



Sample Collection Procedures for Insulating Fluid Samples

GENERAL

Sampling electrical insulating oil for laboratory analysis requires care to ensure that the sample is representative of the product being sampled. Attention to cleanliness is the key to success.

Before attempting to draw the sample identify the type of cooling liquid in the transformer. Normally, mineral oil not contaminated by PCBs, mineral oil with unknown values of PCBs, and silicone fluids will be sampled. If the fluid is other than conventional mineral oil, identify the fluid on the insulating test report under samplers comments.

It is not recommended to draw samples of Askarel type liquids or mineral oils with a PCB contaminant level greater than five hundred ppm. If the transformer has been sampled for PCB fluid contamination, it should contain a label indicating the level of contamination.

Since it is possible that an oil sample can be contaminated with trace amounts of PCB, do not pour waste oil on the ground. If the device is not labeled as a PCB transformer and has never had a PCB determination made, indicate on the data sheet to instruct the laboratory to perform this test. When sampling a unit with no PCB label present, treat the unit as having contaminated fluid. This is to protect the sampler.

PROCEDURE

While reviewing the following procedures, please refer to Figure 1, illustrating the sample valve connections on a typical transformer, and Figures 2 and 3 demonstrating the syringe valve positions.

The apparatus to be sampled should be under positive pressure. For transformers sealed with an inert gas, check the pressure gauge to make sure it

does not indicate a negative pressure. The head of oil in the transformer may be enough to overcome a partial vacuum and allow the sample to be taken. To ensure that the vacuum will not draw air into the transformer, attach a length of Tygon tubing, filled with clean oil, to the sampling valve before cracking the valve open. Carefully observe the direction of oil movement in the tube and close the valve immediately if the oil flow is towards the transformer. Do not allow air to be drawn into the transformer! Air can only enter the transformer when it is under a vacuum.

The valve through which the sample is to be taken should be flushed by allowing about half of a gallon of oil to flow to a waste container.

