INTERNATIONAL STANDARD 842

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Raw materials for paints and varnishes — Sampling

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, International Standard ISO 842 replaces ISO Recommendation R 842-1968 drawn up by Technical Committee ISO/TC 35, *Paints and varnishes.*

The Member Bodies of the following countries approved the Recommendation :

Argentina	Germany	Portugal
Australia	Greece	South Africa, Rep. of
Belgium	Hungary	Spain
Brazil	India	Switzerland
Canada	Iran	Turkey
Chile	Ireland	United Kingdom
Czechoslovakia	Italy	U.S.S.R.
Egypt, Arab Rep. of	Japan	
France	Netherlands	

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

Sweden*

* Subsequently, this Member Body approved the Recommendation.

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Raw materials for paints and varnishes — Sampling

0 INTRODUCTION

Correct sampling is a difficult process and one that requires most careful attention. It is therefore essential that it should be carried out under the supervision of an experienced sampler.

The procedures given below 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. The aim always to be kept in view is that the sample obtained should be properly representative of the bulk.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies methods for the sampling of raw materials for paints and varnishes, and describes and illustrates apparatus that can be used for this purpose. Suitable methods are included for sampling oils and other non-volatile liquids, volatile liquids such as solvents, and dry powders such as pigments and extenders.

The sampling of shellac is dealt with in ISO/R 56, *Specification for shellac,* which may be used, with suitable modifications, as a general guide for sampling other natural resins.

2 DEFINITIONS

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

2.1 batch; lot : A definite quantity of a particular product produced under conditions which are presumed uniform.

2.2 consignment : A quantity of some product delivered at one time. The consignment may consist of one or more batches or parts of batches.

2.3 sample : A definite quantity of material taken from a larger bulk and intended to provide information necessary for assessing a characteristic of that bulk.

2.4 gross sample : A sample as collected.

2.5 reduced sample : A sample obtained by applying a method of reduction to the gross sample.

2.6 top sample : A sample taken at not more than 150 mm below the top surface of the material in a container.

2.7 middle sample : A sample taken at one-half of the depth of the material in a container.

2.8 bottom sample : A sample taken at the lowest part of a container.

3 CLEANLINESS SAFEGUARDS

Special care is necessary to ensure that all sampling apparatus is clean and dry when used. Sampling instruments may first be cleaned with an appropriate (mineral) solvent and subsequently with a hot solution of soap or with another detergent, care being taken to wash away the last traces with scalding hot water. If a source of steam is available, the instruments may receive a final cleansing in a jet of steam. Finally, the operator shall ensure that the apparatus is thoroughly dry.

Throughout the sampling operation the operator shall have clean hands.

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

Material adhering to the outside of the sampling instrument shall be removed before the contents are discharged. The sampling instruments shall be emptied and cleaned immediately after sampling.

4 CONTAINERS FOR SAMPLES

For liquid samples, the containers used shall be either bottles of colourless or amber glass, or metal cans. For pastes, mixtures of liquids and solids, or solids, wide-mouth metal cans or glass jars shall be used. In any case, the container and its stopper shall be of a material which will not contaminate the sample.

Bottles and jars of colourless glass have the advantage that their cleanliness can be visually checked and also that they enable a check to be made easily on whether the sample contains free water or other impurities. Bottles and jars of amber glass provide only a relative protection against the action of light; for materials particularly sensitive to the action of light, complete protection shall be obtained by putting the bottle or jar in a cardboard box or by covering it with black paper.

Galvanized or aluminium cans or stoppers shall not be used for the sampling of volatile alcoholic materials. Glass bottles and jars shall be closed either by cork or glass stoppers or by screw caps. In the case of metal cans intended for liquids, only screw caps shall be used. For other metal cans, either a screw cap or a suitable lid providing a tight closure shall be used. Rubber stoppers shall not be used. Cork stoppers shall be of good quality, clean and devoid of cracks or pieces of cork which are liable to become detached. Contact between cork and sample shall be prevented by covering the stopper with tin or aluminium foil[1] before inserting it in the bottle or jar, unless otherwise directed. If bottles or jars with ground glass stoppers are used, their freedom from leakage shall be checked. Screw caps are more satisfactory if protected by a cork disk covered with tin or aluminium foil[1] or any other material which cannot contaminate the sample.

