



*DESIGNED
MANUFACTURED
TESTED*



federal transformers co. I.I.C.



About us

Federal Transformers Company LLC (FTC) is an ISO 9001:2015 Company established in January 1999 in Abu Dhabi as a manufacturing Company. Over the years the company has built a strong expertise in engineering, design, development and manufacture of high quality transformers catering to the vibrant sector of electric power distribution in UAE and across the region.

Its products are designed, manufactured & tested to comply with national and international standards including IEC-60076 / IEC-60076-11 / IEC-62271 / ANSI C57 / BS-171. The plant has a dust-free, climate controlled atmosphere, employing state-of-the-art technology.

Transformer designs are developed using fully computerized techniques and drawings are prepared using CAD software. Extensive analysis by an interactive computer program is used to obtain designs which meet the requirements of customer specifications and the relevant standards. FTC has carried out type tests on more than 45 different types of transformers at Independent Laboratories in Europe.

FTC has a proven record of supplying over 31,000 Transformers / Package Substations to various utilities in Middle East, Africa, Europe, South East Asia, Australia and South America over a span of 19 years.



Our Vision

“ To be an active player in the vibrant electric power sector of the MENA region by offering high quality electrical transformers and allied products for the power sector. ”

Utilities Approvals

ADWEA, Abu Dhabi

ADDC, Abu Dhabi

AADC, Al Ain

DEWA, Dubai

FEWA, Dubai

SEWA, Sharjah

DMW / CMW, UAE

TRANSCO, UAE

ADSSC, UAE

TAKREER, UAE

ADNOC, UAE

ADCO, UAE

GASCO, UAE

SEC, Saudi Arabia

EDD/EWA, Bahrain

QGEWC (KAHRAMAA), Qatar

QATAR PERTOLEUM, Qatar

EDCO, Jordan

KPLC, Kenya

KNPC, Kuwait

KOC, Kuwait

ECG, Ghana

Zesco, Zambia

PhilGEPS, Philippines

CIE, Cote D'Ivoire

DCRP, Oman

MEDC, Oman



Product Range

- Power and Distribution Transformers upto 36 kV (oil filled)
- Dry Type cast Resin Transformers upto 36 kV
- Prefabricated Package Substation
- Series and Shunt Reactors upto 36 kV
- Midel / Silicone / Biodegradable Oil Filled Transformers
- Special Transformers (Earthing, Booster, Scott Connected. Furnace, Multi-Tap Transformers etc.)
- Transformers for Solar & Wind power projects
- Pressed Steel Radiators
- Fabricated Transformer Tanks

Oil-Filled Transformers

Oil Filled Transformers ranging from 100 kVA / 11kV up to 10 MVA / 36 kV class, including Mineral Oil Filled, Silicon Liquid Filled, Midel Oil Filled & Biodegradable Oil Filled transformers.



Design

Federal Transformers develops the designs using fully computerized techniques. All drawings are prepared on computers using CAD software. Extensive analysis by an iterative computer programme is used to obtain optimal designs which meet the requirements of the customer specifications and the relevant standards.

Core

High permeability cold rolled grain oriented silicon steel is used for core manufacture. Step lap cut core construction is achieved by using fully CNC controlled high performance cutting lines.

The step lap core design:

- Reduces no load loss
- Reduces excitation current
- Reduces noise level

Windings

LV windings are either made of copper foil or paper insulated rectangular copper conductor on a computer controlled foil winding machine or spiral winding. HV windings of distribution transformers are layer disc windings made on a sophisticated machine. The layer design gives uniform impulse distribution and gives high strength against surges.

Thermally upgraded epoxy dotted paper is used for interlayer insulation. HV windings of power transformers are continuous disc windings.

Tanks

Corrugated fin wall tanks or pressed steel radiator type tanks are offered as per requirements. The tanks are first sand/shot blasted and a zinc rich primer coat is applied. This is followed by an undercoat and a finish coat of the required colour. All tanks are tested for leaks prior to assembly of the transformer.

Processing

The core and winding assembly is dried under vacuum in order to remove the moisture from the insulation and then impregnated with transformer oil. The transformer is then filled with oil under vacuum.

