EGYTRAFO

Dry Cast Resin Transformers

Up to 3.6 MVA, 33 KV

ISO 14001 TÜV SÜD ISO 9001 OHSAS 18001

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EGYTRAFO

EGYTRAFO Grp.

- **Vision :** Being market leader in manufacture of transformers and Nickel Cadmium batteries and its services locally and globally.
- **Mission :** Customer focus through high quality and reliable products / services with competitive price and an time delivery.
- **Objective:** Maintain continual improvement in our business and manufacturing procedures with persistent staff development taking in to consideration operational health and safety in all stages.

EGYTRAFO

Different Power Vission

Dear Group Members;

Dear Valued Customers;

First of all, I would like to thank Egytrafo staff for their dedication and our clients whom we have been dealing with for more than 37 years, for the success that we have reached in achieving our goals.

Looking back on the previous years and remember every moment of hard work, deadlines met, challenges and competitions, those were significant stimulants that enhanced our emerging experience since we started.

Our history began since we established our trading company ETCO in 1979 in which we were trading electrical equipments i.e. transformers, HRC fuses, lighting arrestors and Nickel Cadmium Batteries.

Our strong believe towards the Egyptians' qualifications and looking forward to revive the Egyptian market with locally produced Oil transformers and Nickel Cadmium Batteries, Egytrafo Grp. was established in 1994 which became a leading manufacturer for both products.

The success that Egytrafo Grp. proved to all its customers as well as perceiving exactly the market requirements encouraged us to step forward towards our dream in 2007 where we launched Dry type Cast resin transformers in the Egyptian market.

In addition, we have as well established a new factory in Ethiopia in 2013 called "Trafo Tech manufacturing PLC" for the production and maintenance of Oil and Dry transformers.

Our most important key factors of reaching this success are our product's quality and the team's dedication to compete locally and globally. Therefore, our quality assurance team ensures the compliance of the lastest IEC and ISO standards for our products to be internationally accepted.
Besides, our Oil and Cast resin transformers are "KEMA" certified. One of our main objectives is to maintain continuous quality improvement and staff development along with safety regulation.

Clients trust, experience, high quality and success are our main driving factors that we depend on in making our future business.

Last but not least Egytrafo's Grp. main aim is to grow and expand our activities in order to increase its market share. We do believe that our mission never ends.

Grp. Chairman

Introduction

- Transformers are considered long – life capital goods. Therefore, our aim to produce high quality transformers (high efficiency, reliability and low maintenance) using latest manufacturing technology to satisfy customer specific needs.
- All Cast Resin Dry transformers are designed, manufactured and tested according to IEC60076-11 Standards.
- EGYTRAFO produces wide range of Dry type Cast Resin transformers up to 3.6MVA, 33KV suitable for indoor and outdoor installation (inside enclosure with certain IP) and ambient temperatures up to 45°C.
- Transformers are designed to deliver maximum continuous power without exceeding temperature rise limit and withstand overloading according to IEC – 60354.
Other operating condition and customized solutions can be implemented on request.
-Dry type transformers is a reliable alternative for oil immersed transformer with low running costs, free maintenance, environmental friendly and suitable for operation under heavy load flactuations.

1- Dry Type Cast Resin Transformers

A- General Characteristics & Advantages:

-Fire resistance :

In locations where the fire risk associated with the use of mineral oil is unacceptable like offices, shopping complexes, apartment buildings, hospitals ...etc.
The cast coil with Epoxy resin has a self fire – extinguishing performance, to be free from fire due to electrical sparks.

-Maintenance free:

- No liquids (oil) to contaminate, breakdown, leak or explode and burn.
- The insulation material is not subjected to absorption or ageing.

-Insensitive to moisture:

No deterioration of dielectric property due to humidity (enhanced dielectric strength).

-High overloading capacity:

The cast coil with Epoxy resin has a high thermal time withstand factor therefore it can endure much higher overloads for a short time.
Also able to absorb continues overloads up to 40% using cooling fans.

