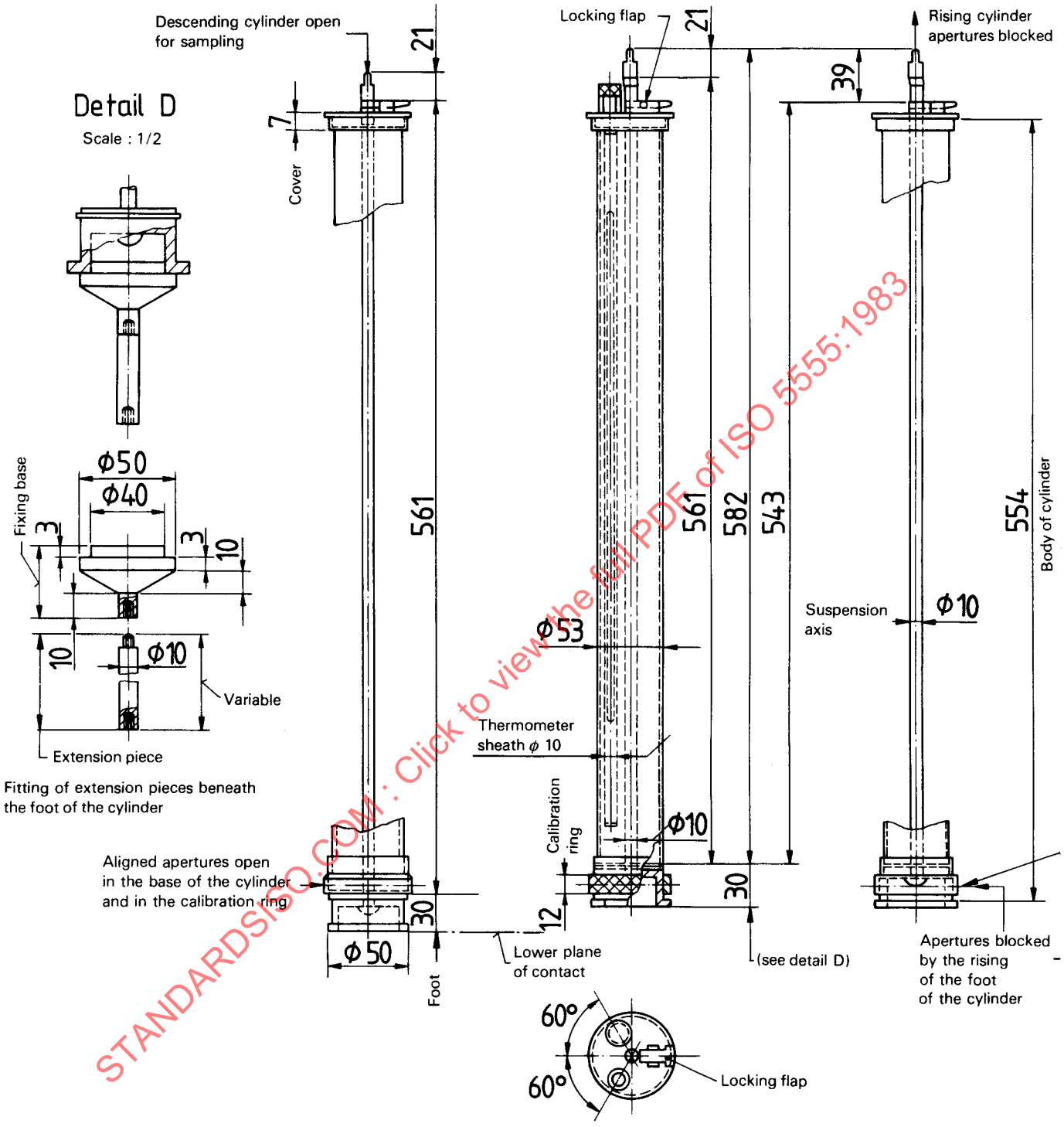
Figure 8 — Bottom sampler or zone sampler (air-tube type) (B.4)



