



**NGEF** (HUBLI) LTD. Transformer Division  
(A Government of Karnataka Enterprise)

**NGEF**  
*TRANSFORMER*

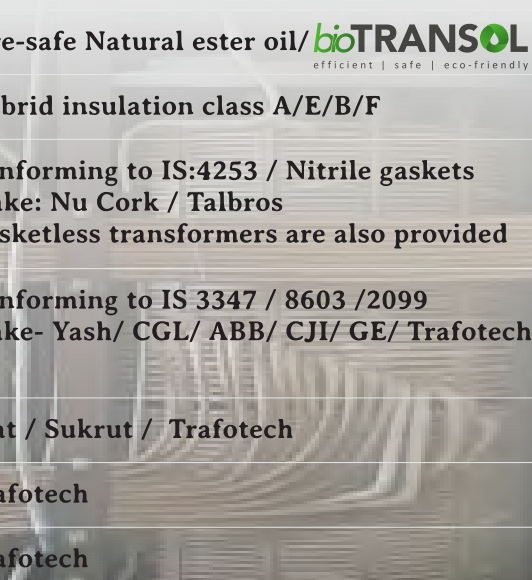
Long-life multi-purpose hybrid insulation transformers filled with natural fire-safe ester oil/ mineral oil.





## NGEF Eco-friendly transformers

Manufactured conforming to	IS:2026-14 & IEC 60076-14/IS 1180
Range	Up-to 50 MVA 132 KV class
Service	Continuous
Expected Life	50 years (if operated as per NGEF guidelines)
Noise level	Low
Tank & radiators	Corrosion resistant
Altitude	Up-to 1000 M
Frequency	50 Hz
Vector group	Dyn11/ Dyn5/ Dyn1/ YNyn0/ YNd11/ YNd1/ Dyn11d0 or as desired
Overloading	As per IS:6600
Cooling	KNAN / K class insulating liquids have fire point above 300 degree C
Tapping	OCTC or OLTC
Self Protection Feature	These are dual ratio transformers which provide 24V DC output for battery charging. On request, Battery & Protection panel can be provided on transformer.
<b>Material used</b>	
Winding	Electrolytic copper
Core	CRGO Silicon steel M4 or better
Liquid insulation	Fire-safe Natural ester oil/ <b>bioTRANSOL</b> <small>efficient   safe   eco-friendly</small>
Solid insulation	Hybrid insulation class A/E/B/F
Gaskets	Conforming to IS:4253 / Nitrile gaskets Make: Nu Cork / Talbros Gasketless transformers are also provided
Bushings	Conforming to IS 3347 / 8603 /2099 Make- Yash/ CGL/ ABB/ CJI/ GE/ Trafotech
Protective devices	Viat / Sukrut / Trafotech
Sealed breathing system	Trafotech
Oil purifier	Trafotech



## Special features of NGEF transformers

<b>Life expectancy</b>	50 years (if operated as per NGEF guidelines)
<b>Fire safety</b>	Filled with fire-safe oil. No fire threats. K class Natural ester oil
<b>Class of insulation</b>	Hybrid insulation A/E/B/F
<b>Operates dry</b>	Provided with Sealed breathing system which keeps transformer active part 100% isolated from atmosphere
<b>Oil filtration</b>	Not required. Transformer provided with oil-purifier which keeps on extracting moisture from windings and other hygroscopic parts. So, lesser outages and keeping the transformer safe from erroneous filter machines
<b>Silica-gel breather</b>	No maintenance required Provided as a back-up only Sealed breathing system does not require breather
<b>Magnetic circuit</b>	Brought-out of transformer and earthed. Health can be checked without opening the transformer. Time saving. Tested at 5 KV against 2 KV mentioned in IS
<b>Isolation feature</b>	Electrostatic shield provided between HV/LV windings to suppress the harmonics.
<b>Winding tightening</b>	Auto winding tightening system is provided. No need to open the transformer after 10 years for winding tightening. Results in time saving / lesser outages
<b>Conservator safety</b>	Provided with rain shed
<b>Residual drain plug</b>	Provided
<b>Jacking screws</b>	Provided on all inspection covers

**Benefits of K Class natural ester oil**

**Fire safe**  
**Human safety**  
**Long life / Financial gain**  
**Avoid Fire protection system**  
**Reduced insurance premium**  
**Safe aquatic life**