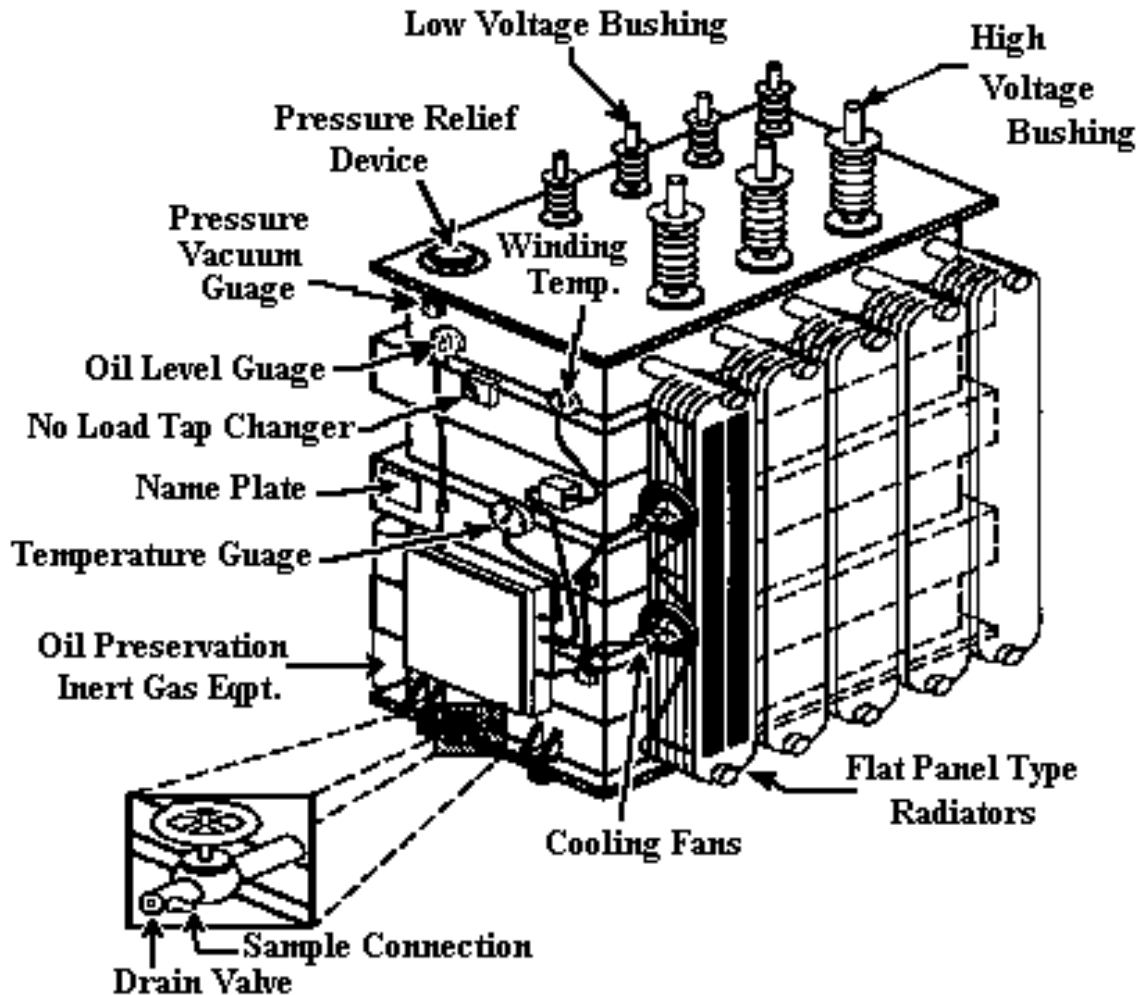


Figure 1

DRAWING THE SAMPLES

I. Bottle Samples for Screen Tests:

After having flushed the valve, rinse the bottle by partially filling and gently swirling and emptying the oil into the waste container. Fill bottle to within an inch or so of the top. Do not over fill to allow for expansion. Visually examine the fluid for water droplets or foreign particles. If present, re-sampling is required. If the sample is clear, attach the cap securely, identify the sampled unit on the bottle's label, and prepare for shipment. Do not tape the cap.

II. Syringe Samples for Dissolved Gas Analysis:

The plastic stopcock (Figure 2 and Figure 3), which comes with the syringe, must remain firmly affixed to the syringe at all times to prevent leaks and to securely close the syringe for shipment. When obtaining oil samples for gas analysis, it is important that the sample never be subjected to a vacuum, which would tend to degas the oil and lead to inaccurate test results. This means that the syringe should be filled without pulling on the plunger.

It will help to follow the sampling procedure if you remember that the handle of the plastic stopcock points to the closed port of the stopcock (Figure 2 and Figure 3). The stopcock handle hereafter is referred to as the handle.

A. Syringe step by step sample instructions:

1. Attach the syringe to the sampling valve located on the side of the drain valve using a short length of Tygon tubing (available at any hardware store) as an adapter. If there is no sampling valve, see step (e) described below.

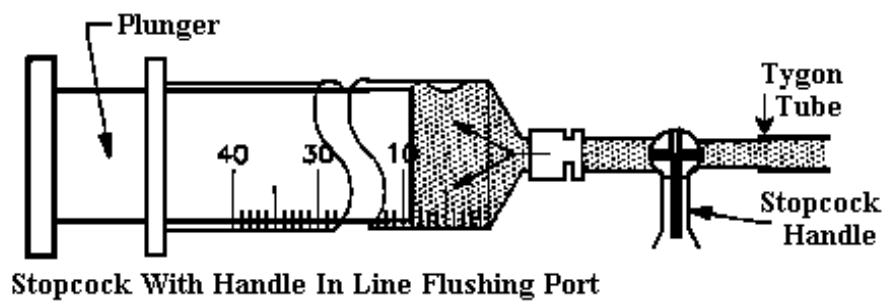
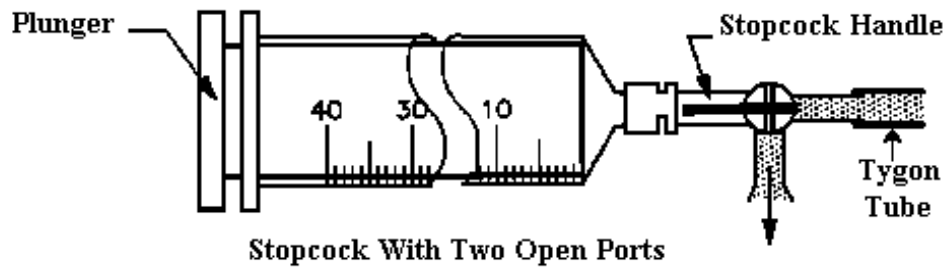


