

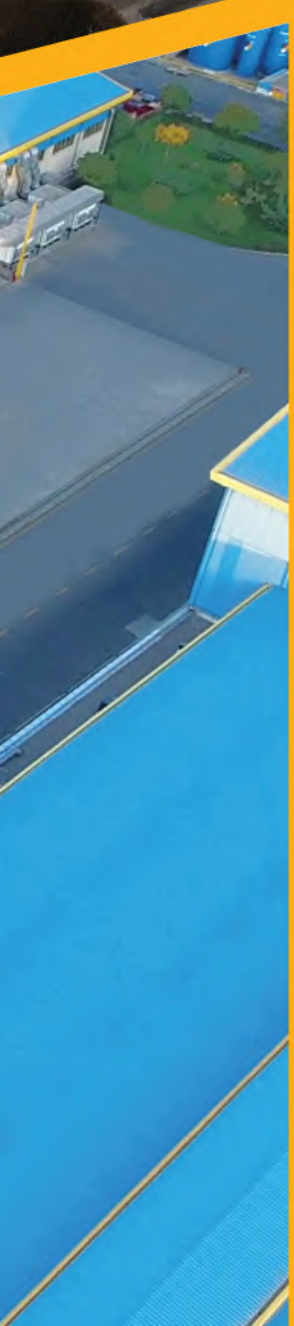


ترانسفورماتورسازی کوشکن

Kooshkan Transformers







Introduction:

Kooshkan Transformers Company was founded in 2002 with the aim of producing all types of high-efficiency oil-immersed distribution transformers and reached mass production in 2004.

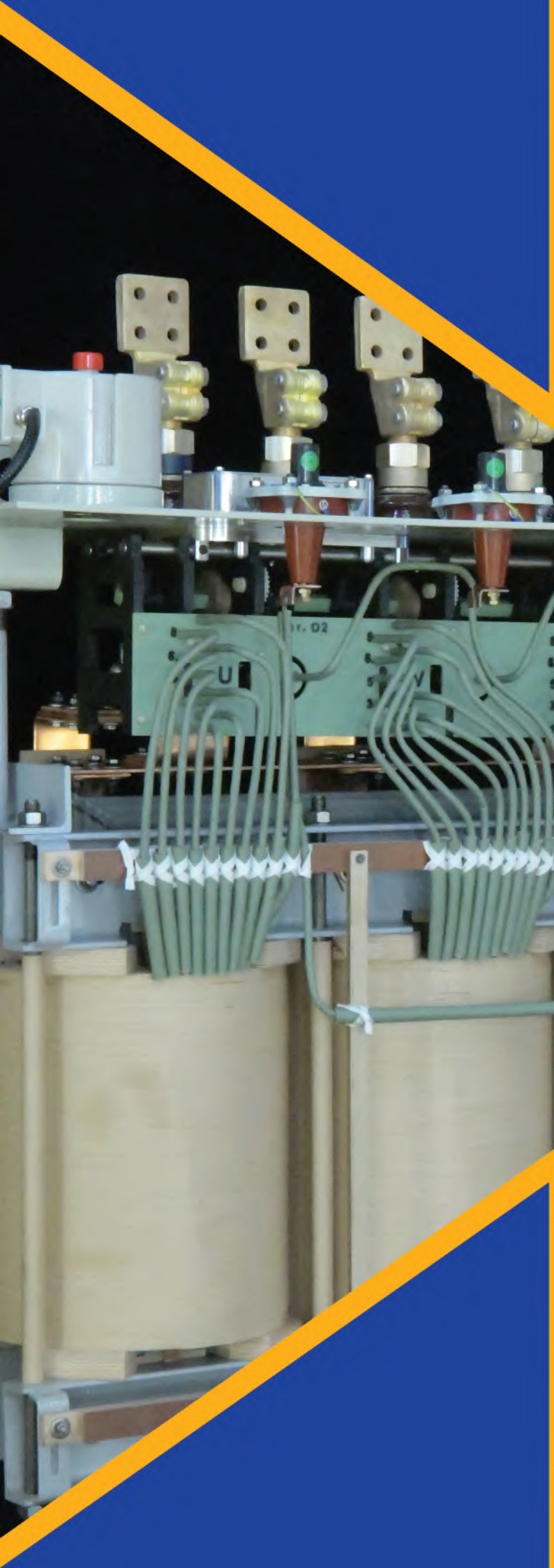
Technical knowledge along with the latest technology and equipment from Western Europe are factors that guarantee the quality of this company's products.

Kooshkan is able to design and produce all types of oil-immersed distribution transformers required by the electrical industry in accordance with the technical specifications requested by the customers and national and international standards with reliable operation and long life.