-Long and stable life time:

With very low partial discharge, life time exceeds 30 years in service. It has higher mechanical and electrical strength against network transients and suitable for heavy load flactuations.

-Installation close to load centers (maximum safety):

Without fire and explosion danger it is possible to place the CRT direct vicinity of load center.

-Easy to connect and install:

Possibility of assemble on site. Easier to handle and less installation costs (neither special precautions nor tools are needed).

-Immediate switch-on:

No need for tests or special precautions before starting up.

-Easy to repair:

Minimum time for inspection & repair also on-site repair is possible.

-No special requirements for installation room:
No need for drainage areas, firewalls or use of expensive high fire point liquids.
Also no air conditioning is required.

-Environmentally safe:
In case of damage they don't pollute the groundwater nor form toxic decomposition products (No pollution effects).

-Hardly inflammable:
Due to the high quality of non-hygroscopic material.

-Low operational cost and service expenses:
Due to reducing the length of costly low voltage cabling and being maintenance free.

-High performance, reliability and high short circuit strength:
Robust structure against electro - mechanical forces during short circuits, external impacts and abnormal vibrations.

B- Field of Applications:

-With CRT advantages and features they're especially suitable for particular industrial applications like: foundries, rolling mills, steel works, textiles, food and cements.

-Due to the fact that materials are flame resistant and self-extinguishing, the cast resin transformers are particularly suitable for special applications like: hospitals, banks, sky - scrapers, commercial and residential buildings, hotels, schools, nuclear plants, ambients with high ecological contents.

-Due to high reliability of the CRT they are suitable for Gas, carbon and oil refineries and extraction, mines and offshore platforms, subways, water supply.

-Transportation means as railways underground, trams and tunnels.

-Locations with vibrations and shocks (like ships and cranes).

2- Dry Type Cast Resin Transformer Construction

A- Main components

• Core:

Manufactured from high quality grain oriented cold rolled silicon steel laminations with high magnetic conductivity. Yokes are clamped with high quality electrostatic painted steel angles to apply uniform clamping forces across the entire core. Top and bottom angles are secured together by steel straps for each core limbs for free stress core assembly.

The core construction of overlapping ensures very low level of iron losses as well as noise.

Different over lapping techniques of laminations are used in core construction (step–lapping process).

• LV windings:

High quality electrolytic aluminum / copper foils are used in LV winding. Turns are insulated from each other using class " F " pre – impregnated paper. Winding process is conducted using high-quality winding machine.

Connections of coil windings to terminal bars are done using shielded arc technique for high joint integrity and quality.

Impregnated or fully casted LV Coils can be manufactured on request.

• HV Windings:

The HV windings are produced by overlapped coils in aluminum / copper strips, connected in series, with rounded corners and insulated with polyester material films.

The alignment of the strip with the insulation and the mechanical tension of components is kept constant with the automatic computer aided equipments.

• Casting:

Coils are assembled inside casting molds. Molds are pre-heated then filled with a thoroughly mixed epoxy resin under vacuum to ensure a solid void free casting. After this Molds enter inside high temperature oven for final curing process.

Epoxy resin mixture consists of high quality harder, resin, silica and fire retardant material to get E2 – C1 – F1 class.

- **Tapping:**

Taps are supported inside epoxy along the face of each HV coils and changed by moving bolted links between different taps.
Tap changers are normally 5 or 7 steps each step is 2.5 %.

- **Temperature control and protection**

Temperature is controlled by electronic device and PT 100 sensor. The controller is used for fan operation, alarm and trip.

- **Cooling:**

There are two types of cooling methods: AN (air natural) and AN/AF (air natural /air forced).
For AN/AF cooling fans are used for over sizing transformer capacity up to 40 %.
Fans are automatically actuated using the temperature controller device.

