power transformers

Tadeo Czerweny®

Features

Rated Power: 25/40 MVA, Ratio: 138 (± 4 x 2,5% NLTC) & (± 16 x 0,625% OLTC) / 25 kV
Tertiary (13.8 kV): Not accesible
Frequency: 60 Hz; Weigth: 85 tn; Client: ENELDIS (Venezuela)

power transformers

The T&D companies, playing in a completely deregulated market, face day after day the challenge of giving a reliable and secure service with very high service quality standards.
The idea of an electric transmission and distribution system with reliable and efficient transformers is insdispensable for an optimal electric energy supply. Our quality assurance program emerged under this slogan, being our company the first Argentine electric transformers factory to obtain the ISO 9001 certification.
Consequently, Tadeo Czerweny trademark is found today associated with most of the expanding electrical systems that provide energy to New Entrerprises, and in general related to those pioneer projects led by State, National and/or International T& D Electric Companies.
Energy distribution and transmission enterprises, technical personnel from industries and electrical market in general, appreciate the high grade of quality and reliability of Tadeo Czerweny´s power transformers, as well as the developed solutions to face the problems presented from the beginning of each proyect.
These facts are those that make our trademark **Tadeo Czerweny a consummate name.**

Tadeo Czerweny S.A. produces power and medium power transformers in a wide range that goes from 5 to 300 MVA with voltages up to 230 kV. These transformers are built with No-load and On-load tap-changers, depending on the service requirements for which they will be destined to, according to IEC, ANSI, IRAM, ABNT standards or any particular standards defined by the users.

Tadeo Czerweny also offers solutions for special and particular requirements like, low noise level, low losses level, low and medium voltage terminal boxes, flanges on high voltage side for SF6 ducts connection, special architectures, as well as transportation, installation, commissioning and start-up supervision services.

Rated Power30 / 30 / 20 MVA Rated Voltage 132 $^{+6 \times 1,67\%}_{-12 \times 1,67\%}$ / 34,5 ± 2 x 2,5% / 13,86 kV.
Earthing Transformer, 7640 kVA x 8 seg. / 5min., 13860 V.

Rated Power 25/25/8,33 MVA Rated Voltage 132 ± 10 x 1,5% / 34,5 /13,86 kV.

Rated Power 40 MVA.
Rated Voltage 132 ± 11 x 1,427 % / 34,65 kV.

Quality Assurance

Transformers are a very important part into the T&D systems. That is why their reliability and quality must be guaranteed from the early design and during their whole service life.

Having this concept in mind **Tadeo Czerweny S.A.** implemented its Quality Assurance System under the ISO 9001 standards, certified on January 1997 by the international auditory DET NORSKE VERITAS. The quality assurance process starts when our Sales Department begins a possible commercial transaction with our customers and gives professional advice about the real needs considering client requirements. This process continues at the Engineering Department by means of the most modern calculation computer methods and verification programs, continuing on the manufactury stage where the inspection starts with the arrival of materials to the plant and goes on through the whole construction, assembly and finished product process.

But is does not end with its delivery, our commitment with the customer holds on as our priority in the customer's satisfaction, only consolidated by means of the efficient guarantee and maintenance service of the transformers sold by **Tadeo Czerweny S.A.**

ISO 9001: 2000
DNV
REGISTERED FIRM

HAEFELY impulse generator for transformers up to 550 kV.

Fully equipped HV Laboratory, to test up to 550 kV transformers

Development Area
3D computer assisted parametric design

Measure equipment
Insulating oils humidity content in (in p.p.m.)

Measure equipment
Iron-silicon steel specific losses

Tadeo Czerweny®

Cores

Cores are made out of grain oriented iron-silicon steel, with a thickness in a range between 0,23 and 0,35 mm, in standard commercial qualities (type M3, M4 or M5), or HiBi type (laser treated grain oriented iron-silicon steel), this last one used when the customer requirements, through losses capitalization, demand a design with reduced no-load losses values.

