

# DAKSHIN TRANSFORMER OIL MULTI STAGE GAS EXTRACTOR



**D-TOMGET, Model:1207**

(As per ASTM 3612-02 Method A)

For  
**Dissolved Gas Analysis of Transformer Oil**

**Designed by**

**Central Power Research Institute, Bangalore**


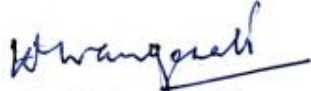
**&**

**Developed by**

**Dakshin Lab Agencies, Bangalore**

**(Concise Catalogue)**

## CERTIFICATE

|   |  |  |
|---|--|--|
|    | <b>केन्द्रीय विद्युत अनुसंधान संस्थान</b><br>(भारत सरकार की सोसाइटी, विद्युत मंत्रालय)<br>प्रो. सर. सी. वी. रामन रोड, सदाशिवनगर डाक घर,<br>पो.बा.सं. 8066, बेंगलूर - 560 080.  | फोन : का. :<br>Phone : Off.:<br><b>080 - 23604448</b><br>फैक्स : } 91-080-23601213<br>फैक्स : }<br><b>Fax No. : 080 - 23604448</b> |
|   | <b>CENTRAL POWER RESEARCH INSTITUTE</b><br>(A Govt of India Society. Min. of Power)<br>Prof Sir C. V. Raman Road, Sadashivanagar P<br>P. B. No. 8066, BANGALORE - 560 080.<br>वेबसाइट / Website : <a href="http://powersearch.cpri.res.in">http://powersearch.cpri.res.in</a><br><b>Email : <a href="mailto:ldl@powersearch.cpri.res.in">ldl@powersearch.cpri.res.in</a></b> |  |
| <b><u>TO WHOMSOEVER IT MAY CONCERN</u></b>  |  |  |
| Date : 07.07.2006.  |  |  |
| THIS IS TO CERTIFY THAT WE HAVE TRANSFERRED TECHNOLOGY OF<br>MULTIPLE GAS EXTRACTION APPARATUS TO M/S. DAKSHIN LAB AGENCIES,<br>BANGALORE. MULTIPLE GAS EXTRACTION APPARATUS PROCURED FROM<br>M/S. DAKSHIN LAB AGENCIES, BANGALORE IS WORKING SATISFACTORILY. |  |  |
| <br>(Dr. K. Dwarakanath)<br>Additional Director  |  |  |

## CONTACT

|   |   |
|---|---|
| <b>M/s. DAKSHIN LAB AGENCIES</b><br><br>First Floor, Ashwini Complex<br>6 <sup>th</sup> Main, LIC Colony<br>New Thippasandra<br>Bangalore 560 075 | +91 9845 20 5110 (Mr.Ramakrishnan)<br><br>+91 9342 34 8545 (Mr. Suresh)<br><br><b>Visit:</b> <a href="http://www.dakshinlab.com">www.dakshinlab.com</a><br><b>Email:</b> <a href="mailto:ramakrishnan@dakshinlab.com">ramakrishnan@dakshinlab.com</a> |
|---|---|

(Email for Comprehensive Catalogue and Video Demo)

## **INSTALLATIONS OF D-TOMGET**

### **Research Institutions**

1. Central Power Research Institute (CPRI), Bangalore
- 2-5. CPRI Regional Testing Laboratory at Guwahati, Kolkatta, Ghaziabad and Bhopal
6. Electrical Research & Development Association (ERDA), Vadodara
7. Indian Institute of Science (IISc), Bangalore
8. Maulana Azad National Institute of Technology (NIT), Bhopal

### **Electricity Boards**

- 9-11. Tamil Nadu Electricity Board (TNEB), Chennai, Coimbaore and Trichy
12. Karnataka Power Transmission Corporation Ltd (KPTCL), Bangalore

### **Hydro Power Plants**

13. National Hydroelectric Power Corporation Ltd., Chamba, Himachal Pradesh
14. Drug Green Power Corporation Ltd. Chhukha, Bhutan

