



## TRÜTH DGA GLASS SYRINGES & **TOSIN** ACCESSORIES FOR TRANSFORMER OIL SAMPLING

### In Compliance With

**IEC 60475**

Method of Sampling Insulating Liquids

**IEC 60567**

Sampling of Gases & Analysis of Free & Dissolved Gases

**ASTM D923**

Sampling Insulating Liquids for Gas Analysis & Determination of water content

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## TOSIN Kit Consist of

TRÜTH Brand

### 1. Glass Syringe :

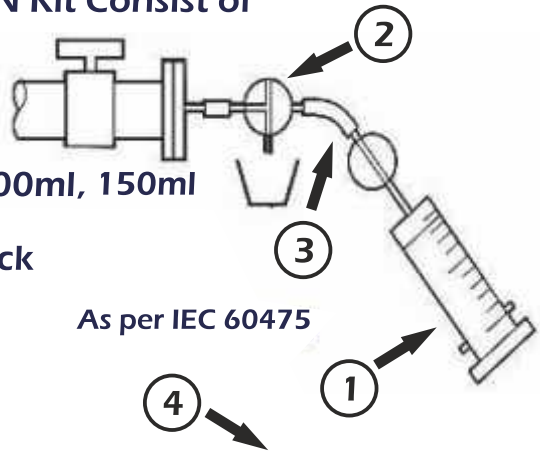
1ml, 2ml, 5ml, 10ml,  
20ml, 30ml, 50ml, 100ml, 150ml

### 2. TOSIN Nylon stopcock 3 way, 2 way

### 3. TOSIN Tygon Tube with connector

### 4. TOSIN Padded Carrying Cases

### 5. TOSIN Un-vented Male Plug Cap



## About : Top Syringe Mfg Co (P) Ltd

Since 1964 the Shandilya Group has been manufacturing glass syringes for medical & laboratory applications and a number of scientific products based on glass tube engineering in its first plant, Top Syringe Mfg Co, at Mumbai. From there we have developed a number of products in glass tube engineering including chromatography consumables, test tubes & sterile glass prefillable syringes. By regularly exporting our medical & industrial syringes in countries round the world including US, we confirm our commitment to excellence in products that we offer. We now offer TRÜTH DGA Syringes along with accessories.

## 2. About Sampling of Transformer Oil

For in-service Oil filled electric Transformers, sampling of the Oil provides a method to determine the condition of the solid and oil insulation as well as the operating condition of the Transformer without opening or de-energizing the Transformer.

Sampling provides a means to check the condition of oil in storage, whether it be new or used, and to determine if it complies with company specifications.

An Oil Sample has to be a representative and maintain the properties & contents of the bulk Oil insulation present in the Transformer. Periodical Testing of the Oil in the Transformer is needed to ensure its Repeated Performance & Long Life of the apparatus.

Sampling the Oil to be Tested is the FIRST concern which will ensure accurate results of the Oil

While sampling the representative Oil one must check for foreign matters including Water droplets, Sediments, Suspected Clear Fibers, Headspace Air etc.

Critical initial On-Site visual inspection of the presence of any foreign matter in the oils should be detected at the time of sampling itself.

Identifying a Poor Sample and the decision to resample should be made & executed prior to the leaving the On-Site.

Outages due to faulty Transformer Oil Analysis could have adverse snowballing effect on the electricity connections.

Tests include :

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| (1) Dissolved Gas Analysis        | (2) Water                           |
| (3) Dielectric dissipation factor | (4) Particles                       |
| (5) Breakdown voltage             | (6) Other chemical & physical tests |

### 3. Sampling of Transformer Oil by Syringe as per IEC 60475 Section 4.2.2

#### 4. Sampling Equipment Required as per IEC 60475 Section 4.2.2.1

Graduated DGA gas-tight syringes of a size suitable for containing adequate oil sample volume and equipped with a three-way plastic valve made of nylon. The use of syringes with matched piston and barrel is preferred when sampling for DGA in order to allow the piston to flow freely with oil volume variations, and to avoid pressure and vacuum build-up in the syringe and breakage during handling. Plastic syringes should not be used. For plastic three-way valves, a new valve should be used each time an oil sample is taken and not recycled, because it may be contaminated with the previous oil sample and lose its gas tightness when used several times.

