Ekofluid

FILOIL® 12 000

Transformer oil treatment plant

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The necessity for transformer oil dehydration and degassing is known for a long time. Transformer oil is used in power equipment where it provides cooling and insulation protection. Over time aggregated moisture, gasses and solid particles can seriously affect these properties. To remove moisture, gasses, and solid particles oil treatment equipment needs to be used. Oil treatment equipment treats oil in the following steps.

Description of oil treatment process

Oil is heated by electrical heaters with surface efficiency below 1.5 W/cm, with indirect heating to prevent local overheating. Oil at the outlet is filtered by a fine, up to, 0.5-micron filter to filter out solid particles before returning the oil back to the transformer. Equipment is fully automatic, optionally controlled by PLC logic and interfaced with a SCADA system. Numerous safety features are introduced throughout the plant to ensure the safety of the equipment as well as the operating personal. Aeration valves, overheating protection, and automatic level switches guarantee the safety of the equipment as well as its ability to identify a possible risk and to power down to prevent any accidents.

All oil treatment plants possess a positive displacement rotary inlet pump. The outlet pump is a centrifugal closed coupled high suction pump. For dehydration and degassing the rotary vane, a vacuum pump and vacuum booster roots pump are used. Vacuum chamber houses a variable amount of coalescer filters to achieve most efficient treatment of oil. All oil treatment plants have automatic variable oil flow control to maximize user comfort during operation. Vacuum breaking valves before and after the vacuum chamber ensure the vacuum side and the pressure side of the oil treatment plant are completely separated.

Features

- Electrical heaters with surface efficiency below 1.5 W/cm2, with indirect heating to prevent local overheating
- Fully automatic operation of the FILOIL units optionally controlled by PLC and operated via a SCADA system on the electrical cabinet
- High vacuum double or single stage coalescer based dehydration and degasification section
- Double or single stage vacuum system to ensure high vacuum in the vacuum chamber
- Filter rated up to 0.5 microns prevents particles from entering back into the transformer
- Oil catch pan to prevent accidental spillage, with automatic shutdown control
- All electrical wiring across the FILOIL units conforms to the highest European standards and consists only of high-quality components to ensure the reliability of the unit
- Variable flow rate of oil is an integral part of the FILOIL plant design allowing the users full flexibility during oil treatment
- Optional digital oil flow meter directly integrated into SCADA
- Optional touch panel for easy SCADA operation placed on the electrical cabinet
- Possibility of full manual control
- Integrated anti clog filter system
- Bypass for the possibility to only use heating or filtering capabilities of the plant
- Highly effective foam sensor to prevent extensive foaming in the vacuum chamber
- Possibility of online moisture measurement probes on inlet and outlet integrated into SCADA
- Possibility of remotely access to the unit via integrated GSM modem
- Commissioning and FAT on location
- SCADA system localized to most popular languages
- Full set of documentation also in electronic form available for download

Extra options

- Standard 20-foot sea fright container
- Road worthy trailer modified to house FilOil unit
- Set of spare parts for 2 (up to 10) years of operation
- Commissioning on site
- Supervision for operation on an energized transformer
- Extra vacuum system for transformer evacuation
- Extra vacuum system for parallel transformer evacuation
- 2 flexible houses with flange or quick coupling connection
- Power cable with cam lock system with variable length
- Remote access module
- Online moisture measurement

Performance

FILOIL double stage high vacuum equipment is used to decrease total water content (ppm) and gasses present in transformer oil. Highly efficient dual stage vacuum system with vacuum chamber housing highly effective coalescer system is an ideal solution for dehydration and gas removal. Water content is decreased to less than 5 ppm according to the IEC 60814 or ASTM D1533 standards. Total gas content is reduced down to less than 0,1% according to the IEC 60567 or ASTM D2945 standard. Particulate matter is lowered to less than 99% of particles over 1.0 microns. Dielectric breakdown is improved above 60 kV. With the use of a regeneration module acidity and interfacial tension are also improved to acceptable values by the IEC 60422 standard.

Property	Starting value	One pass	Several passes
Humidity (ppm)	< 50 ppm	<= 5 ppm	<= 3 ppm
Gas removal (%)	< 10%	<0,2%	<0,1%
Particulate matter (micron)	na	98% of over 0,5	98% of over 0,5
Dielectric breakdown (kV/2,5mm)	30	>=65	>=85

