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R 842

SAMPLING RAW MATERIALS
FOR PAINTS AND VARNISHES

1st EDITION

October 1968

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BRIEF HISTORY

The ISO Recommendation R 842, *Sampling raw materials for paints and varnishes*, was drawn up by Technical Committee ISO/TC 35, *Paints, varnishes and related products and their raw materials*, the Secretariat of which is held by the Nederlands Normalisatie-instituut (NNI).

Work on this question led, in 1963, to the adoption of a Draft ISO Recommendation.

This first Draft ISO Recommendation (No. 731) was circulated in June 1964 to all the ISO Member Bodies for enquiry. As the results of this consultation were not considered satisfactory, the Technical Committee presented a second Draft ISO Recommendation which was circulated to all the Member Bodies in September 1966 and which was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

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

One Member Body opposed the approval of the Draft :

Sweden

The second Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in October 1968, to accept it as an ISO RECOMMENDATION.

ISO Recommendation R 842 October 1968

SAMPLING RAW MATERIALS FOR PAINTS AND VARNISHES

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

This ISO Recommendation describes 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 Recommendation 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 ISO Recommendation, 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 15 cm 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 should ensure that the apparatus is thoroughly dry.

Throughout the sampling operation the operator should have clean hands.

Sampling should 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 should be removed before the contents are discharged. The sampling instruments should be emptied and cleaned immediately after sampling.

4. CONTAINERS FOR SAMPLES

For liquid samples, the containers used should 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 should be used. In any case, the container and its stopper should 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 should 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 should not be used for the sampling of volatile alcoholic materials. Glass bottles and jars should be closed either by cork or glass stoppers or by screw caps. In the case of metal cans intended for liquids, only screw caps should be used. For other metal cans, either a screw cap or a suitable lid providing a tight closure should be used. Rubber stoppers should not be used. Cork stoppers should be of good quality, clean and devoid of cracks or pieces of cork which are liable to become detached. Contact between cork and sample should be prevented by covering the stopper with tin or aluminium foil* 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 should be checked. Screw caps are more satisfactory if protected by a cork disk covered with tin or aluminium foil*, or any other material which cannot contaminate the sample.

5. SAMPLING INSTRUMENTS

5.1 Types and construction

To make sure that the sampling instruments will not be attacked by the products, and that they can be easily cleaned, they should be made of stainless steel, brass or glass**, and should 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.

* Aluminium foil should not be used with alcoholic materials. Polytetrafluorethylene foil can generally be used.

** Copper-bearing metals should not be used when sampling vegetable oils.

5.2 Instruments for sampling oils and volatile liquids

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

5.2.1 *Sampling bottle or can (Fig. 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.