### **Thermal Power Plants**

15. APGENCO Thermal Power Station, Vijayawada, Andhra Pradesh
16. Neyveli Lignite Corporation (NLC) Thermal Power II, Tamil Nadu
17. NTPC Energy Technology Research Alliance, NETRA, Noida
18. NTPC, Singrauli Super Thermal Power Station, Shaktinagar, Uttar Pradesh

### **Industries**

19. Hindalco Industries Ltd. Taloja, Navi Mumbai
20. Areva T & D India Ltd, Bangalore
21. Alstom Project India Ltd., Mumbai
22. Essar Steel Ltd, Hazira, Gujarat
23. Raj Petro Specialties Ltd, Manali, Chennai
24. Tovya Automation Pvt. Ltd, Bangalore
25. Dani Instruments India Pvt Ltd, Mumbai
26. Prama Instruments Pvt. Ltd. Mumbai

### **Oil Testing Laboratories**

27. Abirami Engineering Works, Chennai
28. Power Electronical, Nashik
29. Excel Equipments, Kochi
30. Universal Welding and Engineering Works, Mumbai

### **Railways**

31. EMU Car shed Avadi
32. Electric Loco Shed, Erode

### **Overseas Installations**

33. Tenaga Nasional Berhad, Kuala Lumpur, Malaysia
34. Druk Green Power Corporation Ltd, Chhukha, Bhutan

DAKSHIN TRANSFORMER OIL  
MULTI STAGE GAS EXTRACTOR  
(D-TOMGET -Model: 1207)

**This advanced system is a patented product and unique in its design.**

In this novel method (introduced by Central Power Research Institute Bangalore) the same sample oil could be exposed to vacuum many times, until there is no further increase in the volume of gases extracted.

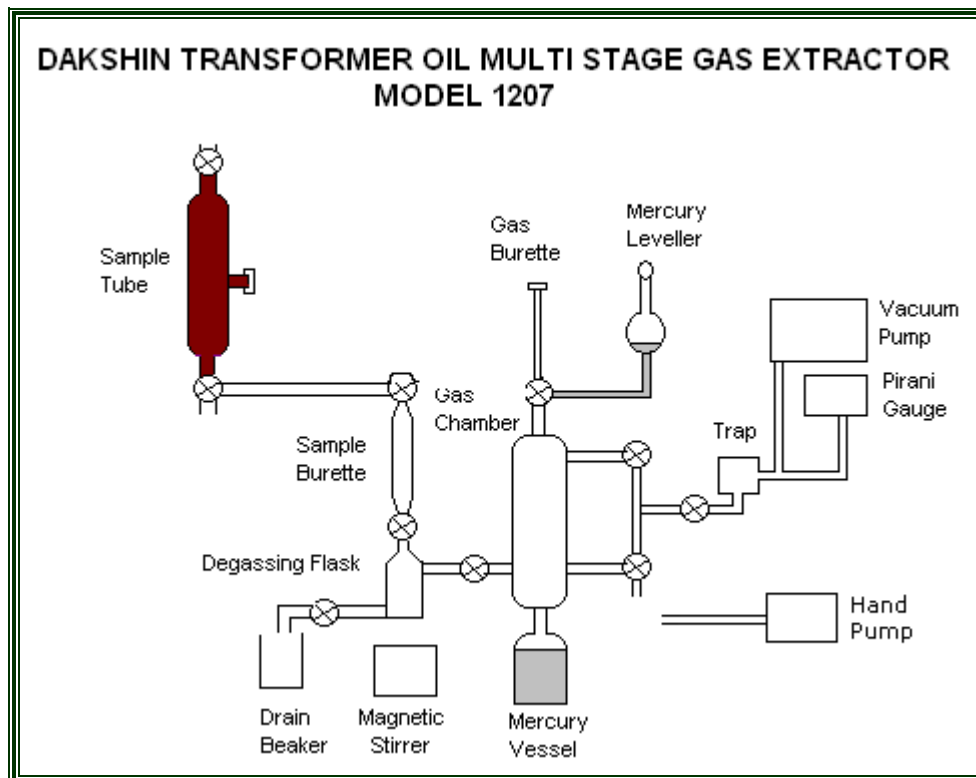
It is designed to extract even small traces of fault gases in transformer oil which are to be detected at an early stage, to identify a developing fault in transformer.

