NIRMAL® OIL FILTRATION SYSTEMS

Fowler westrup

WHEN TECHNOLOGY IS IN HARMONY WITH NATURE, THERE IS NO WASTE, EVERYTHING BECOMES A RESOURCE



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TÜV NORD ISO 9001

FOWLER WESTRUP (INDIA) PVT. LTD.
Bangalore, India

An ISO 9001- 2008 Company



Manufacturing Facility At Bangalore, India

Fowler Westrup (India) Private Ltd., is a joint venture between John Fowler (India) Private Limited, India and Westrup A/s, Denmark. The company is into manufacturing of Transformer Oil Filtration and Regeneration Machines, Seed & Grain Separating and Grading Machinery and Advanced Grain Storage Systems (Silos).

Fowler Westrup employs well qualified and globally trained professionals, and has established a state of the art manufacturing facility in Bangalore, India. The company manufactures "NIRMAL®" Oil Filtration machines for filtration of all types of insulating and lubricating oils. With over 5000 installations worldwide, Fowler Westrup is surging ahead in the industry with world-class technology, backed by total customer satisfaction.

Being in the manufacturing industry for over 5 decades, Fowler Westrup (FWL) has distilled its vast experience into its modern facility at Bangalore, which is totally self sufficient in handling high volumes of production synchronized by ERP implementation. FWL uses the latest of technology & best manpower, where all are trained & skilled, be it the state of the art CNC machines to the advanced shot blasting & painting booths, full fledged testing, Quality control & R&D lab. The team at FWL is up dated with latest technology and manufacturing processes as per national/international norms and continuously updates its technology. As a whole, transformer oil industry knows " NIRMAL®" brand of transformer oil filtration machines which is a bench mark for the rest of the industry.

Transformer Oil

All high capacity transformers in use today have to cope with voltages in excess of 400kv. Therefore it becomes imperative to maintain optimal insulation properties of the transformer oils by rigid control over moisture, dissolved gases and particulate contamination. Transformer oil is in an environment that lead to degradation in its desired properties and even in a proactive maintenance programe, transformer oil will lose its insulation & cooling properties over a period of time. The rating requirements and drive to tighter tolerances of modern transformers and electrical apparatus results in greater electrical stress in insulating material and fluids. To handle these stresses, oils are required to have better dielectric strength, and also lower residual water content must be maintained to reduce the speed of oil ageing . The periodic and proper treatment of these insulating fluids will result in the improvement of properties of the entire insulating system of power transformers and will extend the effective lifetime of the asset.



Benefits of "NIRMAL®" Oil Filtration Systems

- Reduced Down Time For Maintenance of Electrical Equipment
- Extends the life of Oil and Transformer by Rejuvenation of insulating oil.
- Highly cost effective
- Superior quality
- Advanced design

Function of Oil In Electrical Equipment

- Used as cooling media
- Used as dielectric media
- To isolate winding from atmosphere
- To quench the arc

Contaminants of Oil

- **Solid particles like rust, scale, dust and fibers.**
- **Generation of carbon particles due to ageing in switchgears**
- **Oil absorbs moisture resulting in free and dissolved water.**
- **Absorption of air.**
- **Absorption of gases.**
- **Sludge formation.**
- **Increase in acidity level.**

Effects of Contaminants of Oil

Physical

- **Colour not clear, turbid, hazy**
- **Low interfacial tension**
- **Decrease in flash point**
- **Change in density**

Chemical

- **Increase in Neutralization value**

Electrical

- **Low di - Electric strength**
- **Low resistivity**
- **Increase in tan delta value.**



Standard Machine Components

Oil Inlet Gear Pump

A Positive displacement gear pump sucks the oil from the transformer/storage tank and delivers it to the filtration machine. A built in relief valve takes care of any excessive pressure rise.