B - Standard and optional accessories:

Standard accessories are:
- Bi-directional rollers.
- Lifting lugs.
- Earthing terminals.
- Rating Plate.
- 1 set of 3 PT 100 Thermo-resistance (Temp. Sensors).
- Distance bushings for HV cable connection.
- PTC Relay (Temp Controller device).
- Bi-metal connections for LV bars.

Optional accessories are:
- Cooling Fans for AF Operation.
- Protective container with removable front panels (standard is IP 21- IP31).

3- Dry Type Transformers Technical Description

-Egytrafo group produces dry type transformers according to IEC 60076-11 standards from 100 KVA to 3600 KVA up to 33KV, with the following specs:

-Frequency: 50 Hz or 60Hz

-Max ambient temperature:+ 45°C

-HV/LV Insulating material: F/F („H„ class available upon request)

-Winding over temperature:100°C

-Transformers are designed and manufactured in conformity to Environment (E2), Climate (C2), and fire (FI) classes in which each is classified as follows:

-E2: Transformer is suitable for being installed in high-polluted environment and with presence of substantial condensation.

-C2: Transformer is suitable for being stored and used at ambient temperature upto 25°C

-FI: Self electrical tests transformer which doesn't emit toxic substances and opaque smokes.

A - Technical data tables

Connection group Dyn11 ambient temperature: 45 °C

Maximum Winding temperature rise: 100 °C

Insulation level 12-28-75 KV

Rated power KVA	160	250	315	400	500	630	800	1000	1250	1500	2000	2500	3150
NO load losses W	610	820	950	1150	1300	1500	1700	1850	2500	2600	3500	4300	5500
Load losses (75 C)w	2300	3100	3600	4300	5100	6400	7700	8000	10500	11200	1490	18300	22000

Impedance voltage at rated current at 75 °C													
%	4	4	4	4	4	4	5	5	6	6	6.5	7	7

Over all dimensions													
Length mm	1130	1170	1260	1320	1340	1350	1490	1590	1710	1760	1870	1940	2010
Width mm	800	800	800	800	950	950	950	1100	1100	1100	1400	1400	1480
Height mm	1260	1340	1370	1440	1520	1670	1800	1880	1960	2120	2260	2390	2450

Distance between rollers													
mm	420	520	520	520	670	670	670	700	820	820	820	1070	1100

Total weight													
KG	650	870	1070	1280	1500	1650	1920	2150	2500	3180	3680	4550	5100

A - Technical data tables

Connection group Dyn11 ambient temperature: 45 °C

Maximum Winding temperature rise: 100 °C

Insulation level 24-50-125 KV

Rated power KVA	160	250	315	400	500	630	800	1000	1250	1500	2000	2500	3150
NO load losses W	650	880	1030	1200	1500	1650	2000	2200	2500	2800	4000	5000	6300
Load losses (75 C)w	2300	3300	4000	4800	5600	6400	6800	8900	11500	12800	17500	20000	23000