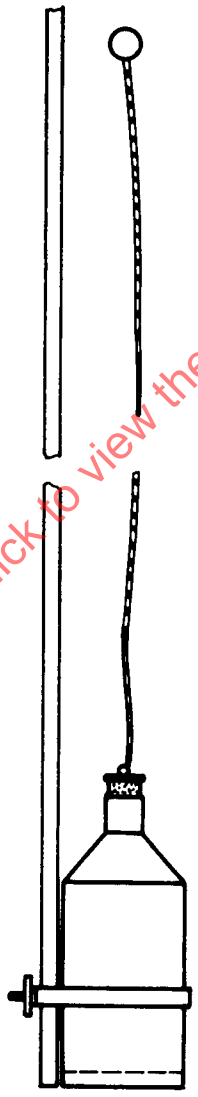
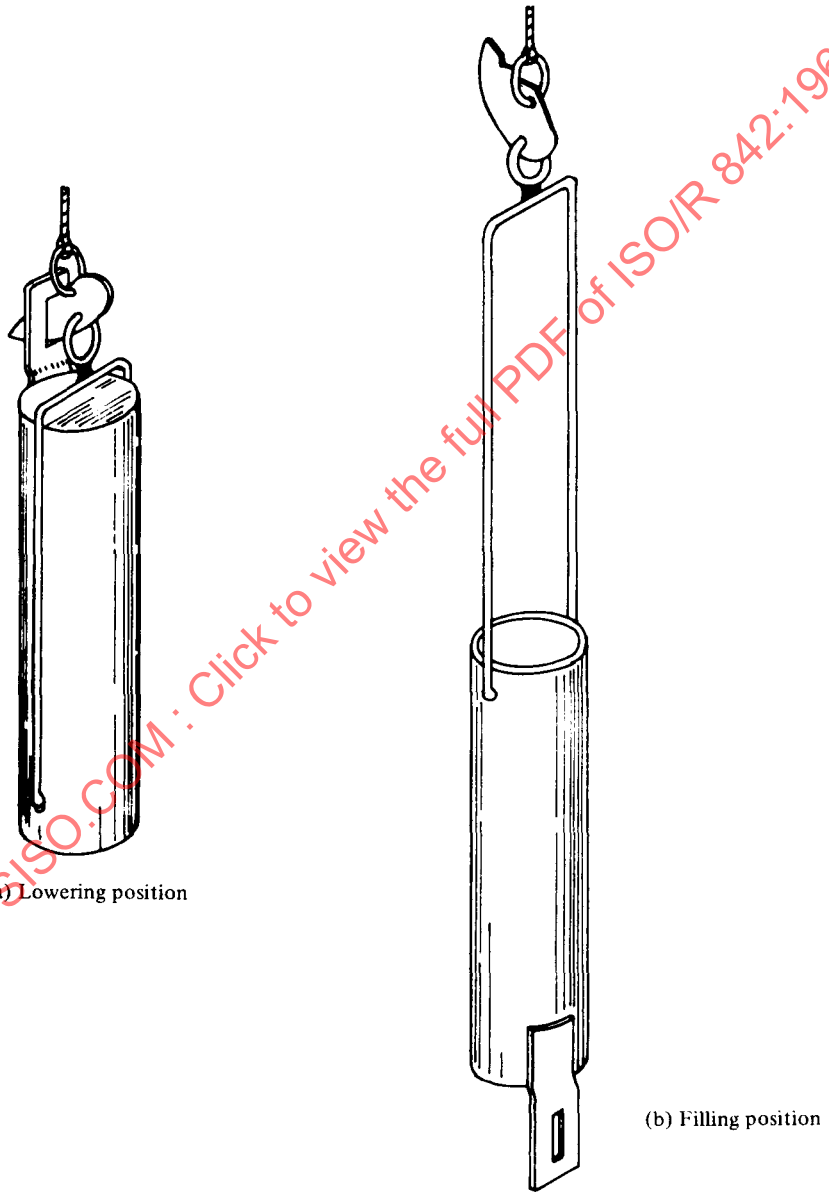


FIG. 1 – **Sampling bottle**

5.2.2 *Sampling tipping dipper (Fig. 2).* This consists of a cylinder 15 cm long and 5 cm 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 (Fig. 2 (b)).



(a) Lowering position

(b) Filling position

FIG. 2 – **Sampling tipping dipper**

5.2.3 *Sampling cylinder (Fig. 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.