Terminations and Connections

A variety of terminations and connections are offered, including:

- H.V. Bare Bushing / Cable Box Bushing
- L.V. Bare Bushing / Cable Box Bushing
- Cover Mounted / Side Mounted Bushing / Plug-In Type Bushing / Top Mounted Bushing Fitting and Accessories
- Rating Plate
- Cooling Fin / Radiator
- Lifting Lugs
- Off Circuit Tap Switch
- Underbase
- Earthing Terminals
- Thermometer Pocket
- Drain Valve
- Oil Filling Hole with Cap
- Oil Level Gauge
- Pressure Relief Device (for sealed type)
- Conservator with Breather (for breathing type)



Optional Accessories

- Jacking Pads
- Uni / Bi-directional Rollers
- Buchholz Relay
- Oil Temperature Indicator with Contacts
- Winding Temperature Indicator with Contacts
- Current Transformers
- Marshalling Box
- On Load Tap Changer (as per requirement)
- Sudden Pressure Relay
- Pressure Vacuum Bleeder
- Hermetic Protection Devices
- DGPT/DMCRRelays



Federal Transformers Co. L.L.C. manufactures a variety of package substations. These units essentially consist of an assembly of the following on a common base:

- SF6 or Oil type Ring Main Unit as per requirement
- Hermetically sealed ONAN Transformer
- Low Voltage Distribution Board

The units are supplied without housing or with GRP housing, steel housing, concrete housing as per specifications & customer requirements.

Federal Transformers has successfully carried out Type Tests including Internal Arc Test on 1600 kVA Package Substation as per IEC 62271-202 standard at KEMA, Netherlands. Federal Transformers is the first Company in GCC to successfully complete these tests and is one of the very few companies in the world to have successfully completed Internal Arc Test on Package Substation.

Package Substations

Unit Type Substations

Product Range

Package Substations are manufactured according to customer specifications. The standard ratings are : 200 kVA, 500 kVA, 1000 kVA, 1500 kVA and 1600 kVA.

Applicable Standards

The Package Substations (Unit Substations / Pocket Substations) are manufactured as per customer specifications with the following standards as applicable.

- IEC 62271-High Voltage / Low Voltage Pre-fabricated Substations
- IEC 60298-A C metal enclosed HV switchgear
- IEC 60076-Power Transformers
- IEC 61439-Factory built switchgear assemblies for low voltage

Design and Construction Configuration

Each unit substation consists of ring main unit with hermetically sealed transformer and distribution feeder pillar.

All equipments are outdoor type, interconnected, factory assembled as an integral unit, ready for placing into position on a concrete base pad.

Ring Main Unit (RMU)

The Ring Main Unit consists of two fault making and load breaking feeder control switches and one tee-off transformer protection unit. The continuous current rating of the circuits is as per requirement.

Following options are available for the RMU: SF 6 RMU, Oil Type RMU. Transformer protection circuit with fuse switch or circuit breaker.

The protection mechanism of the switches are arranged for spring assisted hand operation. Fault current indicator with core balance transformer are supplied as per specifications.



Transformer

Hermetically sealed, ONAN Transformer as per IEC 60076, as per specified rating is used. Fittings and components as per customer requirements are provided.

Flange Connected Distribution Feeder Pillar

Metal clad distribution feeder pillar with NH fuses or any other required fuse type is provided. The feeder pillar is attached to the transformer by a suitably designed busbar trunking with duct / flange.

Package Unit Housing

The package unit can be supplied with or without housing. Metallic Housing / Hot pressed GRP Housing / Concrete Housing as per requirement is provided with desired degree of protection.





Federal Transformers Co. L.L.C. (FTC) manufactures Dry type Cast Resin Transformers.

Fully Type Tested At KEMA Netherlands

The Dry Type Cast Resin Transformers are fully Type Tested at KEMA Netherlands, CESI / Italy including for the following tests.

- Routine tests
- Short circuit test
- Impulse test
- Temperature rise test
- Noise level measurement
- Partial discharge test

Federal Transformers has supplied 1000 kVA 33 kV 4 winding Cast Resin Dry Type Transformer with special high efficiency design for inverter application for the 13 MW Photovoltaic Power Plant (Solar Project) of DEWA.

Federal Transformers has successfully carried out Climatic (C2), Environmental (E2) and Fire Behaviour (F1) class test on Cast Resin Dry Type Transformer at KEMA, Netherlands.

Federal Transformers is the first Company in GCC to successfully complete these tests.

Dry Type Cast Resin Transformers up to 36kV Class

Product Range

- 100 kVA to 4,000 kVA
- 36 kV system Highest Voltage
- Temperature Class F / H
- Indoor or Outdoor application
- Degree of protection as specified

Specification of Dry Type Cast Resin Transformers

Dry type Cast Resin Transformers are ideal for installation close to the electrical load, under adverse environmental conditions. These transformers require very little maintenance. Since both HV and LV windings are cast under vacuum, moisture cannot penetrate and therefore, no drying process is required even in humid conditions after long periods of service.