5 SAMPLING INSTRUMENTS

5.1 Types and construction

To ensure that the sampling instruments will not be attacked by the products, and that they can be easily cleaned, they shall be made of stainless steel, brass or glass[2], and shall have smooth surfaces, without folds or grooves. Examples of suitable instruments are described below; those for sampling liquids are illustrated in figures 1 to 10, and those for sampling solids in figure 11.

5.2 Instruments for sampling oils and volatile liquids

The instruments described in 5.2.1 to 5.2.5 are made in various sizes to hold from 150 ml to 1 l of liquid.

5.2.1 *Sampling bottle or can* (figure 1)

This is suitable for sampling large vessels and tanks. It consists of a weighted bottle or metal container, with removable stopper or cap to which is attached a suitable chain, pole or cord. This device is lowered to the various desired depths where the stopper is removed and the container allowed to fill.

5.2.2 *Sampling tipping dipper* (figure 2)

This consists of a cylinder 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 2 a), and maintained in that position by insertion of the catch into the hole. It is then sunk into the liquid in the tank and at the required depth the rope is twitched. The cylinder rights itself and then becomes full of liquid (figure 2 b)).

5.2.3 *Sampling cylinder* (figure 3)

This consists of an open-headed cylinder with a bottom valve which remains open whilst the instrument is being lowered through the liquid, ensuring that an even flow of liquid passes through the cylinder.

When lowering ceases, the valve closes and a sample of the liquid is drawn from the depth reached by the instrument.

5.2.4 *"Go devil" sampling bottle* (figure 4)

This consists of a bottle heavily weighted at the bottom, 300 mm long, 75 mm in body diameter, and 25 mm in neck diameter, with a chain attached to the neck. When placed in liquid in a tank, it drops so quickly that it does not begin to fill with liquid until it reaches a fixed position.

5.2.5 *Bottom, or zone sampler* (figure 5)

This is suitable for withdrawing bottom samples or zone samples at any level from tanks of liquid. 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 central spindle valve automatically opens and the container fills from the bottom. On withdrawal the valve automatically closes again.

To withdraw a sample at any level, the apparatus is lowered empty to the required level and then by means of an additional cord, previously attached to the top of the central valve spindle, the valve is opened and the container filled. The valve is then allowed to close and the container withdrawn.

5.2.6 *Sampling tubes* (figures 6 and 7)

The sampling tube shown in figure 6 consists of two concentric metal tubes closely fitted into each other throughout their entire length, so that one tube can be rotated within the other. A longitudinal opening or series of openings of about one-third of the circumference is cut in both tubes. In one position the tube is open and admits the liquid; by turning the inner tube it becomes a sealed container.

1) Aluminium foil shall not be used with alcoholic materials. Polytetrafluorethylene foil can generally be used.

2) Copper-bearing metals shall not be used when sampling vegetable oils.

The inner tube is 20 to 40 mm in diameter. It may be undivided in its length, in which case the two tubes are provided with V-shaped ports at their lower ends, so placed that liquid contained in the instrument can be drained through them when the longitudinal openings are open.

Alternatively, the inner tube may be divided transversely into from three to ten compartments, in which case the bottom ports are omitted. Such an arrangement enables separate samples of liquid to be withdrawn from different depths in the container.

The tube should be of sufficient length to reach the bottom of the barrel or container. It is inserted closed, then opened to admit the liquid and finally closed and withdrawn.