NOTE: Priming the piston with clean, degassed oil has been found useful to avoid the formation of bubbles along the piston when introducing the oil sample for DGA analysis. The use of a low viscosity water-soluble lubricant has also been found useful for DGA.

CAUTION: 1) The oil-compatible plastic tubing used for ampoules should be used only once, not recycled, since it has a memory effect and may contaminate the oil sample when sampling for DGA.  
2) Metal bottles should not be soldered, as materials used for soldering may contaminate the oil.

The size of sample required depends on the likely concentration of gas in the sample, the analytical techniques and the sensitivity required.

Transport containers (padded carrying cases), designed to hold the syringe firmly in place during transport but which allow the syringe plunger freedom to move and prevent its tip from contacting the container whatever its position during transportation. Cardboard boxes with removable inner cardboard flaps with inside foam packing that hold the barrel in place have been found convenient for that purpose & also appropriate for transportation. When sampling for DGA, the syringe should preferably be transported in the vertical position, piston upwards, to avoid the formation of bubbles in oil.

## 5. Sampling procedure as per IEC 60475 Section 4.2.2.2

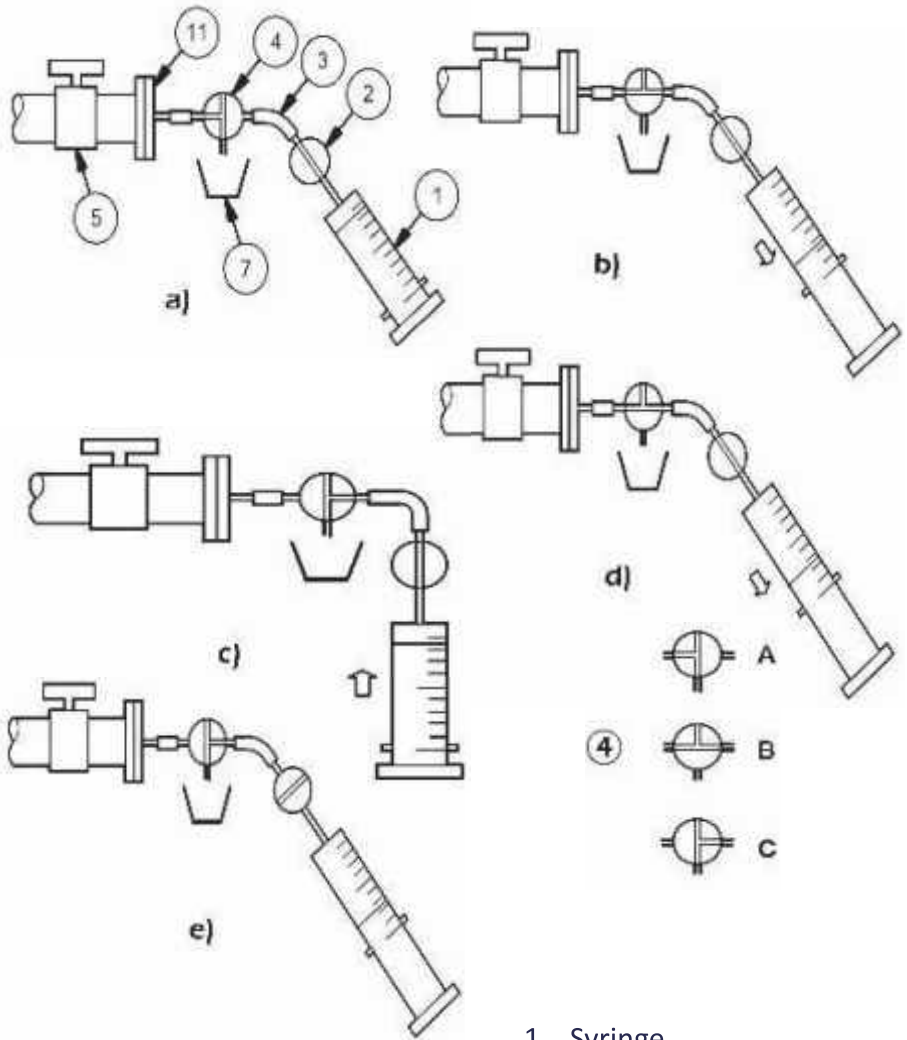
- a) The electrical equipment is connected as shown in Figure 5a, & its sampling valve (5) opened.
- b) The three-way valve (4) is adjusted (position A) to allow 1 l to 2 l of oil to flow to waste(7)
- c) The three-way valve (4) is then turned (position B) to allow oil to enter the syringe slowly (Figure 5b). The plunger should not be withdrawn but allowed to move back under the pressure of the oil.
- d) The three-way valve (4) is then turned (position C) to allow the oil in the syringe to flow to waste (7) and the plunger pushed to empty the syringe to ensure that all air is expelled from the syringe, it should be approximately vertical, nozzle upwards, as shown in Figure 5c. Confirm that the inner surfaces of the syringe and plunger are completely oiled.
- e) The procedure described in steps c) and d) is then repeated until no gas bubble is present. Then the three-way valve (4)is turned to position B & the syringe filled with oil (Figure 5d).
- f) The three-way valve (2) on the syringe and the sampling valve (5) are then closed.
- g) The three-way valve (4) is turned to position C & the syringe disconnected (Figure 5).
- h) When sampling for DGA, if the oil taken from the electrical equipment is hot, place the syringe in its protective box in the vertical position, standing on the piston and with the syringe tip upwards, until the oil has slowly cooled down, then install the syringe back in to the holding flaps of the protective box for transportation. This will prevent the formation of bubbles in oil.