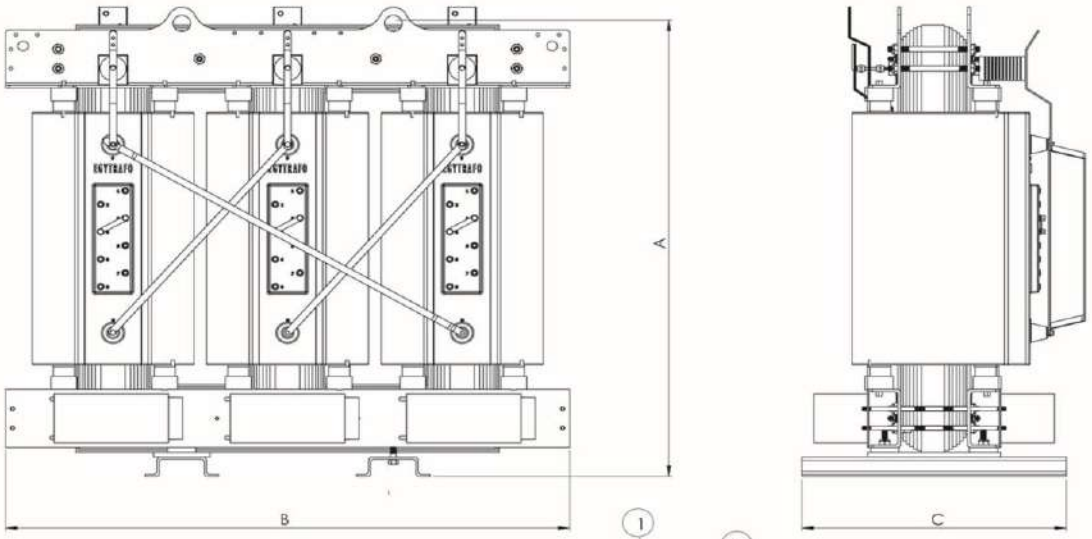
Impedance voltage at rated current at 75 °C													
%	4	4	4	4	4	4	5	5	6	6	6.5	7	7

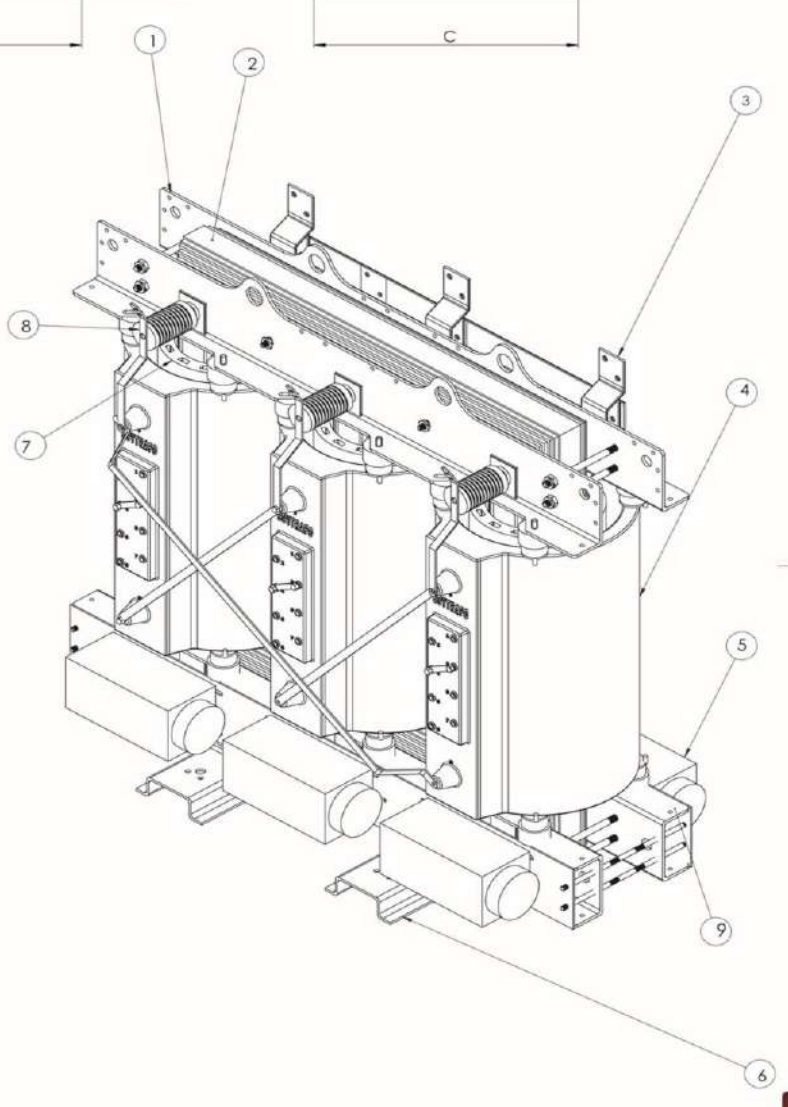
Over all dimensions													
Length mm	1200	1250	1340	1450	1460	1480	1510	1580	1650	1770	1840	1970	2060
Width mm	800	800	800	800	950	950	950	1100	1100	1100	1400	1400	1480
Height mm	1290	1370	1410	1480	1540	1670	1820	1900	200	2135	2295	2415	2500