Heating System

The oil heater heats the transformer oil to the required set temperature. It is provided with electrical resistance elements enclosed in MS tubes separating them from oil. Further, a pre-set safety thermostat is provided to prevent accidental over heating of the oil. A pressure rellef valve is provided to take care of any accidental rise in pressure over the desired level. Suitable baffles in the heater vessel prevent hotspots.

Filtering System

Filtration is carried out through high efficiency non-hygroscopic filter cartridges. The filter medium is progressively denser in the direction of flow. This unique feature ensures large dust holding capacity. The filter housing is designed for faster replacement of choked cartridges. This is indicated by the compound guage.

Degassing System

The optimally designed (Single/multistage) degassing chamber consists of columns of raschig rings to ensure maximum exposure of oil to high vacuum, which causes moisture and gases to evaporate. The flow of oil is indicated through the sight glass provided on the chamber.

Control Cabinet

The machine is equipped with a sturdy and easily accessible electrical control cabinet. A mimic diagram is installed on the cabinet, providing a continual display of the state of operation.

Vacuum Pump

Vacuum Pumping system of high throughput capacity and high quality is provided for evacuating the degassing chamber and is capable of achieving and sustaining a high degree of vacuum.

Outlet Glandless Centrifugal Pump

The filtered oil from the degassing chamber is drawn out by a centrifugal glandless pump. Which glandless feature ensures total isolation of the filtered oil from the atmosphere and is essential for maintaining the quality of the oil. This pump, besides by virtue of being glandless, is hassle free and requires no maintenance.

Lube Oil Filtration Machine



The Lube Oil Filtration Machine is used for purifying the various types of turbine and hydraulic oil used in the machines of the power plant viz Turbine, Generators etc.

This machine conditions Lube oil of grade ISO-VG-46 & ISO-VG-68 and enhance the parameters of oil by reducing the water content from 2000 ppm to 5 ppm apart from separating (removes) the free water, sludge and carbon from Lube oil.

This machine mainly consists of two parts.

- Centrifuge
- Filtration and vacuum system

This Lube Oil Filtration Machine is also used for purifying the hydraulic oil grade ISO-VG-46 used to clean the Hydraulic Cylinders.

For testing power packs, fresh hydraulic oil is required in every cycle with good particle cleanliness and water content less than 50 ppm. This machine consists of 3 stage filtration with heating and degassing vacuum system.

Transformer Evacuation System



Transformer Evacuation System are required for Evacuation of Transformers before filling the New/Filtered Oil on to the Transformers.

Transformer Evacuation Systems are classified based on the type of mounting of the system like

- Skid (stationary) Mounted
- Semi-Mobile type (Castor Wheel mounted)

Transformer Evacuation Systems are further classified based on the capacity of the system ranging from 10 cub.mtr/hr to 2500 cub.mtr/hr.

Oil Storage Tank



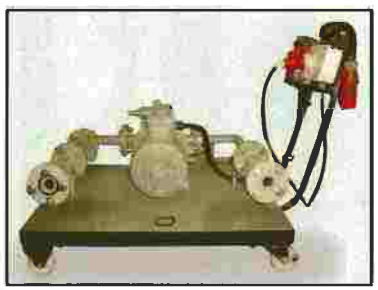
Oil Storage Tanks are required to store Contaminated/Clean oil so that the same can be used as and when it is required.

Transformer oil storage tanks are classified based on the type of mounting of the tank as mentioned bellow

- Skid (stationary) Mounted
- Trailer Mounted
- Truck Mounted
- Vertical Mounted

Transformer Oil storage tanks are further classified based on the capacity (Volume) of the tank ranging from 1000 Liters to 90000 Liters.

Oil Transfer System



A trolley mounted transfer pump is provided for transfer of transformer oil from one transformer or storage tank or oil drum to another transformer/tank.

It consists of Positive displacement Gear Pump, Magnetic Strainer, Control Cabinet, inlet and outlets isolation valves and oil hoses. Flow Meter will be available as optional item.

Oil transfer systems are classified based on the type of mounting of the system. Following are the types of mounting.

