

Headline

News

FPPCC PS transformer tested



CESI Laboratories, the FPPCC PS transformer tested



CESI Laboratories, the short-circuit test hall



SEA Laboratories, the test hall



SEA Laboratories, the FPPCC PS transformer tested

The ENEA procurement of eight power supply (PS) units for the poloidal field (PF) coils of JT-60SA includes the supply of two fast plasma position control coil (FPPCC) PS, provided with four 18 kV/415 V transformers, each one having a rated capacity of 3 MVA and designed as dry-type for indoor installation.

After the official approval of the transformers' First Design Report (FDR) by ENEA, F4E and JAEA in April 2014 and of the FPPCC converters' FDR in July 2014, the first FPPCC PS transformer unit has been manufactured and tested.

In order to prove the good margin of the design and to ensure the quality and the reliability of the transformers, the manufacturer POSEICO-Jema proposed to perform both a short-circuit type test and a thermal type test on one transformer, although this was not required in the technical specification.

Prior to the short-circuit tests, the transformer was successfully subjected to the acceptance routine tests as specified in IEC 60076-1.

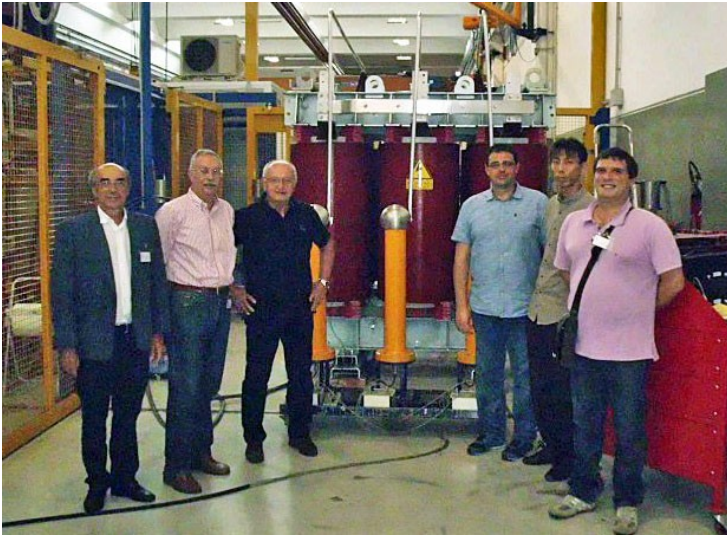
The short-circuit type test was carried out on 7 July 2014 at CESI Laboratories of Milan (Italy), in accordance to IEC 60076-5. In attendance were P. Zito, A. Cucchiario and A. Lampasi (ENEA), L. Novello (F4E), K. Yamauchi (JAEA), D. Cinarelli and K. Celaya (POSEICO-Jema), C. Ceretta (SEA). The terminals at the secondary of the transformers have been connected in short-circuit, and a suitable value of current (with a peak value of about 160 kA in the transformer secondary) was injected in the transformer and the currents and voltages waveform were measured. Nine short-circuit shots were carried out, three for each phase of the transformer and, after each shot, the short-circuit reactance was measured. All short-circuit type tests were passed.

Afterwards, the PS transformer was transferred to the SEA Laboratories for final acceptance tests, held on 10-11 July 2014.

The following tests were made in accordance with IEC 60076-1/11:

- ✓ 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 tests;
- ✓ partial discharge test;
- ✓ temperature-rise test;
- ✓ determination of sound level (IEC 60076-10);
- ✓ hot-spot temperature-rise measurements.

In particular, the thermal type test was performed monitoring the temperature measurement in the secondary windings of the transformer through a temperature probe in each secondary winding, placed at the upper hottest point. In addition, the temperature distribution in the outer resin insulation was monitored with a thermo-graphic camera.



SEA Laboratories, before of the partial discharge test

P. Zito, A. Lampasi and V. Cocilovo (ENEA), K. Yamauchi (JAEA), D. Cinarelli and M. Portesine (POSEICO-Jema) attended the test. All tests gave positive results, including the hot-spot temperature-rise measurements by thermal probes and thermo-graphic camera. No critical hot spots were found.

Contact Us

The JT-60SA Newsletter is released monthly by the JT-60SA Project Team. Suggestions and comments are welcome and can be sent to newsletter@jt60sa.org.

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