

TRANSFORMER OIL REGENERATION EQUIPMENT

Fullers Earth reactivation process

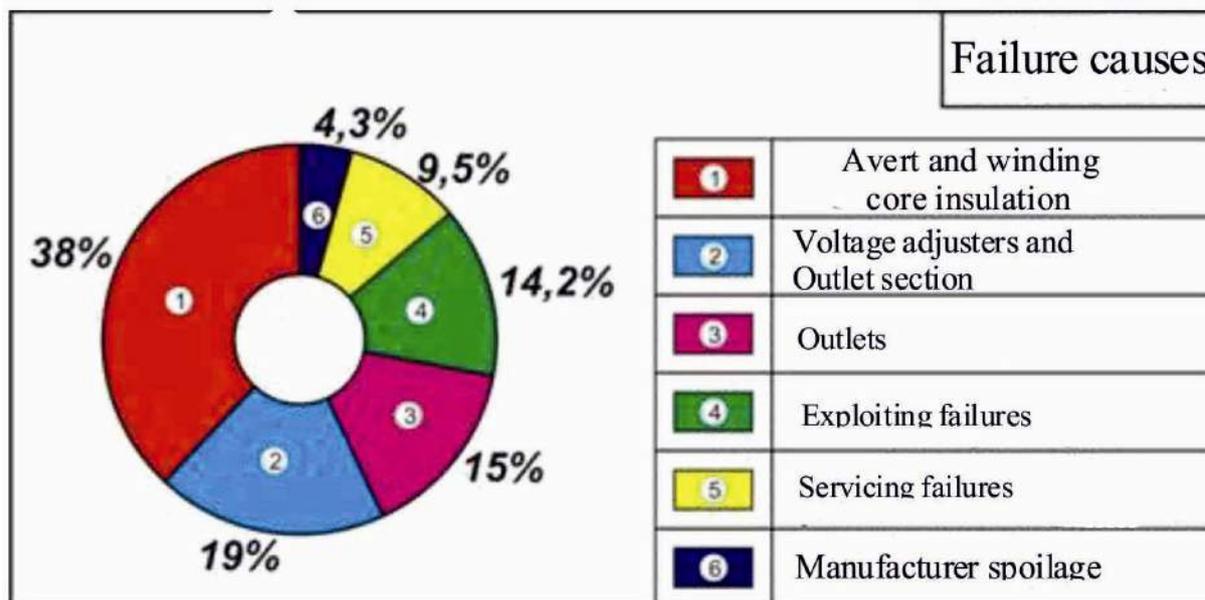


- DIELECTRIC FROM 20 KV TO AS HIGH AS 70 KV - COUPLED TO PURIFIER
- MOISTURE FROM 50 PPM DOWN TO BELOW THAN 5 PPM - COUPLED TO PURIFIER.
- GAS CONTENT FROM 10% BY VOLUME DOWN TO LESS THAN 0.1% BY VOLUME - COUPLED TO PURIFIER
- OIL ACIDITY FROM 0.4 MG KOH/GM OIL DOWN TO 0.03 MG KOH/GM OIL
- TAN DELTA CORRECTION FROM 1 DOWN TO 0.5%
- INTERFACIAL TENSION UP TO 45 DYNE /CM²
- REMOVAL OF SLUDGE
- CORRECTION OF OIL COLOUR

APPLICATION OF THE PLANT AND PROCES DESCRIPTION

At present, more than 40% of transformers in use by energy enterprises are over 25 years old. Annual transformer failure rate has been steadily rising in the past few years.

Regardless of methods used to analyze failures, the results of such analysis indicate the most vulnerable parts of the transformer are the main winding insulation, voltage regulators and taps.



Replacement of all aging transformers is hardly possible, considering the economic realities. However, actual life time of many transformers is far from over. This life time can be extended, and required operational reliability can be maintained.

Oil regeneration plant offered by Globecore expands transformers' lifespan refurbishing dielectric durability and chemical composition of insulating oils.

Being refurbished, oil dismisses decay's outputs and acidity; it also gains blanching, acidity resistance, and brakes soluting gases.

Regeneration plants are unique to **regenerate** insulating oils inside operating transformer as well as inside the one off. On-site regeneration dissolves sediment accumulated by winding insulation and then removes it by means of sorbent. **Regeneration** plant has a definite superiority of "**Fuller earth**" sorbent to **repeatedly refine** its properties. This results in steady oil treatment not to be broken by sorbent replacement or filling.

Being regenerated oil undergoes micro porous sorbent to allow for "molecular filtration" which blocks detrimental contaminants and oil decay outputs inside the sorbent's grains.

After the sorbent has accumulated contaminants **CMM-P** plant starts **sorbent reactivation** mode. Being reactivated the sorbent purifies its micro pores thus placing detrimental contaminants both into the collector and coal filter.