Label carefully the sample.

**NOTE : 1** It is good practice to avoid contamination of the outer surface of the plunger and inner surfaces of the syringe by dust or sand. Such particles can affect the sealing properties of the syringe. This kind of contamination can come from wind-swept dust or from the handling of the syringe.

**NOTE : 2** In the case of sealed transformers, if a bubble appears in the syringe directly after sampling, it is recommended to resample.

Figure 5. As Shown in IEC 60475



## Key

a. Flushing Position

b. Wetting &amp; Flushing of Syringe

c. Emptying of Syringe

d. Taking of Sample

e. Disconnecting of Syringe

1. Syringe

2. Stopcock

3. Flexible Connecting Tubing

4. Three Way Valve

5. Equipment Sampling Valve

7. Waste Vessel

11. Blank Flange

## 6. Storage & Transportation of Transformer Oil Sample as per IEC 60475 Section 4.3

Some of the dissolved oxygen present in the oil sample may be consumed, and hydrocarbons and carbon oxides formed by oxidation. This reaction is accelerated by exposure to light, therefore sampling devices made of transparent materials i.e. glass syringes should be protected by placing them in the box for transportation i.e. padded carrying case.

In any case, the analysis should be carried out as soon as possible after sampling to avoid oxidation reactions and gas losses or pick-ups from the sampling devices. Oil syringes should be placed in sealed boxes to fully eliminate the risk of formation of bubbles important DGA Oil samples during transportation in planes, due to reduced pressure and over-saturation of gases in the oil. The syringe plunger should be allowed to move in order to prevent air ingress in case of oil volume variations.

## 7. Labeling of Oil Sample as per IEC 60475 section 4.4

Transformer or other equipment	Sampling
Customer	Sampling date
Location	Sampling point
Identification Number	Sampling person
Manufacturer	Reason of analysis (routine or other)
General Type (transformer (generation or transmission, instrument, industrial), reactor, cable, switchgear, etc.)	Transformer non-energized, off-load energized or on load
Rated MVA	Oil temperature when sampling
Voltage ratio	Humidity : dry - wet - fog - indoors
Type and location of OLTC	
Date of commissioning	
<b>Oil</b>	
Type of Oil (mineral or non-mineral)	Weight (or volume) of Oil
Product name	Date of last Oil treatment

## 8. List of Test as per IEC 60475 section 4.2.1.5

Oil Test	Oil Volume (ml)
Dissolved Gases	25-100
Water	20
Dielectric dissipation factor	200
Particles	100
Breakdown Voltage	500-1000
Other Chemicals and physical tests	250
All tests	1000-2000



## 9. Advantages of Taking Transformer Oil Samples with the TOSIN Kit

1 Easy flushing prior to sampling

2 Clear visual inspection

3 Free from Suspended Particles and impurities

When oil samples is collected in the syringe, contaminants such as suspended solids or free water if any can be seen in the syringe. These oils can be expelled out immediately & fresh oil sample can be taken so as to take the correct samples back to the lab for accurate test results. This cannot be seen in side another container like vacuum bottles.