A fixed volume (30 ml) of sample oil is directly drawn from oil sampling tube into de-gassing vessel under vacuum, and the evolved gases are isolated in Gas Chamber.

The mercury stored in a stationary vessel, compresses the gases of Gas Chamber (under differential pressure) into Gas Burette.

In Gas Burette, the gas mixture is measured at atmospheric pressure using Mercury Leveler.

Gas mixture is injected into a gas chromatograph either using a gastight syringe or auto sampler.



### **MERITS OF (D-TOMGET) Model - 1207**

1. The same sample oil is exposed to vacuum many times, until complete extraction of gases is achieved
2. Efficiency is more than 98%
3. Extraction is done at a very high vacuum of 0.02 mbar surpassing BIS specifications
4. Movement of mercury is from a stationary vessel is under atmospheric pressure and does not involve manual lifting.
5. Direct transfer of sample oil, into vacuum without exposure to atmosphere, thereby retaining all dissolved fault gases.
6. The gas extractor is vacuum tight as per IS:9434:1992. If subjected to a vacuum of 0.1 mbar and left, the vacuum remains unchanged.
7. Direct measurement of extracted gases to the nearest 0.05 ml at atmospheric pressure.
8. The Gas expansion chamber is ten times the volume of sample oil for complete extraction as per ASTM D- 3612
9. Whenever vacuum pump is switched on, Mercury vapours are exhausted, thereby protecting the operator.
10. Rinsing of apparatus with new sample is done without dismantling the apparatus.

**We reserve the right to make any modifications, for improvements in performance of the system offered, which we consider useful in view of our continued R & D efforts.**

## **SPECIFICATION OF D-TOMGET, Model – 1207**

### **(As per ASTM 3612-02 Method A)**

- 1. Vacuum Pump:** Direct Drive Rotary Vacuum Pump with single phase motor of displacement capacity 200 lit/min. Ultimate partial pressure with Gas ballast closed  $5 \times 10^{-4}$  mbar.
- 2. Vacuum Gauge:** Digital Pirani Gauge with pressure range of 1000 mbar to 0.001 mbar in numeric LED display along with Calibration Certificate.
- 3. Gas Extractor (Patented):** Designed for exposing same sample oil to multiple extractions. To hold vacuum of 0.1 mbar with minimum efficiency of 97% gas extraction, as per IS:9434:1992. The components are,
  - a. Oil Sample tube of 350 ml capacity with two Teflon valves, side tube with Teflon lined septum and two machined adapters for connections.
  - b. Sample Burette to draw fixed volume of transformer oil directly from oil sample tube, retaining all dissolved gases.
  - c. De-gassing vessel with impinging and magnetic stirring. Sample oil exposed to high vacuum of 0.02 mbar.
  - d. Draining valve with PTFE plunger for quick draining and rinsing with new sample.
  - e. High vacuum gas expansion chamber with heavy duty PTFE control valves, mercury trap, PTFE high precision air inlet valve and gas tight threaded joint as a single unit.
  - f. Mercury reservoir with gas tight threaded union joint and excess removal valve.
  - g. Gas burette to measure and transfer extracted gases with gastight septum arrangement along with Calibration Certificate of NABL accredited laboratory.
  - h. Mercury leveler to measure extracted gases at atmospheric pressure.
  - i. Open type oil burette
  - j. Vacuum trap
- 4. Stand:** Vibration free heavy-duty stand with suitable clamps to hold gas extractor.
- 5. Mercury :** Sufficient to operate
- 6. Magnetic Stirrer**
- 7. Power Distribution Board** with vacuum gauge fixed on it.
- 8. Accessories:** Hand pump, vacuum tubes, vacuum grease and spares like septum, magnetic bar and screw caps.