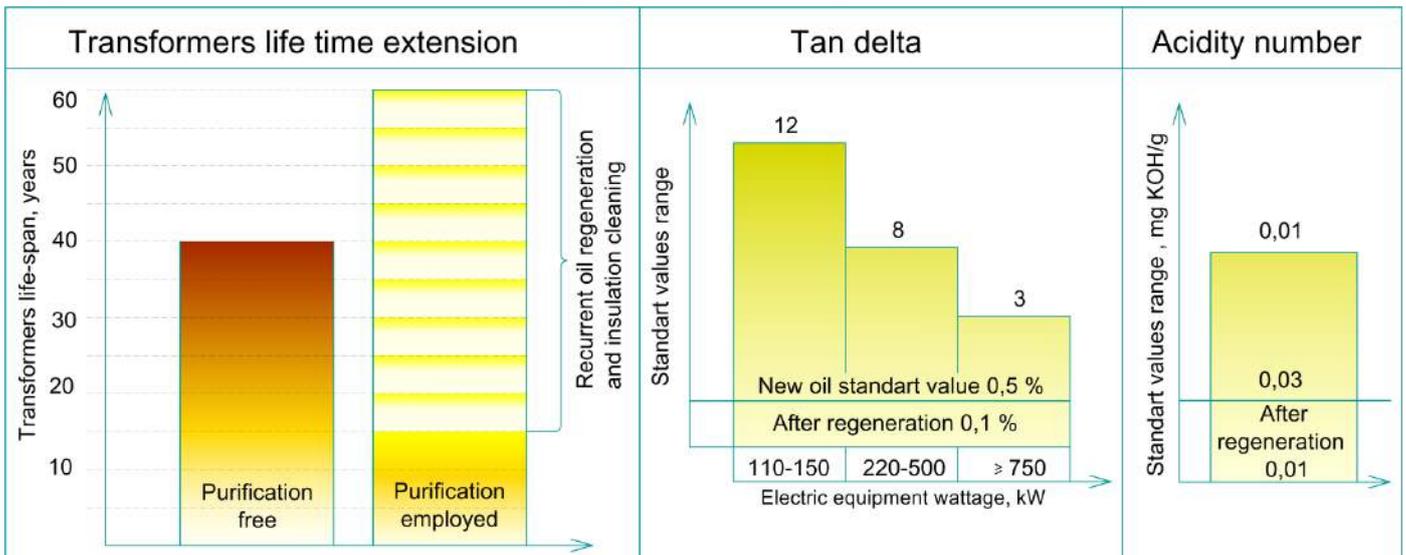
Sorbent is deemed for 300 reactivations life span which means 1,5 – 2 operating years.

Sorbent is approved no environmental danger after it has exhausted its absorbing properties. Thus it can be utilized very the same as a construction waste.

Factory on-site transformer oil regeneration indicates significant results. Regeneration employed technology has proved its high efficiency resulting in substantial decrease of dielectric loss tangent. Its regeneration following value is equal to the one for new transformer oil.

The Unit given reduces oil acidity index until standard value. It exploits outstanding technology to dissolve soluble as well as non-soluble sediments which are the danger when concentrating in cellulose

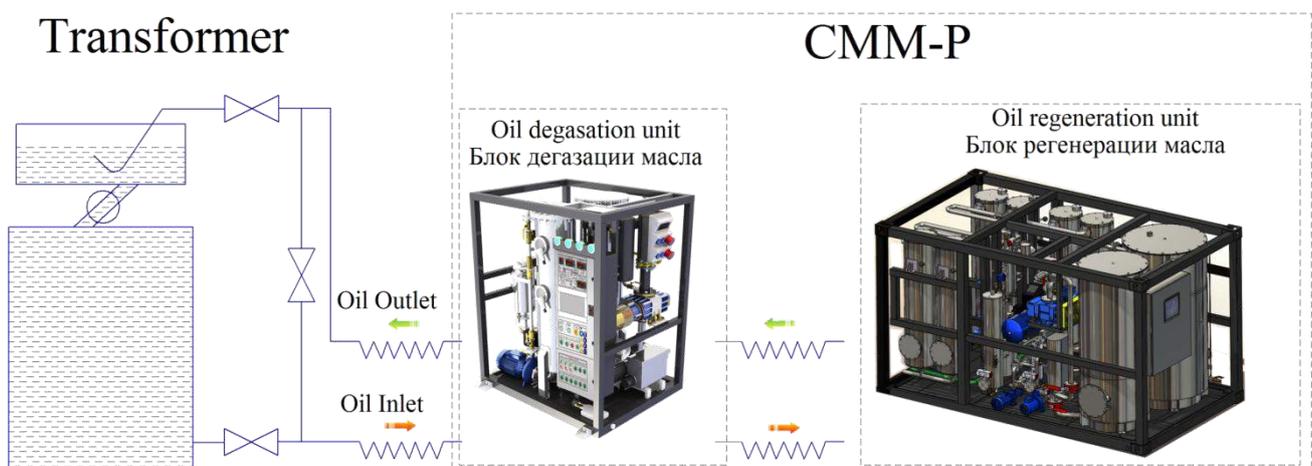
insulation. Therefore the challenge is sediment acidity index ten times surpassing the one for oil. To some extent oil releases acid outputs condensed in cellulose insulation. Concurrently oil acidity index is subsiding very slowly to oppose its further prompt increase resulting in non-soluble sediment and water-soluble acids. Regeneration allows for transformer 20-35 years extended life span.



TREATED OIL PARAMETERS

Water content, ppm, as per IEC 733; ASTM D-1533	5
Max. filtration fineness, micron	1
Gas content, %, as per IEC 60599; ASTM D-3612	0.3
Acid number, mg, KOH/gr as per IEC 296; ASTM D-664	0.01
Corroding sulphur as per ISO 5662; ASTM D-1275	none
Dielectric strength, kV, as per IEC 156; ASTM D-1816	75
Surface tension, N/m, at 25°C as per ISO 6295; ASTM D-2285	45
Tan delta at 90°C as per IEC 247; ASTM D-924	0.001
Oxidation resistivity, Acid number, mg, KOH/g as per IEC 1125A; IEC 1125B	0.2

DIAGRAM FOR TRANSFORMER CONNECTED REGENERATION+DEGASSING UNIT



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