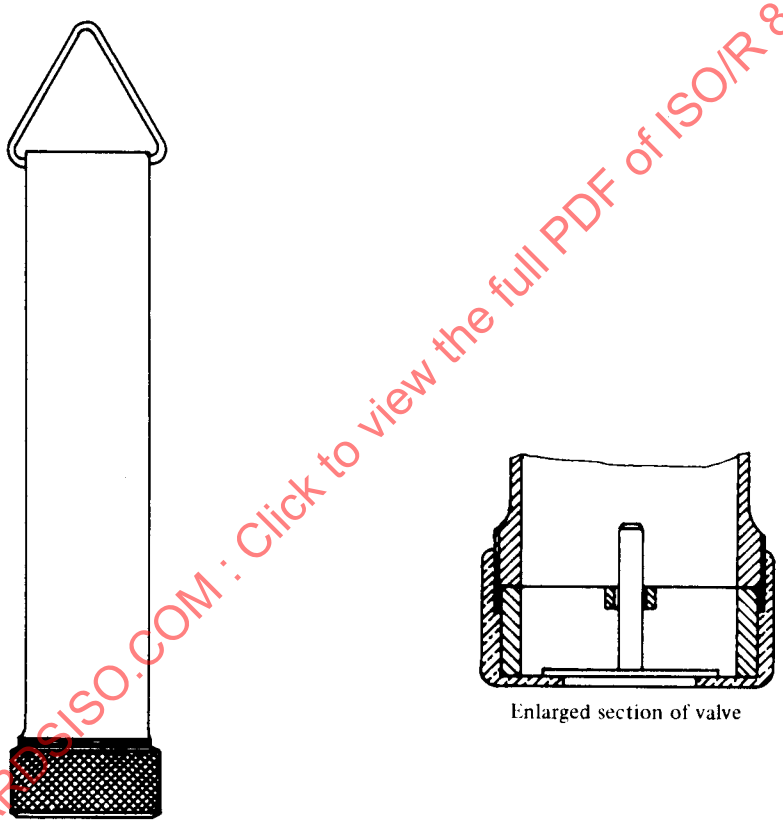


FIG. 3 – **Sampling cylinder**

5.2.4 *"Go devil" sampling bottle (Fig. 4).* This consists of a bottle heavily weighted at the bottom, 30 cm long, 7.5 cm in body diameter, and 2.5 cm 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 (Fig. 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.

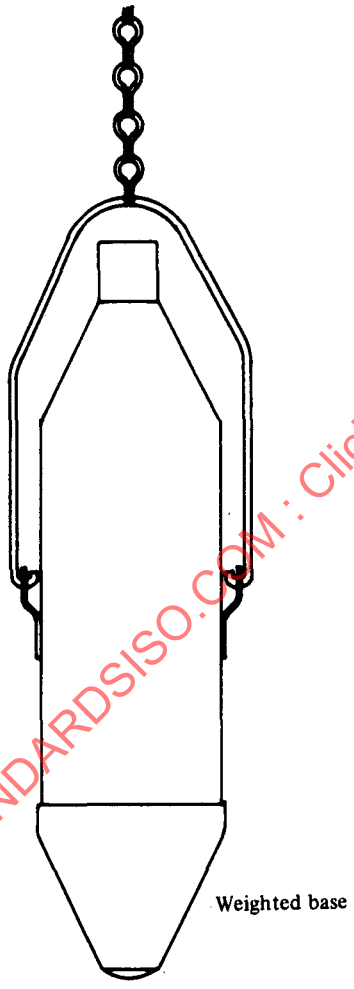


FIG. 4 – "Go devil" sampling bottle

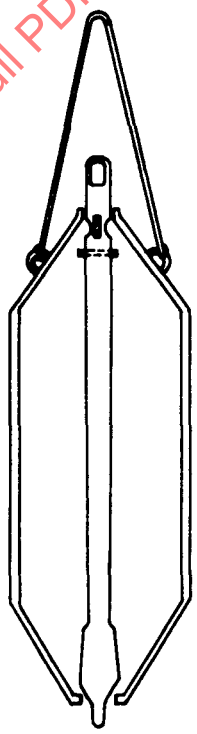


FIG. 5 – Bottom or zone sampler (sectional view)

5.2.6 *Sampling tubes (Fig. 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.

The inner tube is 2 to 4 cm 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 2 to 4 cm in diameter and from 40 to 80 cm in length. The upper and lower ends are conical and narrow down to about 0.5 to 1 cm. 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 (Fig. 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 clause 5.2.9 below) 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.