The steel used, in all cases, has electric insulation on both faces through a thin inorganic material film (known as "Carlite"), which allows high mechanical resistance to mineral oils and high temperatures. The quality of all batches is guaranteed by material certificates of origin (tests made at the producing power plant) and by the rigorous tests done in the reception process and during the whole production process by our Quality Assurance Department. The core production process begins with the grain oriented iron-silicon steel slitting and its cut to meet the lengths and shapes designed by our Engineering Department. This process is executed with computer controlled automatic high production machines, which guarantees minimum tolerance cuts and allows the STEP LAP type cores design. This fact permits to obtain an important reduction in no-load losses values and specially a 50% reduction of the excitation current against the traditional 45° joints type core. The assembly of the core is finally done in horizontal position, on special designed working benches to perfect assembly between legs and yokes, and once the stack ends allows to taking the assembled core help the in an agile and secure way to a vertical position.

Finally, strict dimensional controls are done during the whole process.

Transformer Core Rated Power 20 MVA
Rated Voltage: 66 ±10 x 1,5% / 13,86 kV.

Transformer Core Rated Power 20 MVA
Rated Voltage: 132 $^{+6 \times 1,67\%}_{-12 \times 1,67\%}$ / 34,5 ± 2 x 2,5% / 13,86 kV.

Transformer Core Rated Power 44 MVA
Rated Voltage: 132 ± 11 x 1,427 % / 34,65 kV.

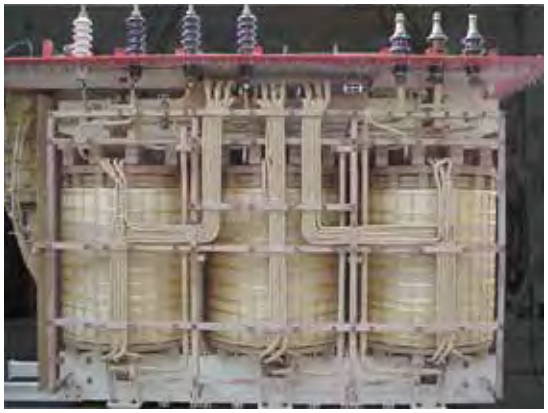
Automatic core cut line STEP LAP Type

Insulation

The insulating system is designed to get dielectric efforts uniformly distributed through it. To achieve this characteristic and depending on winding voltages, potential rings are located at both ends of each winding (end insulation) in order to get uniform electric fields in High Voltage windings.
Insulation between windings of different voltages (obtained through transformerboard barriers installed between windings) is built in such a way that the solid insulation can support by itself the maximum dielectric efforts that appear during laboratory tests. To facilitate heat evacuation, specific oil channels are also included in solid insulation.
In all cases electric fields in channels, barriers and end insulations are verified to be within working limits.
The whole active part is dried out with temperature and high vacuum. The final oil dielectric properties are controlled, in all cases, before allowing its entrance to the transformer tank.
So, considering drying treatments, temperature controlled and high vacuum impregnation process, the insulation system properties reach their maximum performance as they were foreseen at design stage.

Transformer Active Part

OLTC´s sight. Rated Power: 60/40/20 MVA
Rated Voltage: 132±11xx1.4273%OLTC/13.86(20.5-35.5)±10x1%OLTC kV



Transformer Active Part - Secondary/ Tertiary Sight

Rated Power 30/30/30MVA
Rated Voltage: 132±10x1.25% OLTC / 34.5±2x2.5%/13.86kV

U Phase Leg Rated Power 40 MVA

Rated Voltage: 132 ± 11 x 1,427% / 34,65 kV.