The sampling tube shown in figure 7 may be used where the liquid to be sampled is known to be homogeneous in character. It consists of a metal or thick-walled glass tube which may vary from 20 to 40 mm in diameter and from 400 to 800 mm in length. The upper and lower ends are conical and narrow down to about 5 to 10 mm. At the upper end there are two rings to assist handling.

To take an individual sample, the tube is first closed at the top with the thumb or a stopper, and lowered until the desired depth is reached; it is then opened for a short time to admit the liquid and finally closed and withdrawn.

5.2.7 *Valve sampling tube* (figure 8)

This 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 differs from the tubes previously described in that it is inserted into the liquid with the valve open, allowing the liquid 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 so as to keep 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 5.2.9) is used. Sampling tubes of various lengths are used, one 2 m long, made of aluminium, being convenient for sampling road tanks.

This instrument is not suitable for use where sediments have accumulated.

5.2.8 *Sampling scoop for liquids* (figure 9)

This is of metal and is divided into compartments along its length, but it is of D-shaped cross-section and is opened and closed by means of a shutter which moves vertically throughout the entire length. It may be from 25 to 50 mm in diameter.

The instrument is inserted closed, and the shutter pulled out to admit the liquid; the scoop is then closed and withdrawn.

5.2.9 *Sampling tube withdrawal cleaner* (figure 10)

This is a funnel-shaped metal cup designed to sit in the bunghole of a barrel or drum. It contains a fibre washer with a central opening of the same diameter as the sampling tube with which it is to be used. Before taking a sample, the tapered end of the cleaner is placed in the hole of the drum and the sampling tube inserted through the cleaner into the drum. On withdrawing the tube, the excess liquid on the outside is automatically wiped off, and runs back into the drum.

5.3 Instruments for sampling dry powders

The sampling scoops (triers) shown in figure 11 are open instruments and are intended for use with solids. They are of metal, of semi-circular or C-shaped cross-section and will bore out a core through the material.

6 SAMPLING PROCEDURE : GENERAL

NOTE – Instructions relating to sampling procedure cannot be given so as to cover all cases explicitly. They require to be supplemented by good sense, competence and experience, particularly with regard to the choice of the type of sample to be taken. Much care and judgement are needed in order to take a sample which fully represents the general character and the average quality of the material.

6.1 Safety precautions

6.1.1 A number of hazards may arise in the sampling of volatile solvents. They include flammability and toxicity.

a) *Flammability*

The lower-boiling solvents are flammable and the following precautions are advised :

1) care must be taken to see that all sampling equipment used for these substances is made of low-energy spark generating material such as beryllium-copper alloys or glass. If an earth connection can be made to large containers, this shall be done;

2) all regulations regarding "controlled" or "flammable" areas in which the samples are being drawn must be strictly adhered to.

b) *Toxicity*

Vapour from lower-boiling solvents, particularly benzene, is toxic and precautions shall be taken to avoid its inhalation. Liquid benzene is also absorbed through the skin.

6.1.2 It is recommended that two persons should be present when samples are drawn from large containers such as storage tanks, road tanks or rail tanks.

6.1.3 Before sampling from rail tanks, it shall be ensured that no shunting operations are likely.

6.1.4 In order, on the one hand, to allow for the high coefficient of expansion of certain products and for the need ultimately to mix the samples thoroughly to obtain representative test samples and, on the other hand, to avoid too large an air space which can adversely affect most oils, the containers shall be filled to between about 80 and 90 % of their total capacity.

Contacts with the skin, spillage on clothing, etc. shall be avoided as far as possible during sampling. The correct treatment for any harmful material shall be known beforehand and the appropriate treatment antidote shall be at hand.

6.2 Reduction of sample

The gross samples, drawn according to the appropriate procedures specified in clauses 7 to 9, shall be thoroughly mixed.

For liquids the mixing shall be carried out in a clean, dry container, preferably of stainless steel. At least three uniform samples (final samples), each of at least 400 ml, or three to four times the quantity needed to carry out the required tests, shall then be taken as soon as possible and placed in containers complying with clause 4.