**It is a patented product and available only with  
M/s.Dakshin Lab Agencies, Bangalore 560 075**

## UNIQUE SYSTEM

1. Teflon valves eliminate usage of vacuum grease, thus protecting sample oil from possible contamination.
2. These valves hold very high vacuum of 5 microns (0.005 mbar) for longer duration, ensuring total extraction of dissolved gases at ambient temperature.
3. Oil sample tube (which is totally gas tight) is provided to retain hydrogen and carbon monoxide (gases of low solubility) in the same condition as it was inside the transformer without escape into atmosphere.
4. The above oil sampling tube is provided with screw thread septum holder to draw sample oil for Moisture Content Test.
5. During extraction of fault gases, fixed volume of sample oil is transferred under a closed system (from sample oil tube into De-gassing flask through oil burette). This procedure retains all the dissolved gases of sample oil, without any exposure or escape into atmosphere.
6. Drain valves are provided in de-gassing flask so that there is no need for dismantling the system for rinsing purposes with subsequent samples.
7. You could detect your acetylene at a very early stage itself.
8. D-TOMGET fulfills the requirements of ASTM 3612 -02 -A and IS 9434.  
It also surpasses these standards, in its accuracy and efficiency.

**It remains a unique apparatus.**

## COMPARISON OF D-TOMGET WITH STANDARDS

| <b>Parameters</b>              | <b>IS:9434-1992</b>                                     | <b>ASTM D3612-02</b>   | <b>D-TOMGET</b>   | <b>OBSERVATION</b>                 |
|--------------------------------|---|--|---|------------------------------------|
| <b>Vaccum Pump</b>             | Capable of evacuating glass apparatus to below 0.1 mbar | Capable of evacuating glass apparatus to 0.001 mbar or lower | Capable of evacuating glass apparatus to <b>0.001 mbar or lower</b> | Better than IS<br>Satisfies ASTM   |
| <b>Vaccum Gauge</b>            | Capable to measure the vacuum of below 0.1 mbar         | Capable to measure the vacuum of 0.001 mbar or lower         | Capable to measure vacuum of <b>0.001 mbar</b>                      | Better than IS<br>Satisfies ASTM   |
| <b>Vaccum Holding Capacity</b> | Capable to hold vacuum of 0.1 mbar                      | No specification   | Capable to hold vacuum of <b>0.005 mbar</b>                         | Better than IS                     |
| <b>Extraction Efficiency</b>   | Capable of extracting 97% of dissolved gases            | No specification   | Extraction Efficiency <b>more than 98%</b>                          | Better than IS                     |
| <b>Gas Sampling Burette</b>    | No specification  | Sub division 0.01ml Capacity 5 ml                            | <b>Sub division 0.05 ml Capacity 5 ml</b>                           | Satisfies ASTM partially           |
| <b>Gas Chamber</b>             | Ten times of sample                                     | Ten times of sample  | Ten times of sample   | Satisfies IS<br>Satisfies ASTM     |
| <b>Degassing Flask</b>         | Capacity 50ml   | Capacity 50ml  | More than 50 ml for Better extraction                               | Better than IS<br>Better than ASTM |
| <b>High Vacuum Valves</b>      | Glass valves  | Glass valves   | Teflon valves without grease  | Better than IS<br>Better than ASTM |
| <b>Permanent Joints</b>        | No specification  | No Specification   | Joints with coupling for extra safety                               | Better than IS<br>Better than ASTM |
| <b>Magnetic Stirrer</b>        | With hot plate  | Without hot plate  | Without hot plate   | Satisfies ASTM                     |

**Dakshin Lab..... does it better**