Indoor or Outdoor type Housing as per the IP class requirement can be supplied. The Cast Resin Transformers comply with IEC-60076-11 and can be supplied to meet other National or International Standards and customer specifications.

Due to the possibility of installation close to the load centre, with no fire risk from flammable oil leaks inherent in oil cooling type, significant benefit will result in the use of Cast Resin Transforms. This will ensure that overall cost of the installed power supply system is considerably reduced.

Foil Winding

The coils are wound with either Aluminum or Copper foil. The advantage of this construction is that short circuit axial forces are eliminated due to the almost identical electrical lengths of LV and HV coils. An advantage of foil winding is that the interlayer voltage never exceeds the voltage to each turn. The LV foil conductor edges are conditioned prior to winding.

After winding an initial oven cure thermosets the resin. A vacuum impregnation and final oven hardening fully protects the coil from infiltration of moisture. The HV conductor foil is edge conditioned and wound in continuous discs onto a precision former.

This system of winding guarantees the accuracy required for close tolerance mould casting. The winding is reinforced with fibre glass mesh and vacuum cast in a high temperature epoxy resin. Different epoxy formulations are used for aluminum and copper winding material to allow for the varying coefficients of thermal expansion of these materials.

Enclosures

Enclosures are generally manufactured from electro zinc coated mild steel plate. The standard finish is a polyester base to meet special requirements and to conform the specified protection categories.

The core is manufactured from low loss, gain oriented silicon steel laminations individually coated with high temperature inorganic insulation. The core laminations are cut in an automatic CNC controlled step lap cutting machine.

The step lap joints reduces

- No load loss
- Excitation current
- Noise level

Fire Protection

The Cast Resin Transformers are fire resistant and self extinguishing and will not emit any toxic gases even when exposed to direct arcing.

Environmentally Safe

Cast Resin Transformers contain no liquid to pollute ground water or water supplies and no special measures are required to guard against spillage. The transformers meet the requirements of C2, E2 & F1.



The testing lab is fully equipped with state-of-the-art equipment to carry out routine and type tests.

Routine Tests

- 1) Measurement of Insulation Resistance
- 2) Measurement of Voltage Ratio & Vector Group Check
- 3) Measurement of Winding Resistance
- 4) Measurement of No Load Loss and Current
- 5) Measurement of Load Loss & Percentage Impedance
- 6) Induced Overvoltage Withstand Test
- 7) Separate Source Voltage Withstand Test
- 8) Breakdown Voltage test for Transformers Oil as per IEC- 60296

Type / Special Tests as per IEC-60076

- 1) Temperature Rise Test
- 2) Full Wave / Chopped Wave Impulse Test
- 3) Noise Level Measurement Test
- 4) Measurement of Capacitance & Dissipation Factor (Tan Delta)
- 5) Partial Discharge Test
- 6) Measurement of Harmonics of the No Load Current
- 7) Measurement of Zero Sequence Impedance
- 8) Pressure Test on Tank
- 9) Tests on Painting
- 10) Sweep Frequency Response Analysis Test

Type Test Reports

Fully type tested at KEMA, Netherlands / CESI Italy for Short Circuit, Impulse Test on the following transformers