For solids, the gross sample shall be quartered down by means of a rotary sample divider (riffle divider). Three samples of 500 g, or three to four times the quantity needed to carry out the required tests, shall then be taken and packed in containers complying with clause 4.

6.3 Final samples

Samples shall be protected from light, moisture and dust, and from excessive heat or cold. Protection against moisture and dust may be obtained by covering the stopper and top of the container with a cap of paper, plastics material or metal.

The containers shall be labelled as soon as the samples are taken; the labels shall bear all the necessary information to enable the samples to be identified without dispute. The label and marking ink used shall be capable of withstanding moisture and solvents. The label shall not be attached to the stopper, but to the neck or body of the container.

It is recommended that the following particulars should be given on the label :

a) description of the material;

b) size and particulars of consignment (tank-wagon, tank, ship, barrel, drum);

c) designation and reference number of the sample;

d) consignor;

e) place of sampling;

f) date of sampling;

g) name of sampler.

After closure and labelling, the sample container shall be sealed with sealing wax in such a way that the contents and the label cannot be removed without breaking the seal. Precautions shall be taken to avoid contamination of the sample with wax.

Samples shall be accompanied by a delivery note repeating the details given on the label and, if necessary, by a report giving all the details of sampling.

7 PROCEDURE FOR SAMPLING OILS AND OTHER NON-VOLATILE LIQUIDS

(Collection of gross sample)

7.1 Liquids in large quantities in shore tanks or ships' tanks

Each tank shall be sampled separately. The volume or depth of liquid shall be measured before sampling and, if necessary, the temperature shall be taken.

When stearin or any other solid matter has been deposited, or where the material is semi-solid, it is desirable that it should be heated sufficiently to allow good mixing before sampling.

If the liquid is not homogeneous in character, for example if it contains free water or froth, samples shall be taken at levels not more than 300 mm apart throughout the depth of the liquid. It is recommended that the first sample should be taken from the lowest point in the tank and thereafter at every 300 mm level above that point.

If the liquid is known to be homogeneous in character, three samples taken at levels one-tenth of the depth of the liquid from the surface, but at not more than 150 mm from the surface (top sample), one-half of the depth (middle sample) and at a point nine-tenths of the depth of the liquid from the surface (lower sample) may be sufficient.

In each instance, the sample shall be taken by a sampling instrument which is filled at the required depth. The samples drawn from different levels shall be mixed together in the same proportion they represent in the total quantity of liquid being sampled.

If free water is present this should, where possible, be removed and measured before samples and weights or volumes are taken. If foots are present, a bottom sample shall be taken at the lowest point of the tank (bottom sample).

7.2 Liquids being transferred from one tank to another

The most efficient method of sampling very large quantities is, during the transfer, by means of frequent dipping in the stream at regular intervals during outflow of the whole contents of the tank; this method is particularly easy of application when the liquid is pumped through a weigh-meter tank.

Alternatively, the 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 liquid. The difficulties arising from the presence of free water and foots are obvious.

7.2.1 *Tap or drip cock*

The tap or drip cock shall be fed from a nozzle introduced into the centre of the 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 rising section of the main pipeline and on the pressure side of the pump.

The tap or drip cock shall be of such design as to be easily and quickly cleaned in case of blockage.

7.2.2 *Operation*

The rate of flow in the main pipeline shall be sufficient to ensure the turbulence necessary to effect complete mixing of the materials in the pipe.

As irregularity in the rate of flow can lead to inaccuracy, the rate of flow at the tap or drip cock shall throughout the sampling be regulated proportionately to the amount of liquid passing through the pipeline.

Adequate cover shall be supplied, over the whole apparatus and the containers for collecting samples, to prevent adventitious contamination of the sample.

The total sample from the drip cock shall be carefully mixed immediately after the completion of the discharge and then smaller samples should be taken for any necessary tests.