Experienced experts and high-quality raw materials are other factors that increase the trust of the customers towards our products.

The main products of this company are oil-immersed distribution transformers from 25kV to 5000kV and the voltage levels up to 36 kV in two types of conservator and hermetic, as well as single and three phases low loss transformers used in the distribution grids.

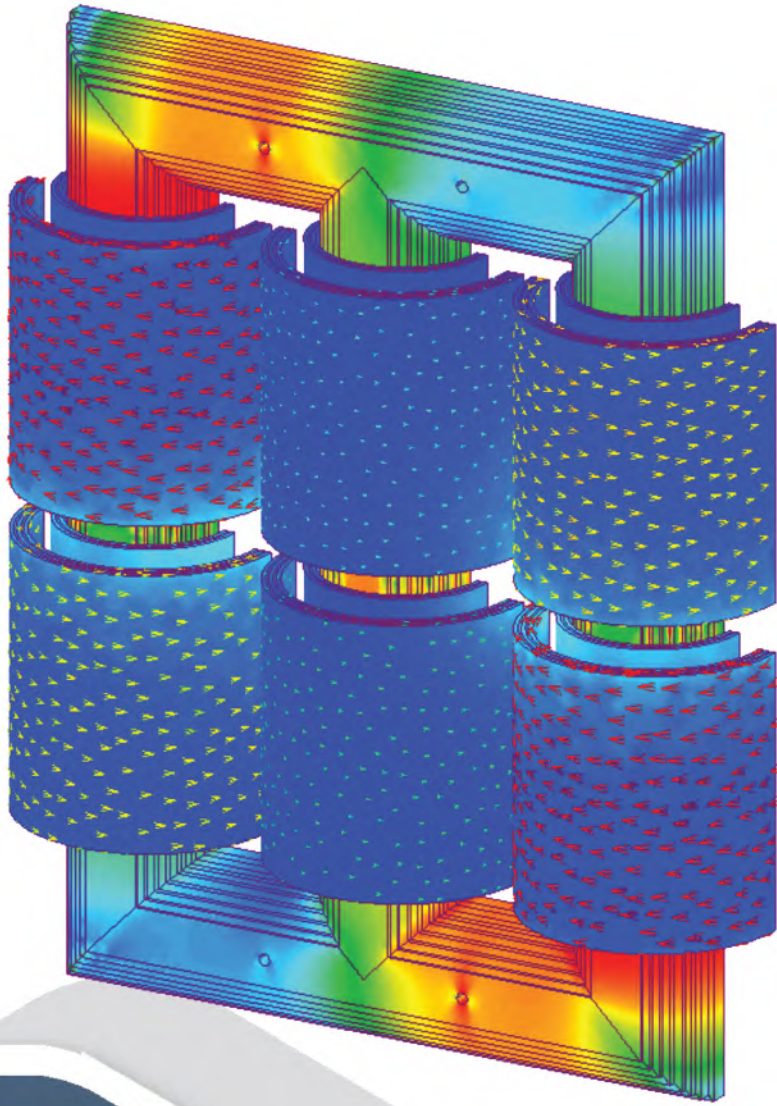
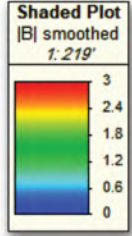
This company guarantees the quality of its products by establishing ISO9001-2015, ISO14001-2015 and ISO 45001-2018 integrated management systems.



Products:

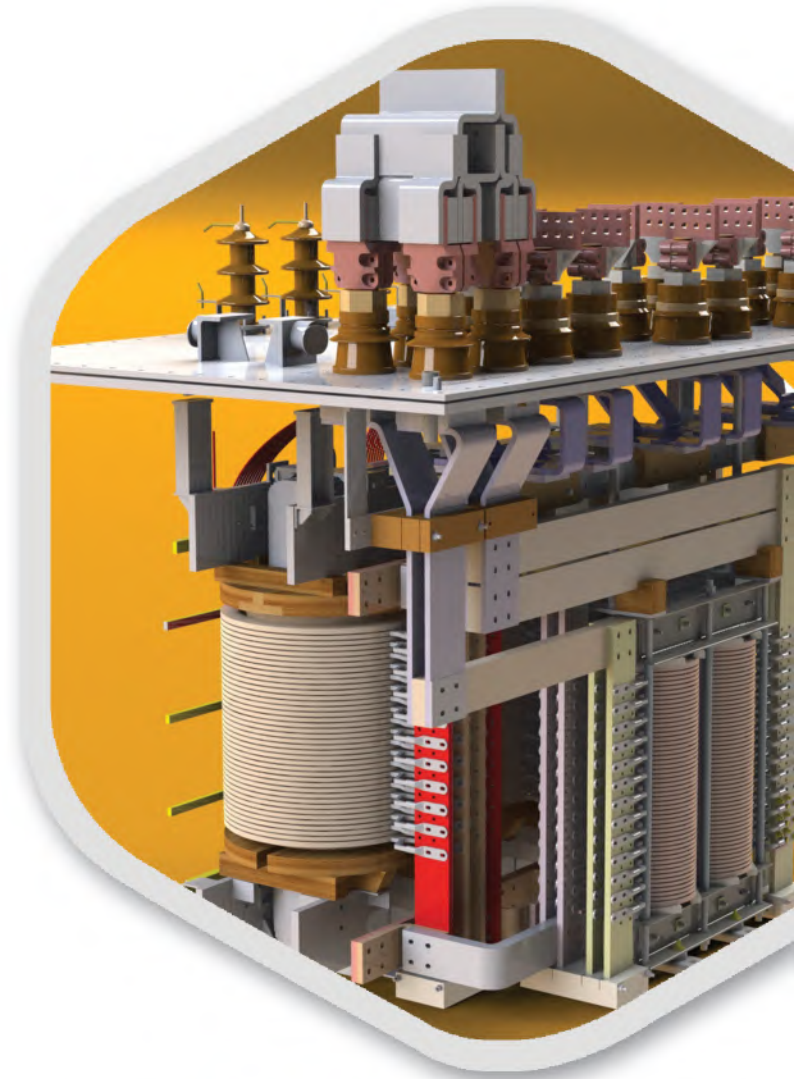
- All types of three phases low loss oil-immersed distribution transformers with voltage levels up to 36 kV and 5000 kVA
- All types of single-phase oil-immersed distribution transformers
- All types of high efficiency oil-immersed distribution transformers (CC for 20kV and AA for 33kV transformers)
- All types of special transformers for oil, gas and petroleum industries and regional electricity, such as grounding, compact, dual voltage, rectifier transformers
- Oil-immersed hermetic and gas cushion transformers
- Distribution transformers up to 5000kVA with on-load tap changer (OLTC)





Design:








- Transformer design based on customer information and technical specifications and national and international standards including ISIRI, BS, DIN, IEC, and IEEE
- Design with the approach of reducing load and no-load losses, reducing the noise level, increasing the efficiency and lifetime of the transformer
- Core design using the Step-lap method
- Design of LV windings in the form of foil and flat wire
- Accurate magnetic, electrical and thermal analysis using specialized software based on the finite element method (FEM)
- Optimization of transformer design using artificial intelligence (AI) methods