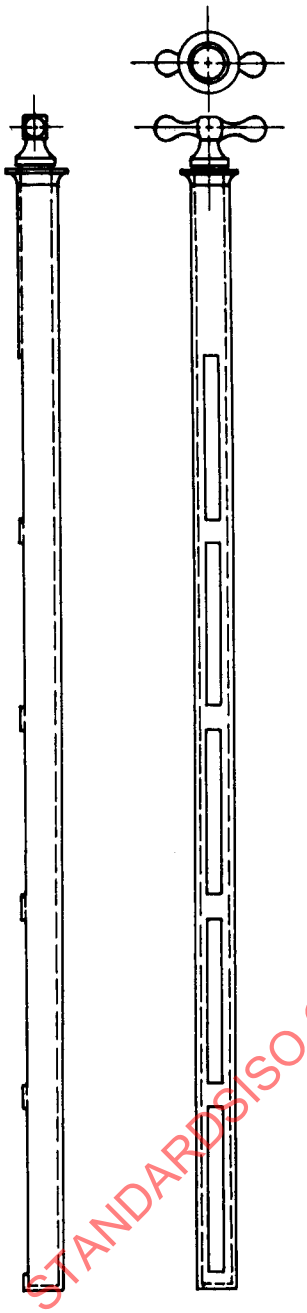


FIG. 6 – Sampling tube consisting of two concentric tubes

FIG. 7 – Sampling tube with single tube

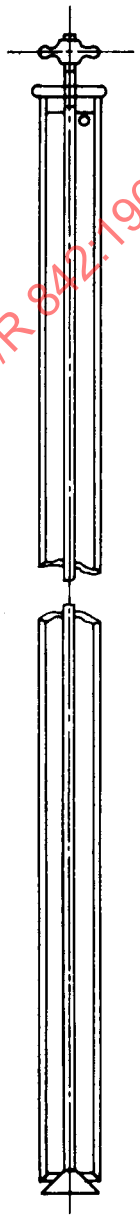


FIG. 8 – Valve sampling tube

5.2.8 *Sampling scoop for liquids (Fig. 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 2.5 to 5 cm in diameter.

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

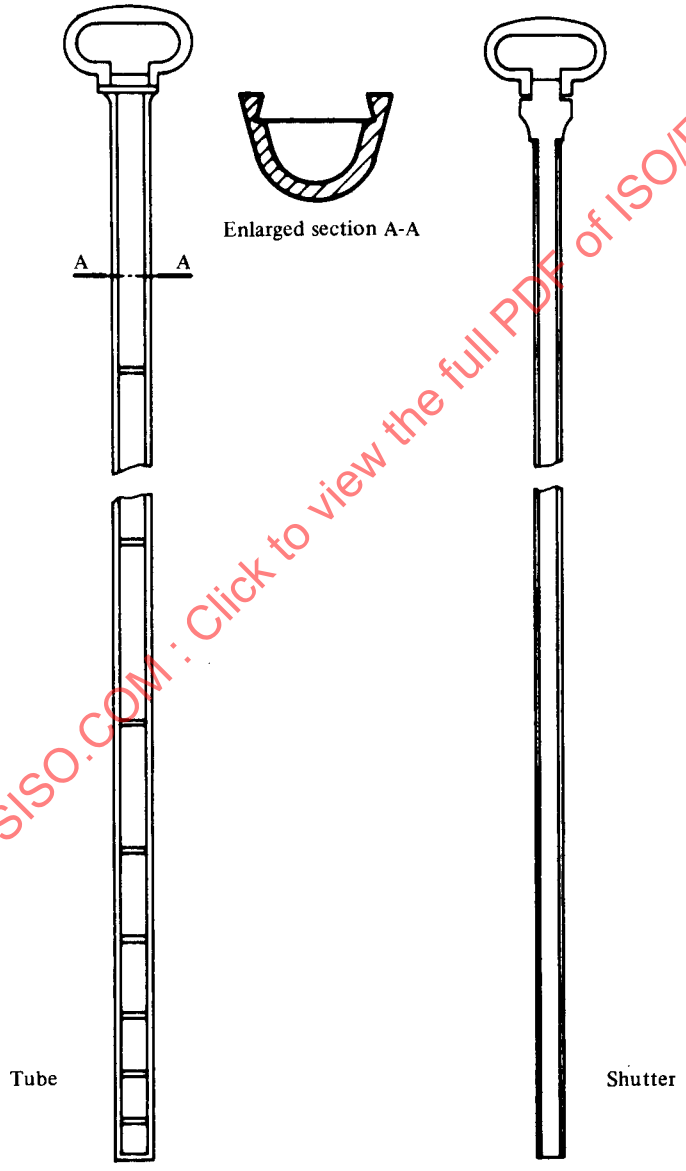


FIG. 9 – **Sampling scoop for liquids**

5.2.9 *Sampling tube withdrawal cleaner (Fig. 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.