Precautions shall be taken against the possibility of choking of the drip cock, etc. by pieces of dirt.

If free water is present, it shall be removed, where possible, before samples are taken and weights or volumes are measured.

7.3 Liquids in road and rail tanks

No entirely satisfactory method of sampling road and rail tanks has been devised. Current methods include withdrawing a sample during or immediately after filling, and, where sampling is carried out at other times, withdrawing a top sample and a middle sample through the manhole and a bottom sample from the discharge cock after running off and measuring any free water. The samples shall be kept separately and shall be adequately marked.

7.4 Liquids in small tanks, barrels, casks and other small containers

When consignments are reasonably homogeneous, the number of samples shall be taken according to the following table.

Total number of containers in the lot	Minimum number of containers to be sampled
1 to 2	all
3 to 8	2
9 to 25	3
26 to 100	5
101 to 500	8
501 to 1 000	13
1 001 to 3 000	20
3 001 to 10 000	32
10 001 and above	50

The containers from which samples are drawn shall be selected at random throughout the consignment and shall not have been opened previously.

Prior to sampling, barrels and casks shall be rolled and tipped, and the contents of tubs, vats or small tanks shall be thoroughly stirred until the contents are homogeneous. Care shall be taken not to contaminate the liquid during this operation.

A sample shall be drawn from each container to be sampled with a suitable sampling instrument (see 5.2) which is inserted through the bunghole in a barrel or through convenient openings in other containers in such a manner as to sample from as many parts of the contents as possible. Equal portions of these samples shall be thoroughly mixed to form the gross sample.

If a consignment consists of several identifiable batches or lots, or if different parts of the consignment are of different quality, it is desirable to consider these separately.

In the event of a single final sample representing the whole consignment being required, the samples drawn from the different batches or lots, or from the different qualities, shall be mixed together in the same proportion they represent in the total consignment.

8 PROCEDURE FOR SAMPLING VOLATILE LIQUIDS

(Collection of gross sample)

8.1 Volatile liquids in loaded tank cars or other large vessels

The gross sample taken shall be not less than 2,5 l and shall consist of small samples of not more than 1 200 ml each, taken from near the top and bottom of the liquid by means of a metal or glass container with a removable stopper or top. The instrument shall be lowered to the desired depth and allowed to fill by the means appropriate to the type of instrument utilized.

If a sample drawn from close to the bottom of a tank shows a decided difference in colour or appearance from samples taken at other depths, an extra bottom sample shall be taken and examined separately from the gross sample. In such a case, the gross sample shall not include any portion of the bottom sample.

8.2 Volatile liquids in barrels and drums

The number of samples shall be taken according to the table. It is further recommended that, in the case of expensive materials such as terpene hydrocarbons that are bought in small quantities, every container should be sampled.

The containers from which samples are drawn shall be selected at random throughout the consignment and shall not have been opened previously. If a consignment consists of several identifiable lots, it is desirable that these be considered separately.

A portion shall be withdrawn from about the centre of each container, using a suitable sampling instrument. The gross sample thus obtained shall be not less than 1 200 ml and shall consist of equal portions of not less than 300 ml from each container sampled.

8.3 Detection and removal of free water

A portion shall be withdrawn from the lowest part of a container, either by means of a suitable instrument or, in the case of a level tank car, by opening the bottom valve. If water is found to be present, it shall all be drawn out and its volume recorded and deducted from the volume of liquid delivered.

9 PROCEDURE FOR SAMPLING DRY POWDERS

(Collection of gross sample)

Prepare a gross sample for each lot. When a consignment consists of more than one type of container, classify the containers according to type and treat them as separate lots. If a consignment consists of several identifiable lots, it is desirable that these should be considered separately.

The number of samples shall be taken according to the table.

The containers from which the samples are drawn shall be selected at random throughout the lot and shall not have been opened previously. A portion shall be withdrawn near the centre of the container by means of a suitable sampling instrument. The gross sample thus obtained shall contain equal portions from each container sampled and shall be not less than 2 kg or three to four times the quantity needed to carry out the required tests.