**WOULD YOU LIKE FIRE TO HAPPEN ON A TRANSFORMER AND THEN QUENCH IT?  
OR  
YOU WOULD NOT ALLOW THE FIRE TO HAPPEN?**

**Here is the role of NGEF transformer, filled with fire-safe K class natural ester oil.**

## Technical Comparison

### NGEF Hybrid transformers VS Conventional mineral oil filled transformers

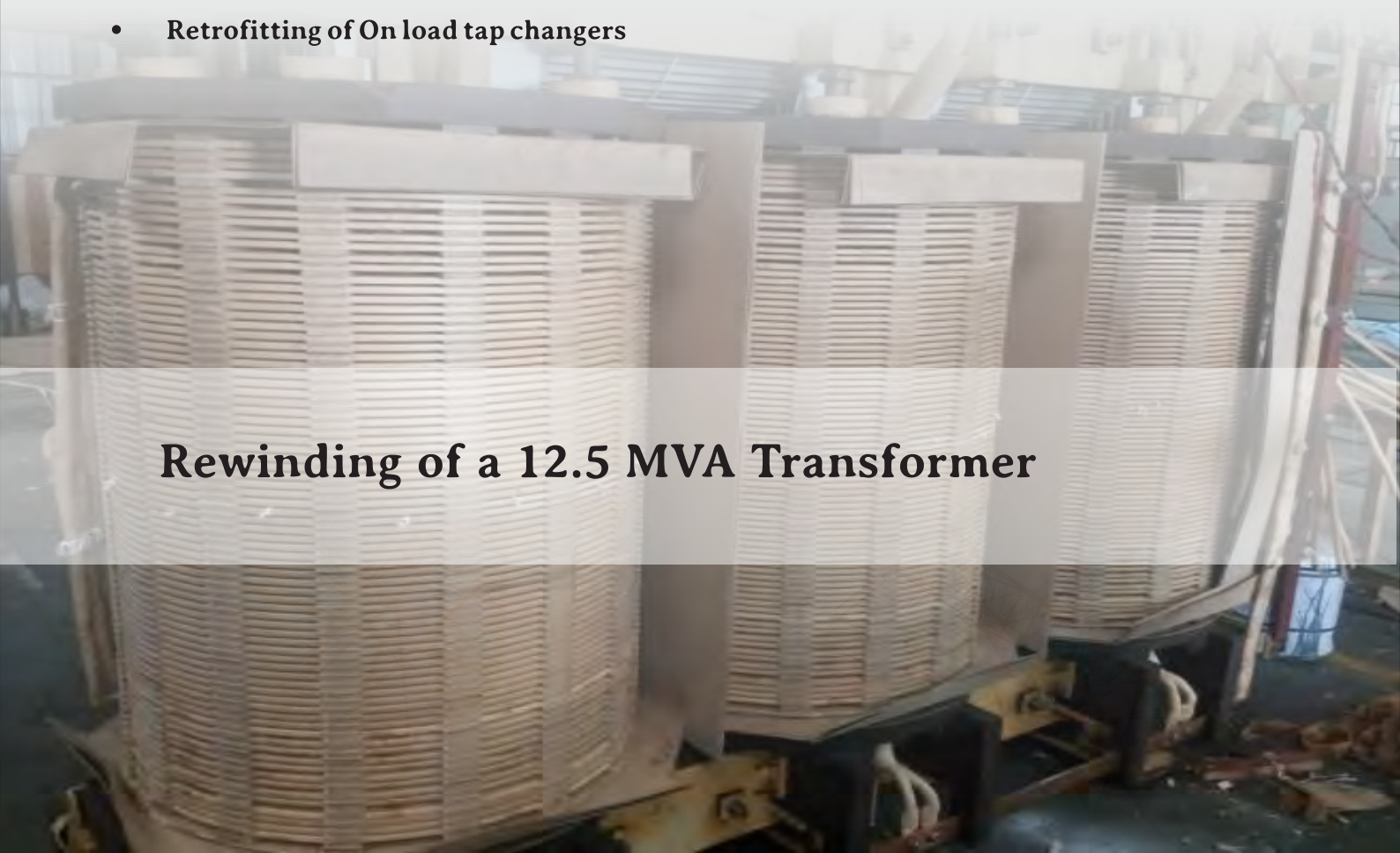
Description	Mineral oil transformer	NGEF <i>Trafoplus+</i>
Life expectancy	25 years	50 years (if operated as per NGEF guidelines)
Fire safety	Un-safe	Reliable / Safe
Bio-degradability	NO	YES
Capability to hold moisture	60 ppm	1100 ppm
Transformer ageing	fast	4-5 times slower
OLTC operations before an overhaul	“X” as specified by manufacturer	“2X” number of operations
Moisture effect	Biggest enemy. Moisture kills hygroscopic insulation. Life of transformer = Life of insulation	Core coil assembly totally isolated from atmosphere due to SBS, so outside moisture can-not enter transformer. Inside moisture is extracted by Oil-purifier provided on transformer.
Oil filtration	Required	Not Required
Breather maintenance	Required	Not Required
Winding tightening / maintenance after 10 years	Required	Not Required
Magnetic circuit testing	Not possible without opening the transformer  Tested at 2 KV	Magnetic circuit brought-out and testing possible without opening the transformer Tested at 5 KV
Oil leakage	Frequently observed problem	Transformers are provided with Nitrile gaskets OR gasket-less transformers are provided
Auxiliary winding for battery charging	Not provided	PROVIDED
COST	1X	1.1 X (Only 10% extra for multiple special features and double life)

**NGEF also manufacture mineral oil filled transformers *Trafomore*, with all above features**

All transformers above 10 MVA are provided with live moisture measurement meter.  
Option available for smaller ratings also.