4 Easy adjustment to avoid direct contact with Air (100% Air tight)

If the sample comes in contact with humid air, the readings of the oil samples will show high atmospheric gases and high moisture hence not providing for an accurate result. The Syringe is air tight and can hold the oil sample in the syringe not allowing it to come in contact with any air. If there is a small leak in the sampling tubing or connections, the vacuum bottles will draw air into the sample, which cannot be seen inside the bottle. If any bubbles are seen in the syringe, they can be expelled out immediately. Any extra air can be seen and expelled thus maintain integrity of the collected sample

5 Integrity

Any contraction and expansion in the sampled oil, will only move the plunger backward or forward without having any air bubble formation

6 Easy identification of color of the oil sample

7 Easy identification for the need of Resampling

8 Protection from direct sunlight / diffused Light





The oil collected in the Glass syringes is protected from direct sunlight by packing the syringe filled with the oil in the padded carrying cases.

9 Easy handling & convenient transportation

10 First choice under IEC regulations 60475 & IEC 60567

11 Consistent & Accurate reading of Test Results






**NEW** TRÜTH DGA Glass Syringe for Transformer Oil Sampling as per IEC 60475  
Section 4.2.2.2

Size	1ml	2ml	5ml	10ml
<b>Catalog No.</b>	09-04-02-02	09-05-02-03	09-08-02-05	09-09-02-05
<b>Description</b>	1ml, TRÜTH DGA Glass Syringes, Match Number, Metal Luer Lock Tip, 0.02ml Graduation	2ml, TRÜTH DGA Glass Syringes, Match Number, Metal Luer Lock Tip, 0.05ml Graduation	5ml, TRÜTH DGA Glass Syringes, Match Number, Metal Luer Lock Tip, 0.2ml Graduation	10ml, TRÜTH DGA Glass Syringes, Match Number, Metal Luer Lock Tip, 0.2ml Graduation
<b>Piston Outside Diameter</b>	4.7mm ±0.2mm	6.50mm ±0.2mm	12.13mm ±0.2mm	14.98mm ±0.2mm
<b>Barrel Outside Diameter</b>	7.2mm ±0.2mm	9.8mm ±0.2mm	15.5mm ±0.2mm	18.4mm ±0.2mm
<b>Barrel Collar Diameter</b>	12.75mm ±0.75mm	16.50mm ±0.75mm	22.75mm ±0.75mm	26.75mm ±0.75mm
<b>Overall Length</b>	120.00mm ±0.75mm	121.00mm ±1.00mm	113.00mm ±1.00mm	134.00mm ±1.00mm
<b>Graduation Increment</b>	0.02ml	0.05ml	0.2ml	0.2ml
<b>Volume</b>	1ml ±1.5% of volume	2ml ±1.5% of volume	5ml ±1.5% of volume	10ml ±1.5% of volume
<b>Picture</b>				

Other sizes of 200ml, 250ml, 500ml, & 1000ml available on request

\* Specifications are subject to change without prior notice.  
Syringes will be always in compliance of ISO 594/595.