- Skid (stationary) Mounted
- Semi-Mobile type (Castor Wheel mounted)

Oil transfer systems are further classified based on the flow rate/capacity of the system ranging from 100 LPH to 25000 LPH.

"Nirmal®" Transformer Oil Filtration Machines Technical Parameters*

Description	Models		
	JMHV	JHV	JHVR
Vacuum Level at Final Oil Run Through (in torr)	<3	<1	<0.5
Unprocessed Oil Quality			
a) Water content (Max) ppm	50	50	50
b) Gas content (Max) % vol	10	10	10
c) Breakdown voltage KV (min)	20	20	20
Oil Quality After Single Circulation			
a) Water content (Max) ppm	20	6	3
b) Gas content (Max) % vol	2	0.5	0.1
c) Breakdown voltage KV (min)	50	60	65
Oil Quality After Three To Five Circulations			
a) Water content (Max) ppm	10	3	2
b) Gas content (Max) % vol	1	0.1	0.05
c) Breakdown voltage KV (min)	60	70	75

*Under Test Conditions.
*Stationary and Mobile configuration available
*Flow capacity ranging from 600 LPH to 12000 LPH and above

NOTE: The parameters shown confirm to IS & IEC standards



Standard Features

- Fail safe mechanical non-return valves at inlet and outlet of the degassing chamber prevents flooding of the unit in the event of power failure.
- Optical level monitor control oil and foam level in the degassing chamber.
- 3 piece ball valves with Teflon seating and stainless steel balls.
- Slim seal butterfly valves with nylon coated disc.
- Accurate vacuum gauges.
- The oil and vacuum connections are in the form of flanged joints with 'O' rings, ensuring full sealing efficiency at all times and thus minimal maintenance requirements.

Key Features

- User friendly
- Excellent price/performance ratio
- Easily replaceable non-hygroscopic filter cartridges
- High performance & high efficiency vacuum pumps
- Highly efficient oil level control and temperature control systems
- Fully optimized degassing system
- Minimal maintenance
- Fail safe interlocking system

Nirmal Models

- JMHV – Medium High Vacuum
- JHV – High Vacuum
- JHVR – Ultra High Vacuum

Configuration

- Stationary
- Semi mobile with castor wheels
- Mobile – Trailer mounted
- Mobile – Truck mounted

Options

- Transformer Evacuation system
- Filter press, Ionic Reaction column
- Flowmeter, Gas & Moisture measuring instruments
- Condensers
- Audio / visual alerts

R & D CENTER



Customer Service

- Installation
- Commissioning
- Turnkey solutions
- Spare parts
- Service and maintenance schemes
- Technical support network
- Advanced testing facility

Customer Base

- India
- Canada
- USA
- United Kingdom
- Middle East
- Australia
- South East Asia
- Africa

Recently Executed Prestigious Projects

- Oil Handling Systems for Koteswar Hydro Power Project
- Oil Handling Systems for NHPC Project at URI and Chamera
- Oil Storage Tanks & Filtration Machines for various PGCIL sites
- Oil Handling Systems for Teesta Urja Project
- Oil Handling Systems for Tala Hydro Electric Project at Bhutan

Photo Gallary







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FOWLER WESTRUP (INDIA) PVT. LTD.

(A joint venture of John Fowler, India & Westrup, Denmark)
Plot No. 249 & 250, Bommasandra Industrial Area, 3rd Phase, Bangalore - 560 099
Tel: +91 80 27832992, Mob: +91 9945241738, Fax: +91 80 27831594, e-mail: fwl@fowlerwestrup.com
Contact: **Delhi:** +91 11 29942741/29942742, **Mumbai:** +91 22 25916456/59, **Kolkata:** +91 33 24646586

Fowler Westrup - Creating a Greener & Cleaner World... Store Clean Recycle

Due to our continuous R&D efforts, technical specifications are subject to change without prior notification.

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