10 SAMPLING REPORT

The sampling report shall include all the information required to identify the sample as well as any details which may be useful to the operator. A copy of the report shall accompany the sample.

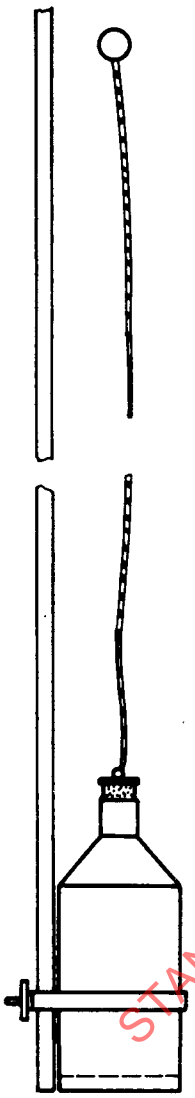
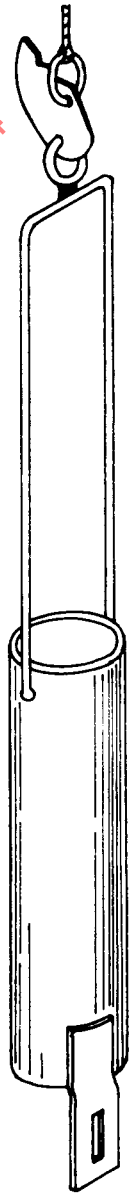