## NGEF SERVICES

- Dry-out & re-conditioning of wet transformers at site / at our works (any rating)
- Rewinding of transformers up-to 100 MVA capacity
- Up-grade capacity of transformers by 12-16% depending on DP value of paper or Furan results of oil
- Retro-filling of transformers with natural Ester oil & make them fire-safe
- Increase (double) the number of operations of OLTC before an overhaul is done
- Convert existing free-breathing transformers to Filter-free transformers by installation of life extension devices. This can be done at site with few hours shut-down
- Modification of cooling system of transformer; like installation of Water cooled Heat Exchangers in place of Air cooled radiators
- RLA study of transformers / defining the remaining life
- Fault analysis of damaged transformers
- Internal inspection of transformer active part by cameras
- Repair / overhauling of On-load tap changers
- Retrofitting of On load tap changers



**Rewinding of a 12.5 MVA Transformer**

NGEF believes to despatch the transformers in a good dry state, with life extension devices mounted on them, so that moisture entry does not take place at all. It is not necessary to first allow moisture entry in transformers and then extract it using the wrong methods. NGEF attends this at root level and block all the moisture entry paths to transformer, right in the beginning.

NGEF also provides transformer spares:

Bushings  
 Oil temp indicator  
 Magnetic oil gauge  
 Off circuit tap changers  
 Silica-gel breathers  
 Cooling Fans

Radiators  
 Winding temp indicator  
 Buchholz Relay  
 RTCC Panels  
 Sealed breathing system  
 Marshalling box

Gaskets  
 Pressure relief valve  
 Oil surge relay  
 Mineral/Ester oil  
 Oil purifier  
 OLTCS



Transformer on floor.



26.5 MVA 132KV Transformer overhauling at M/s NFL, Panipat

**भारतीय मानक ब्यूरो**  
 BUREAU OF INDIAN STANDARDS  
 BENGALURU BRANCH OFFICE

ENDORSEMENT FOR CHANGE (S) IN THE LICENCE

CMLNO	NAME OF THE LICENSEE WITH THE ADDRESS	NAME OF THE PRODUCT	IS NO.
6200060989	NGEF (HUBLI) LTD SURVEY NO.26, P.B. ROAD, RAYAPUR POST RAYAPUR Dist : Dharwad Karnataka 580009	Outdoor type oil immersed distribution transformers	IS 1180 : Part 1 : 2014

SUNDEEP KUMAR  
 Scientist - C

ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION  
 TEST REPORT

NAME & ADDRESS OF CUSTOMER:  
 NGEF (HUBLI) LTD,  
 P. B. Road, Rayapur,  
 Dharwad 580009,  
 KARNATAKA

REPORT NO.: 97-1819-000091  
 DATE: 09.04.2018  
 CUSTOMER REF. No.: MK/7237/2017-18  
 DATE OF SAMPLE RECEIPT: 16.02.2018  
 DATE OF TESTING: 23.03.2018

SAMPLE DESCRIPTION:  
 250 kVA Distribution Transformer  
 Oil filled, 7 Taps,  
 Vector Group: Dyn11,  
 Energy Efficiency Level: 3

SAMPLE IDENTIFICATION:  
 ERDA SAMPLE CODE NO.: ERDA-00246537  
 SERIAL No.: 2684001-01  
 DRAWING No.: R7 6250 1081,  
 R6 6250 1082,  
 10 6250 1100 21 1A

TEST DETAILS:  
 Short-circuit withstand test (Cl. No. 17 & 21.4b)

TEST SPECIFICATIONS:  
 IS 1180 (Part 1): 2014  
 (Amendment No.1 & 2)

REMARKS:  
 The sample conforms to the requirements of standard for short-circuit withstand test.

C and I Calibrations Pvt. Ltd.  
 TEST REPORT

NAME AND ADDRESS OF CUSTOMER:  
 M/s NGEF HUBLI LTD.  
 (A GOVERNMENT OF KARNATAKA ENTERPRISE)  
 P. B. Road, Rayapur, Dharwad - 580009  
 Karnataka, India

TEST REPORT NO.: C&I/TEST/18/01/004  
 SHEET 1 OF 3

DESCRIPTION OF TEST ITEM:  
 250 kVA 3 Phase Distribution Transformer

TESTS PERFORMED:  
 1. Routine test  
 2. Type test  
 3. Special test

TESTED/CHECKED BY:  
 S. R. FAHILWANI

**MISSION:** NGEF mission is to strive to earn the trust and respect of customers by offering practical solutions, which are fairly priced with a level of support that consistently meets or exceeds our customer's expectations.

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