Figure 2

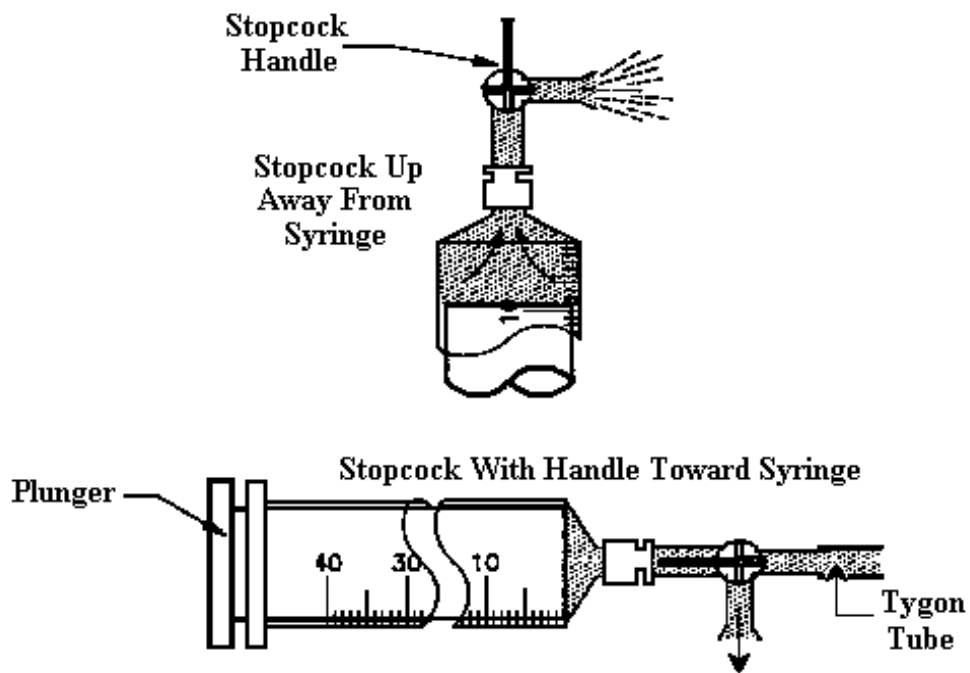


Figure 3

2. Flush the system as follows:
 - a) Move the handle toward the sampling valve,
 - b) Open sampling valve and move the handle towards the syringe allowing the oil to flush the tube and stopcock.
 - c) Move the handle towards the side port, allowing oil pressure to enter the syringe barrel, forcing the plunger out. Until the inside of syringe has been wetted with oil, it may be necessary to pull on the plunger.
 - d) When the oil reaches the 50 cc mark, move the handle towards the sampling valve and eject oil from syringe by pushing in the plunger. Catch this ejected oil in a waste container to avoid spilling it on the ground.

3. Draw the sample by moving the handle towards the side port and allow the oil pressure to fill the syringe. **Do not pull on the plunger!** When the oil reaches the 40 to 45 cc mark, move the handle towards the syringe. Do not over fill since the shipping container was designed to protect the syringe with the plunger extended no further than 50 cc.

4. Examine the sample to see that there are no foreign particles or bubbles present. If the sample is clear, move the handle towards the syringe, close the sampling valve and remove the syringe with the stopcock still firmly attached to the syringe. If the sample was not clear, repeat steps (a) and (b).

If you are unable to obtain a bubble-free sample after two or three attempts, fill the syringe to above the 50 cc mark, move the handle towards the syringe, close the sampling valve and remove the Tygon tube (with the syringe still attached) from the sampling valve. Hold the syringe upright and allow bubbles to rise towards the stopcock.

Move the handle towards the side-port and **gently** push the plunger to eject any bubbles. Close the valve (handle toward the stopcock) when the volume reaches 40-45 cc. Remove the Tygon tubing from the syringe. Wipe off surface oil and prepare for shipment to the laboratory.

Note: The stopcock must be firmly attached to the syringe and the handle must point to the syringe.

When there isn't a sampling valve, a sample can be obtained by removing the syringe plunger and gravity filling the syringe after having flushed the drain valve and syringe. Remove any bubbles as instructed in step 4. Please note on the test form the fact that the sample was drawn using gravity fill so that proper allowances can be made in the data analysis.

AFTER THE SAMPLE

1. Complete the Sample Data Sheet as thoroughly as possible.
2. Wipe any oil from outer surface of the sample container and place in the shipping container. Place the Sample Data Sheet(s) in a plastic bag and enclose it in the shipping container.
3. Seal the shipping container and affix the gummed address label supplied by TJ/H2b Analytical Services, Inc. If no label was supplied, please ship the sample to the TJ/H2b location nearest you.
 - 3123 Fite Circle, Sacramento, CA 95827
 - 4927 Jefferson Highway, Jefferson, LA 70121
 - 3098 Happy Valley Road, Sun Prairie, WI 53590
 - 204 Gale Lane, Kennett Square, PA 19348
 - 335 25th Street S.E., Calgary, AB, Canada T2A 7H8

FINDINGS:

The results of the test analysis are prepared in a written report and mailed to the contact address entered on the Sample Data Sheet. You will be notified of critical results by fax/telephone.

Permission to provide this information has been granted by TJ/H2B (<http://www.tjh2b.com/>).