Distance between rollers													
mm	420	520	520	520	670	670	670	700	820	820	820	1070	1100

Total weight													
KG	690	950	1100	1300	1450	1650	1650	1950	2300	2650	3200	4700	5400

B - Detailed assembly drawings





1	Upper Clamp
2	Iron core
3	L.V TERMNAL
4	H.V COIL
5	FANS
6	BASE
7	L .V COIL
8	H.V TERMNAL
9	INSULATOR

4- Electrical tests:

Routine tests:

All transformer are tested according to IEC 60076 standards before shipment
The following routine tests are performed on each unit manufactured in our testing Laboratories & the relevant test reports are issued.

1- Transformer turns ratio & vector group.
2- No load losses and magnetic current (no – load current).
3- Full load losses and impedance voltage.
4- Winding DC resistance.
5- Separate source voltage withstand & test AC & Induced AC over voltage withstand test.
6- Insulation resistance test.
7- Partial Discharge test.

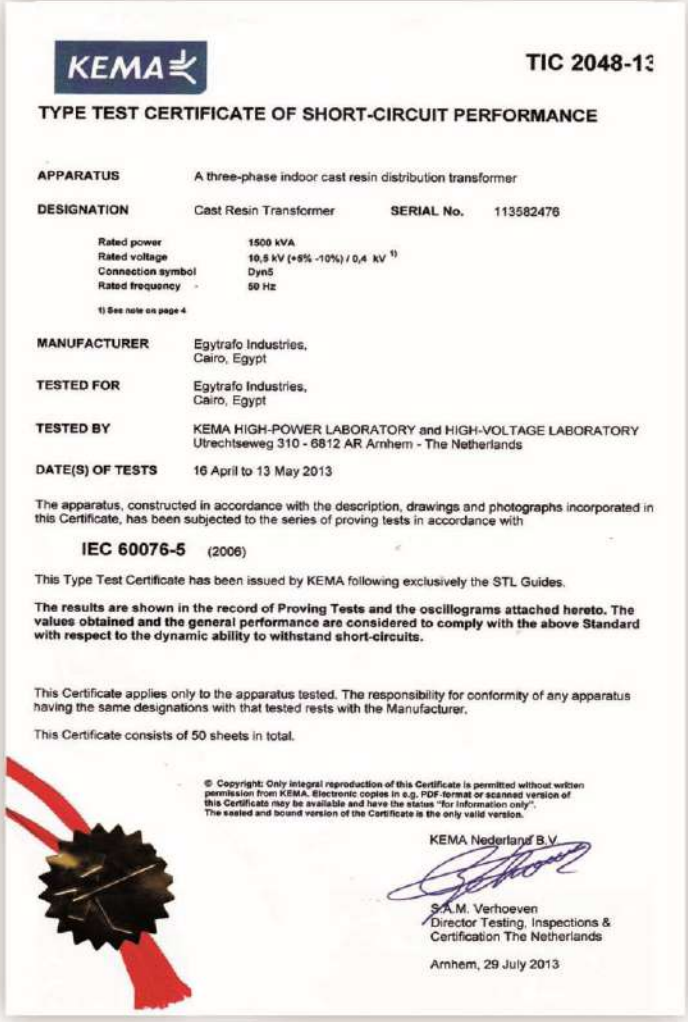
Type tests:

1- Temperature rise test.
2- Impulse test (ability to withstand lighting impulse).

