

# Behavioral classes

## Environmental, climatic and fire classification

HTT resin-encapsulated transformers fulfill the guidelines listed in normative annexes ZA, ZB and ZC for Environmental Classification E2, Climatic Classification C2 and Fire Classification F1. The required tests were performed on 400 kVA three-phase dry resin-encapsulated transformers.

## Moisture-penetration test in accordance with Environmental Classification E2

The transformer is completely immersed in a pool of water (conductivity of the water 0.67 S/m). An induced AC voltage test is performed immediately afterwards.

## Temperature-shock test in accordance with Climatic Classification C2

The transformer is cooled down to a temperature of -25°C in a climatic chamber. Temperature shock is applied by means of application of twice rated current. The heating-up phase up to achievement of average limit temperatures (in accordance with Insulation Class F) is 51 minutes. Then the transformer cools down to ambient temperature. After that it is tested with induced and applied AC voltage.

## Fire performance in accordance with Fire Classification F1

One high-voltage coil, one low-voltage coil and one substitute core with a comparable Behaviour to an original element are placed in a fire chamber in each case for verification of Fire Classification F1. The coils are exposed to burning ethyl alcohol (calorific value 27 MJ/kg), which is ignited underneath the coils, for a period of twenty minutes. A second heat source, in the form of a flat vertical radiant heat emitter (output 24 kW) is additionally used to heat the Coils.

The test criteria are as follows:

- Maximum temperature above ambient in the measuring section of the stack must not exceed 420 Kelvin above ambient.
- The temperature in the measuring section five minutes after switching off the second heat source (45 minutes after the start of the test) must not exceed 140 Kelvin above ambient temperature and must exhibit a falling trend.
- The temperature in the measuring section 60 minutes after start of the test must not exceed 80 Kelvin above ambient temperature. This condition demonstrates that self-extinguishing of the fire can be assumed.
- The arithmetical mean of the optical transmission factor of light in the measuring section referred to an optical measuring path length of one meter through the smoke for a period of 20 to 60 minutes from the start of the test must not be lower than 20%.

We will be pleased to supply complete test reports on request.