

Cast Resin Transformers -Popular choice for high-service reliability

Hanley Energy's cast resin transformers are dry-type transformers (CEI EN 60076-11) in which the magnetic circuit and windings are not immersed in an insulating liquid but are cast with an epoxy resin mixture. These special transformers, thanks to the development of materials and manufacturing techniques, are finding an ever-increasing scope of application for their high-service reliability.

DESIGNED TO MINIMIZE LOSSES

CASTING PROCESS

The casting process minimises the deposit of pollution and corrosive particles as well as being strong and waterproof. The active parts are cast with a resin mixture of quartz flour and epoxy resin after being secured to a mould and preheated under vacuum.



WINDINGS

The cast windings are divided in many tapes having only one turn for each layer - achieving a higher impulse voltage resistance capability and a lower risk of partial discharge. The winding is usually made with aluminium tape (aluminium's coefficient of thermal expansion is very close to that of the resin) therefore mechanical stresses due to the transformer's temperature variation are reduced. Low voltage windings are manufactured by a single foil of aluminium or copper, producing a strong resistance against short-circuit stress because the dielectric stresses are very low.

INSULATION

The insulation between turns is ensured by the use of pre-impregnated Class F insulating materials (an epoxy resin pre-impregnated foil that through a heat treatment will match with the secondary conductor) making the winding solid and strong but at the same time free to move with a certain degree of flexibility. The winding's terminals are TIG welded into the winding all the way through and are in aluminium rigid alloy so as not to compromise the dynamic strength of the winding. As a result the windings are very resistant to condensation and pollution.



HIGH PERMEABILITY, LOW-LOSS GRAIN-ORIENTED STEEL SHEETS

MAGNETIC CORE

The magnetic core is manufactured with highly permeable, low-loss grain-oriented steel sheets with 45 degree step-lap joints – designed to minimize stray-flux losses. The surface of the magnetic core is also covered by a special paint that protects it against oxidation and corrosion as well as reducing noise.

COOLING

The cast resin transformers are usually cooled with natural cooling by air (AN), though certain cases require the use of fans for cooling with forced air (AF). At all times the ventilation openings must be kept clear to allow the natural dissipation of heat produced from the transformer (Joule effect). Proper cooling is ensured through circulation of natural air, flowing through the transformers surfaces with a natural flow from the bottom to the top. In the transformer room there should be openings at the bottom for the entry of cooling air and at the opposite side of the top for the exit of the thermal loaded air.



S = OPEN SURFACE (MQ)

in

P = ADDITION OF NO LOAD LOSSES AND LOAD LOSSES AT 120°C (KW)

H = HEIGHT OF THE TWO OPEN SURFACES (M)

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1 - LOW VOLTAGE TERMINAL

- 2 LIFTING LUGS
- 3 CONNECTION BOX IP55 FOR PT100
- 4 RATING PLATE

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- 5 HIGH VOLTAGE TERMINAL
- 6 TAP-CHANGER
- 7 TROLLEY FOR SHIFTING
- 8 COUPLERS
- 9 EARTHING TERMINAL

CERTIFIED QUALITY

We hold prestigious international certificates and approvals in the cast resin technology sector. All our transformers are certified: E3 - E2 - C2 - F1 in Environmental. Climatic and Fire Behaviour classes.

- CESI E3-E2-C2-F1 Certification
- GOST Russian Certification
- MEDC Oman Approval
- Sai Gon Utility Vietnam Approval
- KAHRAMAA Qatar Approval
- EWA Bahrain Approval
- ISO 14001 Certificate
- ISO 9001 Cer

INDUSTRIES SERVICED

IEC 60076-11 TESTED

Our cast resin transformers are designed and manufactured in accordance with the main international standards: CEI EN 50541-1 / IEC 60076-11 / IEC 60076-1 / IEC 60076-2 / IEC 60076-5 / IEC 60076-10 / HD538.1 S1 / HD538.2 S1 / CEI 14-12 and the new Ecodesign legislation: Directive No 548/2014

- Separate source AC withstand voltage test
- Induced AC withstand voltage test ٠
- Measurement of partial discharge test
- Measurement of no-load losses and no-load current
- Measurement of voltage ratio and check of phase displacement
- Measurement of winding resistance
- Measurement of load losses
- Measurement of short-circuit impedance
- It is also possible to perform, on request, the following tests:
- Noise level test
- Lightning impulse test
- Temperature rise test

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