Special tests:

1- Short circuit withstand test.
2- Sound level test (noise test).
3- Environmental, Climatic & Fire behavior test.

Egytrafo transformers are type tested & KEMA certified for short circuit withstand test.
Per request, type tests & special tests are conducted on customer expenses



KEMA

TIC 2048-13

TYPE TEST CERTIFICATE OF SHORT-CIRCUIT PERFORMANCE

APPARATUS A three-phase indoor cast resin distribution transformer

DESIGNATION Cast Resin Transformer **SERIAL No.** 113582476

Rated power	1500 kVA
Rated voltage	10,5 kV (+5% -10%) / 0,4 kV [1]
Connection symbol	Dyn5
Rated frequency	50 Hz

1) See note on page 4

MANUFACTURER Egytrafo Industries, Cairo, Egypt

TESTED FOR Egytrafo Industries, Cairo, Egypt

TESTED BY KEMA HIGH-POWER LABORATORY and HIGH-VOLTAGE LABORATORY Utrechtseweg 310 - 6812 AR Arnhem - The Netherlands

DATE(S) OF TESTS 16 April to 13 May 2013

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with

IEC 60076-5 (2006)

This Type Test Certificate has been issued by KEMA following exclusively the STL Guides.

The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard with respect to the dynamic ability to withstand short-circuits.

This Certificate applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the Manufacturer.

This Certificate consists of 50 sheets in total.

KEMA Nederland B.V.

S.A.M. Verhoeven
Director Testing, Inspections & Certification The Netherlands

Arnhem, 29 July 2013

5- Services and After sales services:

Our concept is to ensure safety, efficiency and prolonged life of the transformers, consequently reducing operational risks.
Egytrafo can provide a comprehensive service and maintenance portfolio to support their customers including transformers produced by others.

The following service items can be provided:
- Supervise the installation of the transformer at customer sites.
- Training customers on the operation and maintenance of transformers.
- Following up the status of the transformers under operation at customers sites.
- Providing the needed spare parts if requested.
- Providing periodic maintenance for the transformer at site.
- Performing site tests like Turns ratio and polarity , Insulation resistance
- Repairing transformers during and after warranty period at site and in our factory.
- Yearly maintenance contracts as per request.
- Engineering, design and upgrading of old transformers for replacement.

6- Export

We have already exported our transformers to several countries throughout the world.
In line with our vision and strategy to cover more areas in the world, the trend is to enhance our potential for corporate expansion by building more production units/ agencies in different market centers.

Afghanistan - Eritrea - Ethiopia - Germany - Ghana - Iraq - Jordon - Kenya - KSA - Lebanon Nigeria - Qatar - Rwanda - Sudan - Syria - UAE - UK - Yemen