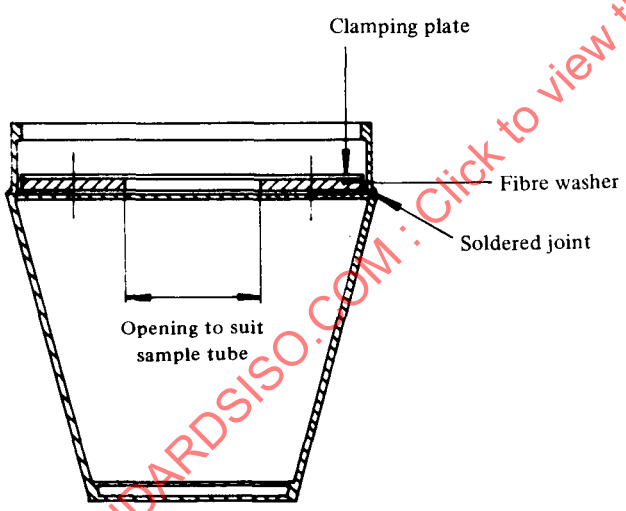


FIG. 10 – **Sampling tube withdrawal cleaner**

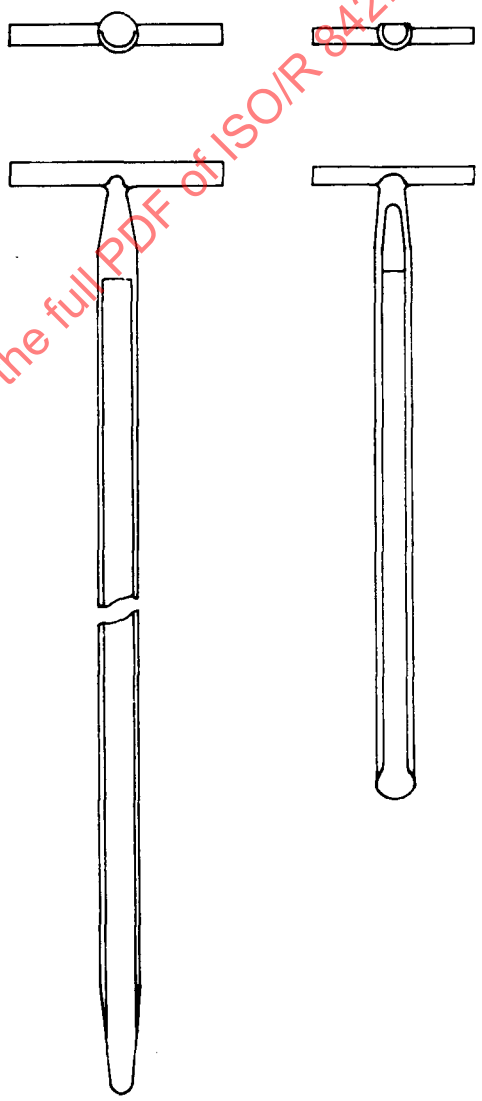


FIG. 11 – **Sampling scoops**

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.

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 should be done.

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

Toxicity

Vapour from lower-boiling solvents, particularly benzene, is toxic and precautions should 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 should 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 to allow 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 should be filled to between about 80 and 90 % of their total capacity.

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

6.2 Reduction of sample

The gross samples, drawn according to the appropriate procedures described in sections 7 to 9, should be thoroughly mixed.

For liquids, the mixing should 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, should then be taken as soon as possible and placed in containers complying with section 4.

For solids, the gross sample should 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, should then be taken and packed in containers complying with section 4.

6.3 Final samples

Samples should 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 should be labelled as soon as the samples are taken; the labels should bear all the necessary information to enable the samples to be identified without dispute. The labels and marking ink used should be capable of withstanding moisture and solvents. The label should 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 :

- Description of the material.
- Size and particulars of consignment (tank-wagon, tank, ship, barrel, drum).
- Designation and reference number of the sample.
- Consignor.
- Place of sampling.
- Date of sampling.
- Name of sampler.

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

Samples should 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 should be sampled separately. The volume or depth of liquid should be measured before sampling and, if necessary, the temperature 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 should be taken at levels not more than 30 cm 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 30 cm 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 15 cm 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 should be taken by a sampling instrument which is filled at the required depth. The samples drawn from different levels should 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 should be taken at the lowest point of the tank (bottom sample).