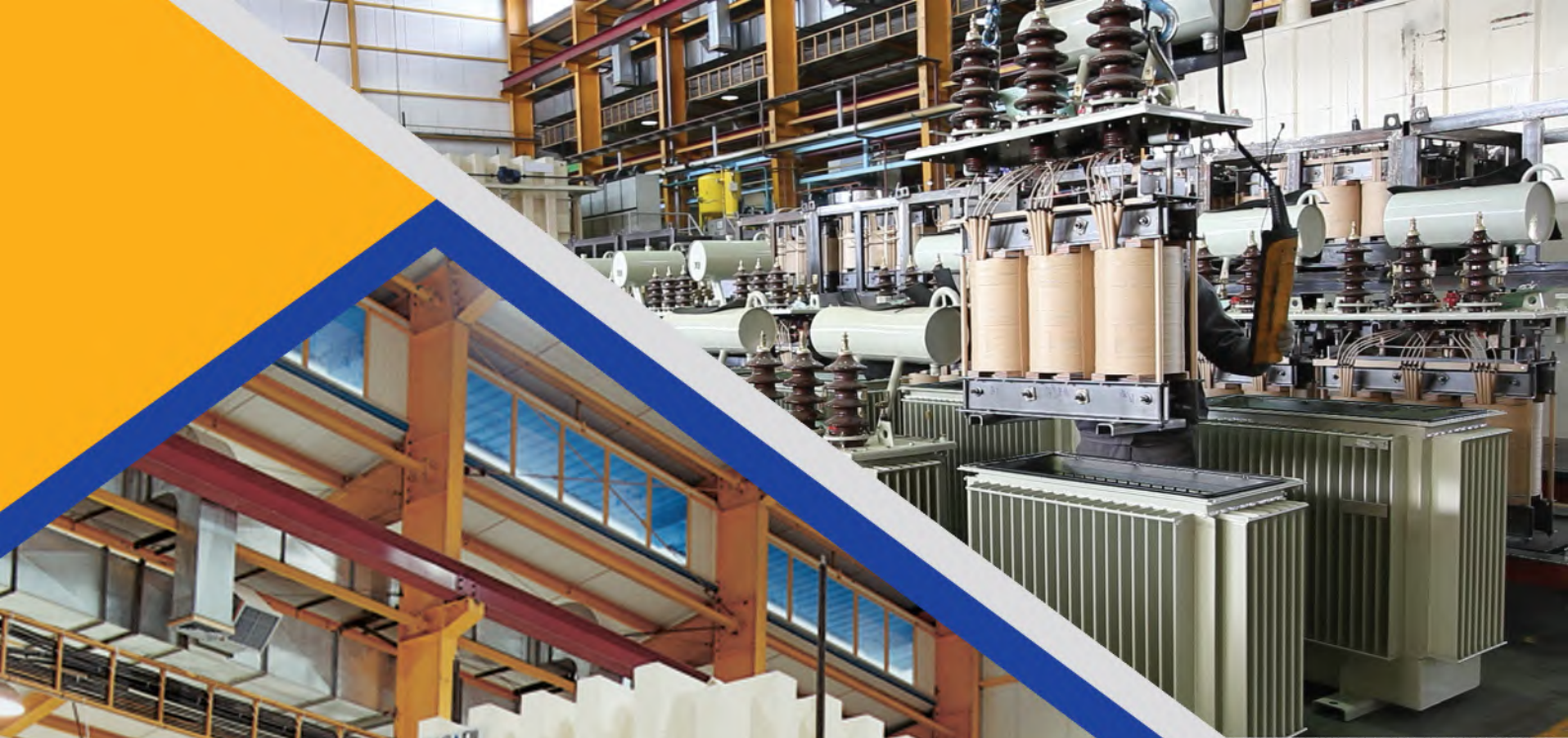






Tank:

-  Tank construction as a corrugated wall type by using the advanced Fault machine with fully automatic welding capability
-  Tank construction as a radiator type and gas cushions
-  Tank assembly in accordance with the latest production methods of transformers in terms of connection design and welding methods
-  Tank leakage test
-  Shot blasting process to remove rust and prepare the surface for painting and eliminate residual stresses caused by the welding process
-  Painting by electrostatic powder method in order to:
 - Durability and longer life compared to liquid coating due to high adhesion
 - High resistance to strike, the corrosiveness of acid and chemical substances and rust
-  Painting with the epoxy-polyurethane method





Assembly:

- Use of low loss and high-quality, cold-rolled grain-oriented silicon steel laminations with 0.27 or 0.23 mm thickness
- Step-lap core stacking using an advanced and fully automatic machine with a cutting angle of 45° in order to reduce the no-load current, losses and sound level
- Production of LV windings with foil conductor with fully automatic devices in order to increase the strength of the windings, reduce axial short circuit forces, uniform current distribution and reduce eddy currents and losses
- Using the LFH (Low-Frequency Heating) drying method in order to:
 - Continuous control of temperature and drying process
 - The low temperature of the drying chamber and as a result increase the transformer insulation lifetime
 - Simultaneous execution of drying and oil injection process
 - Minimum energy consumption during the drying process





Test:

- Conducting all routine, type and special tests in accordance with IEC60076 and other standards required by the customer
- Conducting the tests as fully automatically with high accuracy and without the need to change the transformer leads
- Providing the test results report automatically
- Periodic calibration of the laboratory equipment

Routine tests:

- Measurement of winding resistance
- Measurement of voltage ratio and check of phase displacement
- Measurement of short-circuit impedance and load loss
- Measurement of no-load loss and current
- Dielectric routine tests including:
 - AC Applied voltage test (insulation endurance of windings to each other and to the tank and core)
 - AC Induced voltage test (insulation endurance windings layers relative to each other)
- Leak testing with pressure for liquid-immersed transformers (tightness test)
- Check of the ratio and polarity of built-in current transformers
- Check of core and frame insulation for liquid

immersed transformers with core or frame insulation

- Insulation of auxiliary wiring

Type tests:

- Temperature-rise type test
- Dielectric type tests
- Determination of the sound level
- Measurement of the power taken by the fan and liquid pump motors
- Measurement of no-load loss and current at 90 % and 110 % of rated voltage

Special tests:

- Dielectric special tests
- Winding hot-spot temperature-rise measurements
- Determination of capacitances windings-to-earth, and between windings
- Measurement of dissipation factor ($\tan\delta$) of the insulation system capacitances
- Determination of transient voltage transfer characteristics
- Measurement of zero-sequence impedance(s) on three-phase transformers (Routine test for grounding transformers)
- Short-circuit withstand test
- Measurement of d.c. insulation resistance each winding to earth and between windings



- Vacuum deflection test on liquid immersed transformers
- Pressure deflection test on liquid immersed transformers
- Measurement of frequency response
- Check of external coating
- Measurement of dissolved gasses in dielectric liquid





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