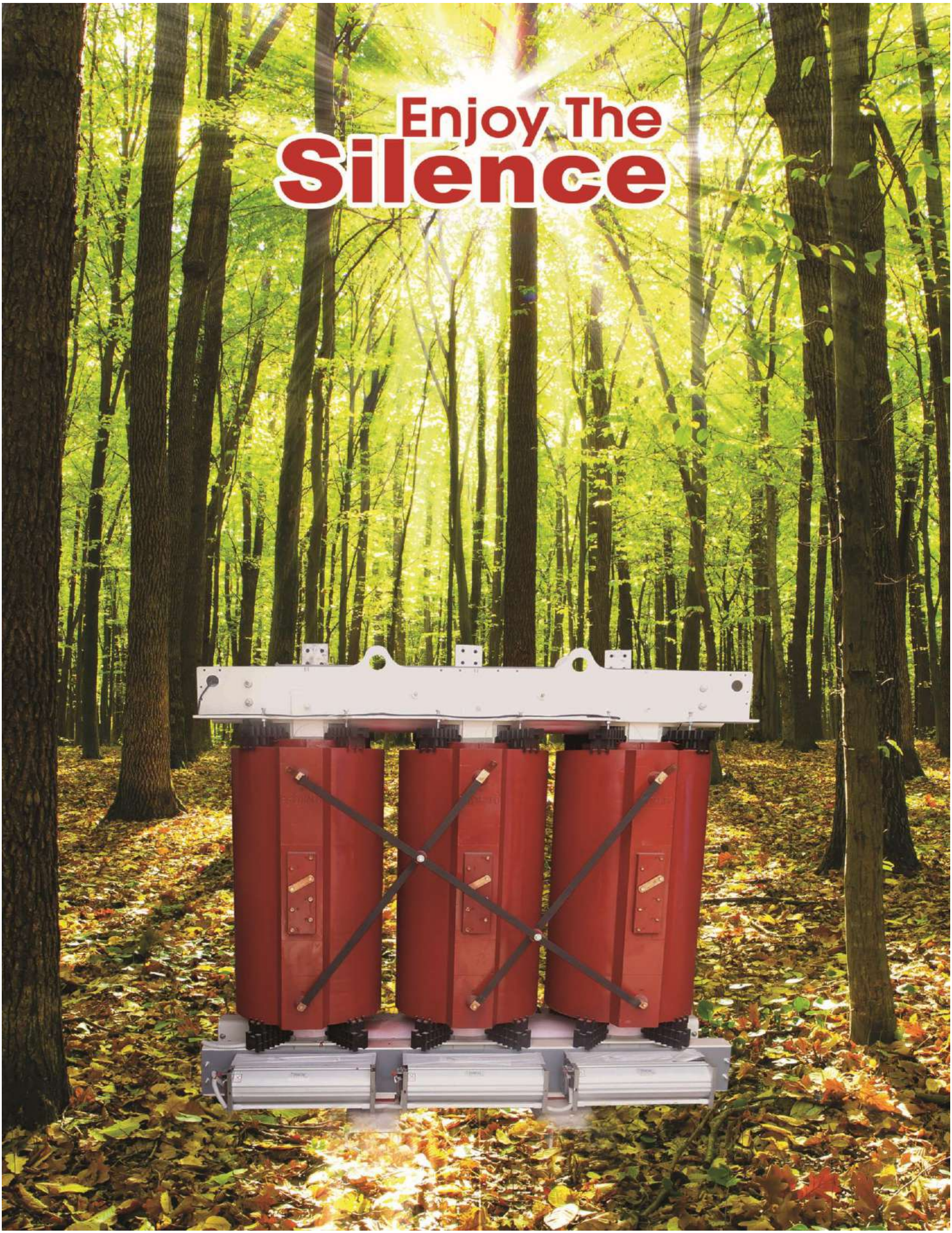
Branches and Agencies Abroad:
TRAFOTECH MANUFACTURING FACTORY – Mekelle – Ethiopia
GULF TEPCO Factory – El Maddinah El Monawara – KSA
Ambab Development Co. Ltd – Sudan (Distributer)
Dar El Hedaya – Iraq (Agent)
Syrian Co. For Trading – STCO – Syria (Agent)

7- Quality Assurance & Achieved Certificates:

The quality assurance is systematically performed at all stages starting from the materials receive, production process up to final delivery and extended to after sales service.
All processes are monitored and analyzed. Actions are taken for any discrepancy for continual improvements and deliver error free products on time.

EGYTRAFO has achieved three management system certifications as follows:-

1. ISO 9001: 2008: Quality management system (design, development, manufacturing and sales).
2. ISO 14001: 2004: Environmental management system.
3. OHSAS 18001: 2007: Occupational Health and Safety management system.


Enjoy The
Silence

EGYTRAFO

7 Ibrahim Salem St., El Merghany, Heliopolis
Cairo, Egypt.
Tel.: +202 241 74921 / +202 241 74922
Fax: +202 241 51147
Email: info@egytrafo.com
Website: www.egytrafo.com