FIGURE 1 – **Sampling bottle**

a) Lowering position



b) Filling position

FIGURE 2 – **Sampling tipping dipper**

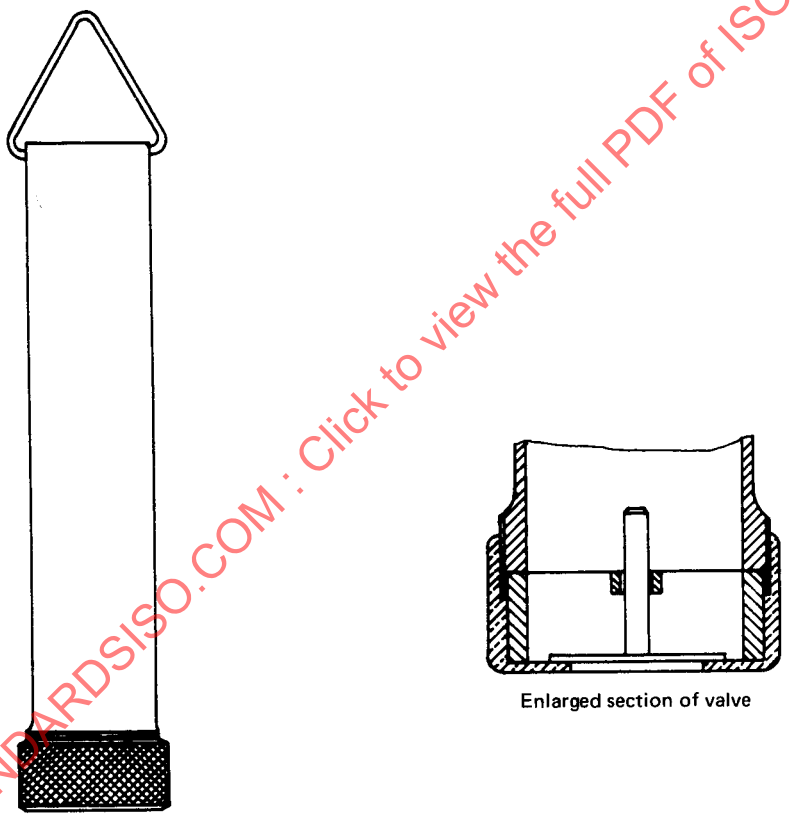


FIGURE 3 – **Sampling cylinder**

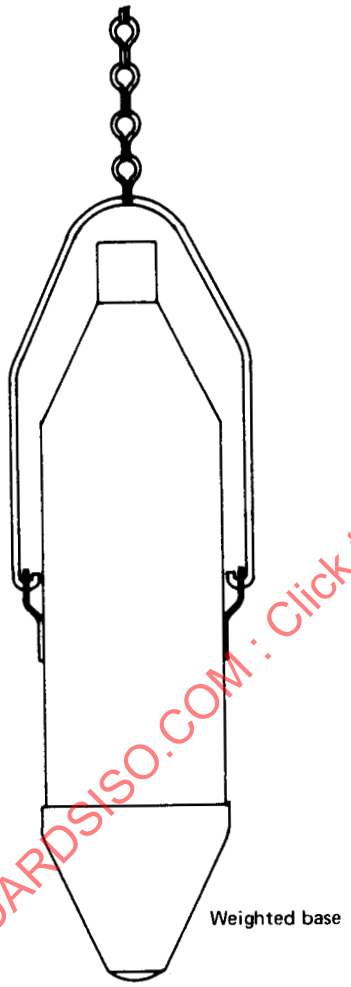


FIGURE 4 – **"Go devil" sampling bottle**

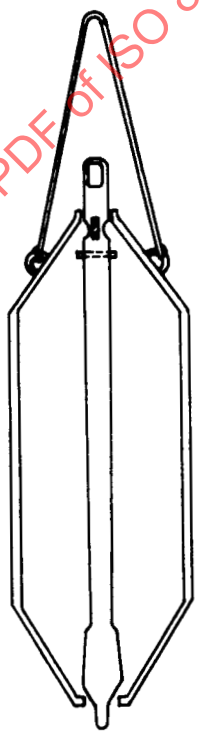


FIGURE 5 – **Bottom or zone sampler (sectional view)**

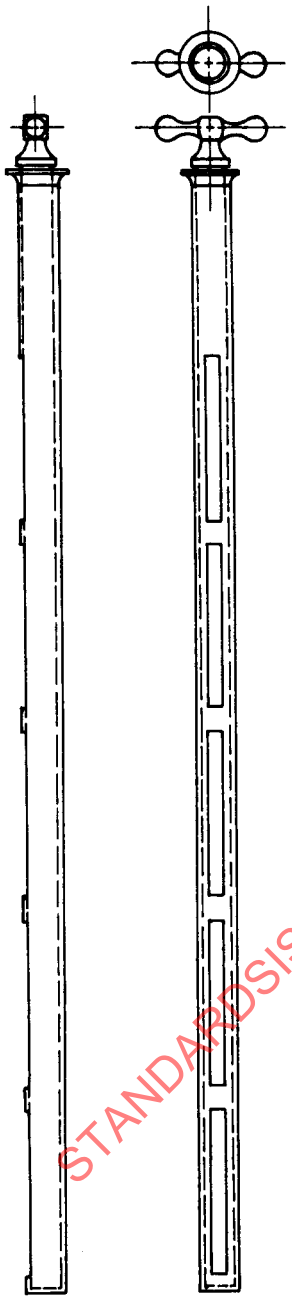


FIGURE 6 — **Sampling tube consisting of two concentric tubes**

FIGURE 7 — **Sampling tube with single tube**

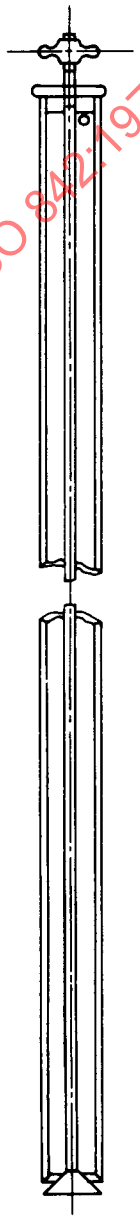


FIGURE 8 — **Valve sampling tube**