- 1 100 kVA, 11/0.433 kV ONAN Transformer, as per FEWA specifications.
- 2 200 kVA, 11/0.433 kV ONAN Transformer, as per ADWEA specifications.
- 3 250 kVA, 11/0.433 kV ONAN Transformer, as per FEWA specifications.
- 4 500 kVA, 11/0.433 kV ONAN Transformer, as per ADWEA specifications.
- 5 1000 kVA, 11/0.433 kV ONAN Transformer, as per ADWEA specifications.
- 6 1500 kVA, 11/0.433 kV ONAN Transformer, as per ADWEA specifications.
- 7 1000 kVA, 33/0.433 kV ONAN Transformer, as per ADWEA specifications.
- 8 1500 kVA, 11/0.415 kV AN Dry type Cast Resin Transformer, as per ADWEA specs.
- 9 1000 kVA, 11/0.415 kV AN Dry type Cast Resin Transformer, as per ADWEA specs.
- 10 500 kVA, 11/0.415 kV AN Dry type Cast Resin Transformer, as per ADWEA specs.
- 11 1000 kVA, 11/0.433 kV Package Substation, as per ADWEA specifications.
- 12 1500 kVA, 11-6.6/0.4 kV ONAN Transformer, as per DEWA specifications.
- 13 1000 kVA, 11-6.6/0.4 kV ONAN Transformer, as per DEWA specifications.
- 14 1000 kVA, 11/0.415 kV ONAN Transformer, as per ED-Bahrain specifications.
- 15 1500 kVA, 11/0.415 kV LNAN Transformer, as per ED-Bahrain specifications.
- 16 2000 kVA, 11/0.433 kV ONAN Transformer, as per FEWA specifications.
- 17 500 kVA, 11/0.433 kV ONAN Transformer, as per ADWEA specifications.
- 18 1000 kVA, 11/0.433 kV ONAN Transformer, as per ADWEA specifications.
- 19 1500 kVA, 11/0.433 kV ONAN Transformer, as per ADWEA specifications.
- 20 1600 kVA, 11/0.433 kV ONAN Transformer, as per KAHRAMAA specifications.
- 21 1500 kVA, 22/0.415 kV ONAN Transformer, as per ADWEA specifications.
- 22 1500 kVA, 11/0.415 kV ONAN Transformer, as per ED-Bahrain specifications.
- 23 1500 kVA, 11/0.415 kV LNAN Transformer, as per ED-Bahrain specifications.
- 24 1600 kVA, 11/0.433 kV ONAN Transformer, as per KAHRAMAA specifications.
- 25 1000 kVA, 11/0.433 kV ONAN Transformer, as per KAHRAMAA specifications.
- 26 500 kVA, 11/0.433 kV ONAN Transformer, as per KAHRAMAA specifications.
- 27 1600 kVA, 11/0.433 kV ONAN Transformer, as per KAHRAMAA specifications.
- 28 1600 kVA, 11/0.433 kV AN Dry type Cast Resin Transformer (C2, E2 & F1).
- 29 1600 kVA, 11/0.433 kV Package Substation as per KAHRAMAA specifications.
- 30 1600 kVA, 11/0.433 kV AN Dry type Cast Resin Transformer.
- 31 1500 kVA, 22/0.415 kV AN Dry type Cast Resin Transformer.
- 32 1000 kVA, 33/0.270-0.270 kV AN Three Winding Dry type Cast Resin Transformer
- 33 1500 kVA, 11/0.400 kV AN Dry type Cast Resin Transformer.
- 34 1500 kVA, 11/0.415 kV AN Dry type Cast Resin Transformer, as per ADWEA specs (KEMA)
- 35 1000 kVA, 11/0.433 kV ONAN Transformer, as per KAHRAMAA specifications (in year 2015 - Radiator Type)
- 36 500 kVA, 11/0.433 kV ONAN Transformer, as per KAHRAMAA specifications (in year 2015 - Radiator Type)
- 37 1000 kVA, 11/0.433 kV ONAN Transformer, as per KAHRAMAA specifications (in year 2015 - Corrugated Type)
- 38 1600 kVA, 11/0.433 kV ONAN Transformer, as per KAHRAMAA specifications (in year 2015 - Radiator Type)
- 39 1000 kVA, 11/0.400 kV ONAN Transformer, as per DEWA specifications.
- 40 1000 kVA, 11/0.433 kV ONAN Transformer, as per OES Oman specifications
- 41 1500 kVA, 11/0.415 kV ONAN Transformer, as per ED-Bahrain specifications (in year 2016)
- 42 1000 kVA, 11/0.433 kV ONAN Transformer, as per OES Oman specifications.
- 43 100 kVA, 11/0.400 kV ONAN Transformer, as per DEWA specifications.
- 44 1500 kVA, 11/0.400 kV ONAN Transformer, as per DEWA specifications.
- 45 2000 kVA, 11/0.433 kV AN Dry type Cast Resin Transformer.

QUALITY

Federal Transformers Co. LLC has approved Quality and EHS Management Systems conforming to ISO 9001, ISO 14001, OHSAS 18001 and ZonesCorp EHSMS.





Federal Transformers Co. L.L.C

Mussafah, P.O Box 9769

Abu Dhabi, U.A.E.

Tel : +971 2 551 1366 / 2 551 2788

Fax : +971 2 551 1250

E-mail : ftc@ftcuae.ae /

ftc2000@emirates.net.ae

www.federaltransformers.com