## TRÜTH DGA Glass Syringe for Transformer Oil Sampling as per IEC 60475 Section 4.2.2.2

Size	20ml	30ml	50ml	100ml	150ml
Catalog No.	09-10-02-07	09-11-02-07	09-13-02-08	09-15-02-10	09-16-02-08
Description	20ml, TRÜTH DGA Glass Syringes, Match Number, Metal Luer Lock Tip, 1ml Graduation	30ml, TRÜTH DGA Glass Syringes, Match Number, Metal Luer Lock Tip, 1ml Graduation	50ml, TRÜTH DGA Glass Syringes, Match Number, Metal Luer Lock Tip, 2ml Graduation	100ml, TRÜTH DGA Glass Syringes, Match Number, Metal Luer Lock Tip, 2ml Graduation	150ml, TRÜTH DGA Glass Syringes, Match Number, Metal Luer Lock Tip, 2ml Graduation
Piston Outside Diameter	20.10mm ±0.2mm	22.90mm ±0.2mm	27.45mm ±0.20mm	35.90mm ±0.2mm	35.90mm ±0.2mm
Barrel Outside Diameter	23.4mm ±0.30mm	27.30mm ±0.40mm	32.35mm ±0.55mm	41.20mm ±0.40mm	41.20mm ±0.40mm
Barrel Collar Diameter	32.75mm ±0.75mm	37.55mm ±0.75mm	44.00mm ±0.75mm	55.50mm ±0.75mm	55.50mm ±0.75mm
Overall Length	150.00mm ±1.00mm	163.00mm ±1.00mm	178.00mm ±0.100mm	215.00mm ±1.50mm	262.00mm ±1.50mm
Graduation Increment	1.0ml	1.0ml	2.0ml	2.0ml	2.0ml
Volume	20 ml ±1.5% of volume	30 ml ±1.5% of volume	50 ml ±1.5% of volume	100 ml ±1.5% of volume	150 ml ±1.5% of volume
Picture					

Other sizes of 200ml, 250ml, 500ml, & 1000ml available on request

\* Specifications are subject to change without prior notice.

Syringes will be always in compliance of ISO 594 / 595.

## 12. Features of TRÜTH Glass Syringes for DGA

1. The syringe is made from heat resistant borosilicate glass
2. They conform to ISO 594/1 ; 595/2
3. The material and construction is resistant to breakage from shock and sudden temperature changes
4. It is annealed and tested until free of internal strain, to withstand repeated washing with hot water
5. Reinforced at luer lock tip and barrel base, the points at which most breakage occurs
6. The syringe cylinder plunger fit is leak proof and meets the requirements of Federal Specification GG-S-92 lb/A-A-54840/ISO 7886 for any leakage or backflow & for smooth plunger movement.
7. In compliance with IEC-60567, IEC-60475 & ASTM-D923
8. Plunger is individually ground and fitted to barrel for smooth movement with no back flow
9. Barrel rim is flat on both sides to prevent rolling and is wide enough for convenient finger tip grip
10. The syringes are available in universal fit or custom fit design. The custom fit syringes are uniquely numbered for matching
11. The syringes metal luer lock tip meets the specification of the American National Standards for Medical Materials luer taper fitting performances ISO 594 (Earlier HIMA MD 70.1 – 1983)
12. The fitting is made from chrome-plated brass and fits all female luer lock fitting
13. The syringe is clearly marked with appropriate graduations.
14. The graduations and logos are permanently fused on to the glass. This accounts for a lifetime accuracy and legibility
15. The syringe plunger is colored bevelled rimmed to facilitate dosage measurement
16. The syringe reinforced Flanges which is flat on two sides prevents the syringe from rolling

# TOSIN ACCESSORIES FOR TRANSFORMER OIL SAMPLING INSTRUMENTS



②

3 way Stopcock

## TOSIN Nylon Stopcocks

Catalog No.	Description
09-25-17-00	TOSIN 3 way Nylon Stopcock

### Features

- Made of 100% Nylon
- Two female ports and one male port
- Two female ports designed to accept Luer Lock fitting
- Manufactured in accordance with IEC-60475, IEC- 60567 & ASTM-D923
- Rugged Construction
- Manufactured to meet strict ANSI standards
- Our quality control ensures that the valves will perform reliably

③



09-25-16-00

## TOSIN TYGON® Tubes With Connector

Catalog No.	Description
09-25-16-00	TOSIN TYGON® Tube With Connector

### Features

- Standard accessory for IEC section 4.2.1.4 for transformer oil sampling.
- Two pieces of TYGON® Tubing are attached with connector.

## TOSIN Un-vented Male & Un-vented Female Plug Cap



⑤

Catalog No.	Description
09-25-19-00	TOSIN Un-vented Male Plug Cap

### Features

- Rugged Construction
- Accept Luer Lock fitting
- Meets ANSI standards



● Our Valuable Clients ●



**TOSHIBA**



**intertek**  
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**ALSTOM**

**Schneider**  
Electric



**SIEMENS**



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