Total capacity :	1,0 litre
Empty mass :	1,4 kg
Overall length :	600 mm
Maximum diameter :	60 mm

Figure 9 — Continuous average sampler (B.5)

Dimensions in millimetres



Material : stainless steel	18/8
Total height :	615 mm
Diameter, max. :	60 mm
Capacity :	1 litre
Empty mass :	1,4 kg

Figure 10 — Continuous average sampler (B.5)

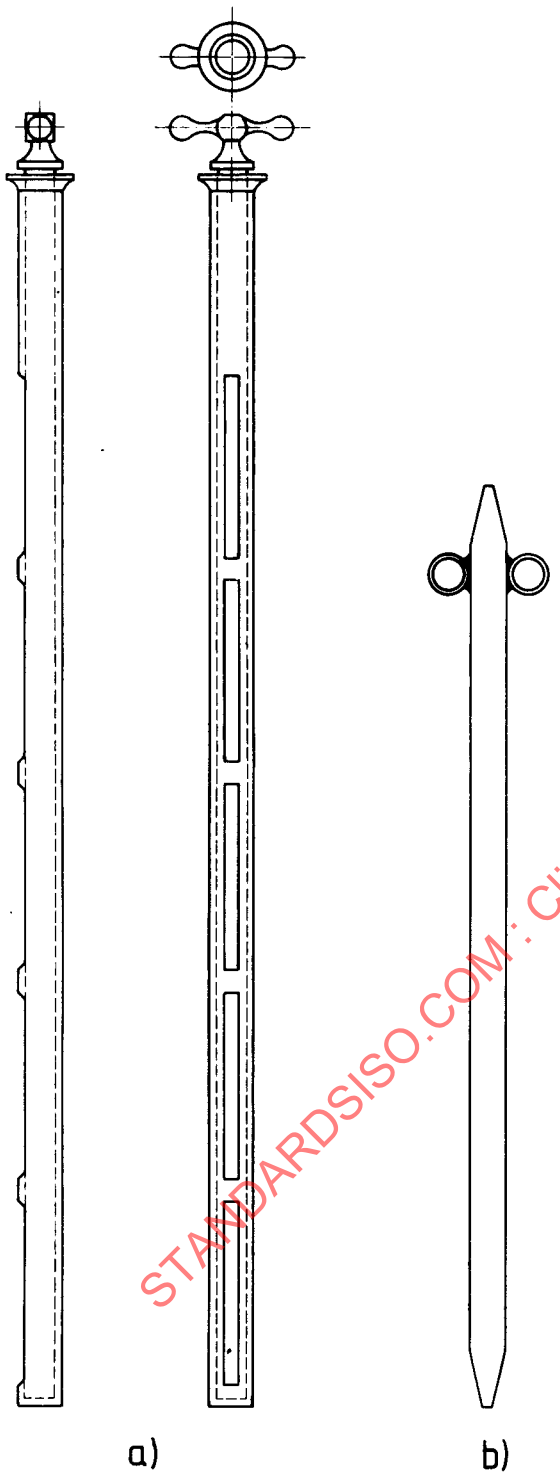


Figure 11 — Sampling tubes (B.6)