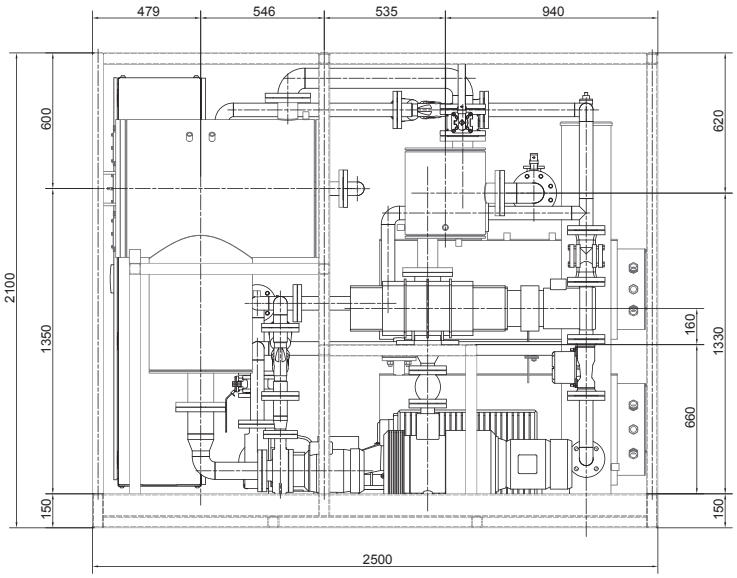
Technical data

Property	Unit	12000
Dimensions		
Length	mm	2500
Width	mm	1700
Height	mm	2100
Weight	kg	2700
Wheels dimensions*		
Length	mm	2500
Width	mm	2200
Height	mm	2200
Weight	kg	3200
Oil throughput		
Oil flow min	l/h	2000/2500/3000
Oil flow max	l/h	11000/12000/13000
Piping		
Oil inlet	DN	50
Oil outlet	DN	50
Transformer vacuum outlet	DN	80
Operating temp	°C	50 - 90
Filters		
Inlet coarse	micron	150
Pre filter	micron	10
Fine filter	micron	0,5
Coalescers	quantity	20
El.power supply		
El. Heater steps	quantity	03 - 06
El. Heater steps	kW	150 - 200
Motors	kW	24

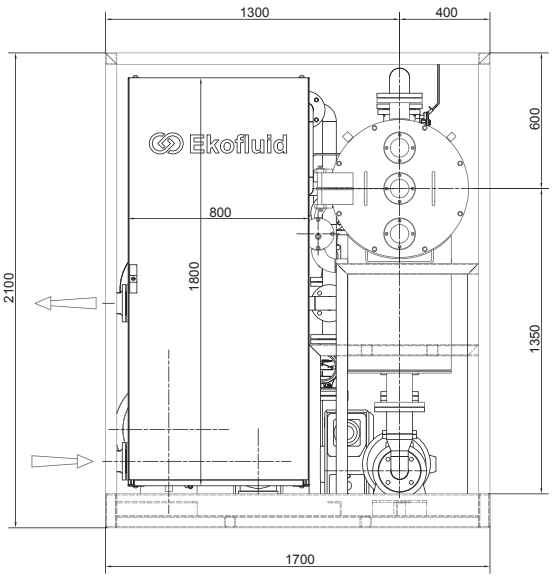
Property	Unit	12000
Vacuum		
Vacuum capacity	m³/h	740
Vacuum booster	yes/no	yes
Vacuum	mbar	0,1 - 10
Oil mist separator	yes/no	yes
Second vacuum line*		
Vacuum capacity	m³/h	1000 - 2880
Vacuum booster	yes/no	yes
Vacuum	mbar	0,1 - 10
Oil mist separator	yes/no	yes
Control		
Manual control	yes/no	yes
Additional configuration*		
Interchangeable inlet/outlet		optional
Bypass valve for pumping		optional
Sampling valves		optional
Outlet water monitoring		optional
Sensors*		
Moisture on inlet/outlet		optional
Gasses on outlet		optional
Tan delta on outlet		optional
Automatic control*		
PLC logic	yes/no	yes
Digital touch screen	yes/no	yes
Noise		
Level	dB	<75

*these items are optional

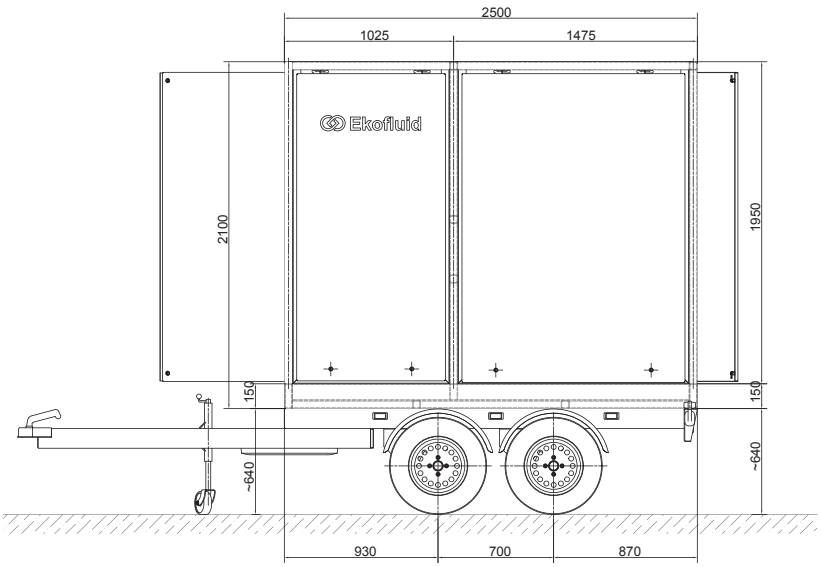
SIDE VIEW (1 : 10)



VIEW - A (1 : 10)



SIDE VIEW



VIEW - B