Auto Transformer Active Part Rated Power 30/30/20 MVA

Rated Voltage: 33 (+2x2,5%; -4x2,5%) 13.8 - 13.2kV

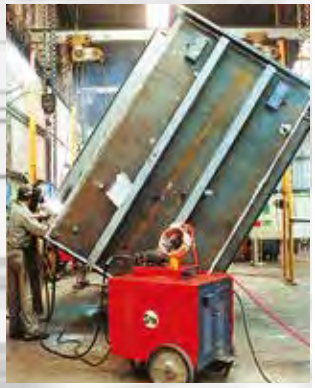
Tadeo Czerweny®

Tanks

All tanks are integrally manufactured in the metal-shop at **Tadeo Czerweny S.A.**'s modern industrial plant, who has centred its development in the last years on light structures. These structures are conveniently strengthen and they assure minimum vibrations and low noises. On the other hand they resist rigorous overpressure tests required by the Standards and/or our customers, as well as absolute vacuum, that permits oil treatments or drying treatments at the operation site.
The boilermaking of the tanks is verified in its airtightness by the most modern detection methods, based on penetrative inks systems, before getting painted. Then the tanks are cleaned and shotblasted by means of granulated metal rubbing processes, which assures the maximum adherence of the superficial protection scheme designed for the environment conditions indicated by our customers.

Transformer Tank Rated Power 30 MVA.

Rated Voltage: 132 $^{+6 \times 1,5\ \%}_{-12 \times 1,5\ \%}$ / 13,86 kV.



Windings

Depending on the voltage and power of the transformer, windings can be cylindrical, spiral or helix type, in continuous or interleaved disc. All windings are designed in a manner that the distribution of voltages in the presence of atmospheric type impulse solicitations is alike to a lineal distribution. In all cases it is verified that the maximum electrical stresses produced in windings in presence of these impulses are resisted with the adequate security coefficients.

In the same way, windings and their clamping system, are projected in order that short-circuit electro-dynamic efforts are minimum and uniformly distributed.

Every winding is manufactured with maximum purity electrolytic copper conductors. Depending on the transformer's power and voltage, power winding conductors can be rectangular (stripes) or continuously transposed conductors (C.T.C.).

Before the final assembly, all of the windings are dried rigorously and pre-stabilized with higher pressure values than the ones that appear in external short-circuits.

In this process all dimensions are verified, compensating whenever is needed, according to the results obtained by the Engineering Department against the real parameters. In this way all windings are dimensionally compensated-equilibrated and/or the clamping structures redesigned, always looking forward to minimizing short-circuit electro-dynamic efforts.

The whole winding fabrication process is accompanied by a rigorous quality control scheme, verifying by means of the self-control and the Quality Assurance Department inspections : who cares about all dimensions, cleaning conditions and non-obstruction of the refrigeration channels.

Voltage 33 kV Rated Power 30 MVA.
Rated Voltage 33 ± 10 x 1% / 13,86 kV.

Continuosly Transposed Conductor

Continuous Disc Winding / Voltage 34,5 kV

Rated Power 30/20/30 MVA.
Rated Voltage 132 $^{+4 \times 1,5\ \%}_{-10 \times 1,5\ \%}$ / 34,65 ± 2 x 2,5 % / 13,8 kV.

Continuous Interleaved Dis Winding

(Strip wrapped in NOMEX*) - Voltage: 132 kV
Rated Power 25/18.75/12.5 MVA
Rated Voltage: 132±10 x 1.25% OLTC / 34.5±2x2.5%/13.86 kV
Client: EMSA Company - ARGENTINA
* NOMEX is the Du Pont trademark for this aramid product.

Tadeo Czerweny s.a.®

Industrial Plant view

Customer Services

Transformers Commissioning, installation and start up in their operational site under our Service Department supervision, complement the whole quality assurance system already started at the manufacturing plant. This Department knows all standard procedures, it is equipped with the latest approved instrumental and posses skilful technical personnel, when required by clients it is also in charge of maintenance tasks on readily installed transformers performing delicate operations including full tasks in on-load-tap changers, all sort of accessories revision and insulating oil preservation. Regarding this last item, Tadeo Czerweny counts on modern dehydrator plants that allow treatments to recover oil quality.

Tadeo Czerweny®

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