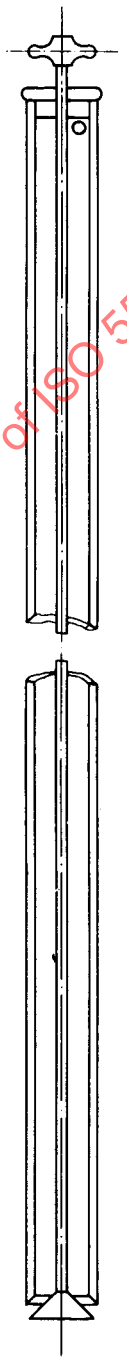
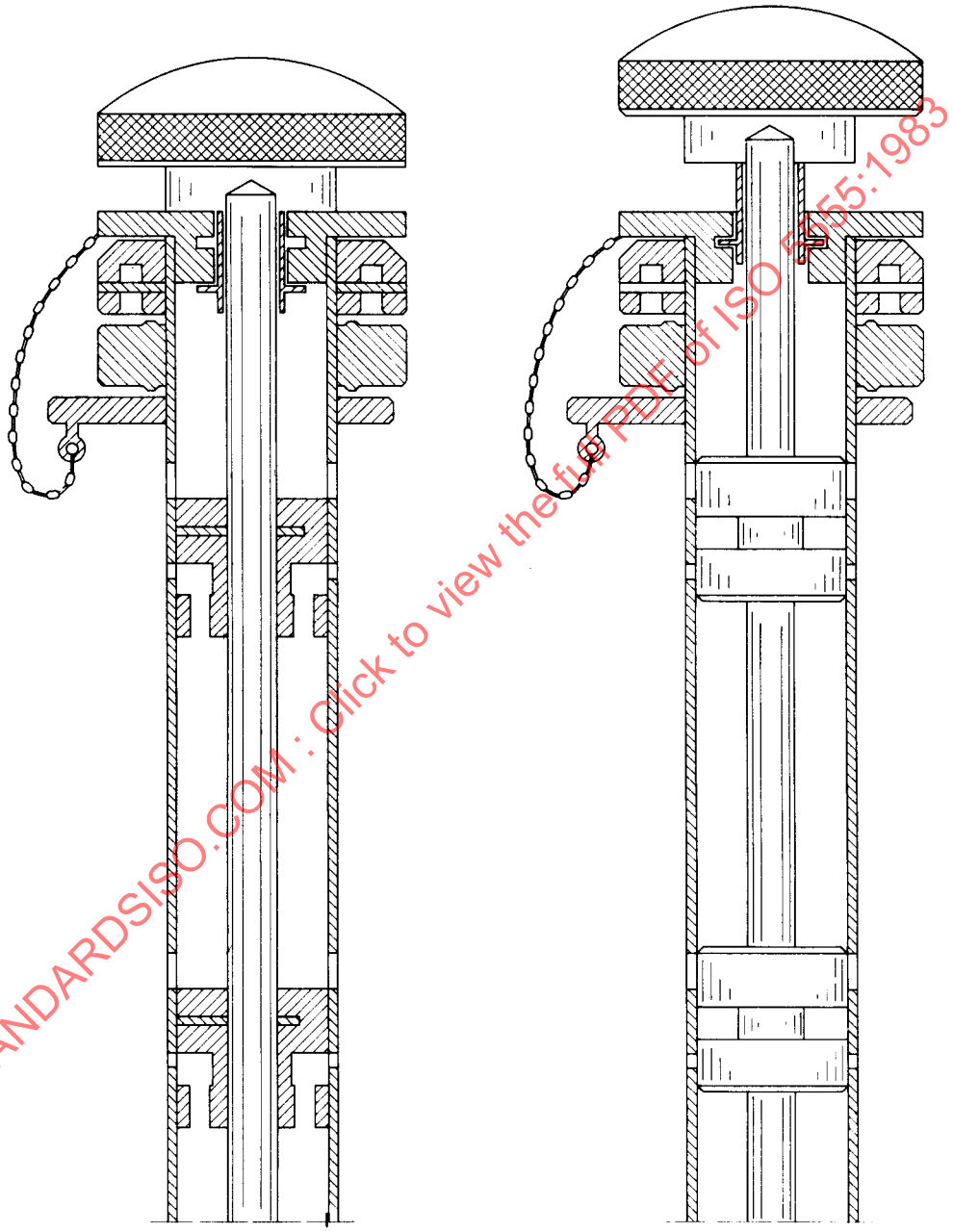


Figure 12 — Valve sampling tube (B.7)



Scale : 0,6/1

Figure 13 — Compartmented valve sampling cylinder (B.8)