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SUITABLE FOR EXTREMELY HARD ENVIRONMENTS

E4 | C3 | F1
Certified

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December 2021

Tesar Italy successfully achieved the Test Certificate for the Environmental, Climatic and Fire behaviour classes E4-C3-F1 as per IEC 60076-11:2018 on a cast resin transformer with rated power 1000kVA and rated voltages 20/0,4kV BIL 125kV in respect of the last ECO DESIGN Tier2 losses as per EU 548/2014 and EU 1783/2019.

Here is the list of tests carried out on the same transformer in succession:

- Thermal shock test **C3**
- Condensation and Humidity penetration test **E4**
- Fire behaviour test and checking of gases emission **F1**

The tests were attended and certified by independent third-party laboratory CESI* in Milan.

What does each class certification grant the product and why was it chosen?

- **C3** means that the transformer is suitable for transport and storage at temperatures down to -40°C, making it so there are very few places on earth where it cannot be placed, and energized and operated at -25°C, a temperature that avoids installation problems and not reachable in indoor installation or inside of an enclosure for outdoor use (IEC 60076-11 Ed.2 2018-08 paragraph 12.1).
- **E4** means that the transformer is suitable installed in places in direct access to harsh environment: area close to industry where conductive dusts and industrial smokes are abundant, area close to the coast and exposed to salt spray or to very strong and polluting winds from the sea, desert areas, characterized by no rain for long periods, exposed to strong winds carrying sand and salt, and subjected to regular condensation (IEC 60076-11 Ed.2 2018-08 paragraph 12.2).
- **F1** is required to install transformers in places subject to a fire hazard such as buildings or places where many people gather (i.e., hospital, public buildings, industrial, etc.), making restricted flammability and emission of toxic substances and opaque smokes a warranty (IEC 60076-11 Ed.2 2018-08 paragraph 12.3).

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Tesar Italy had to overcome various challenges to achieve the certification, among them the research of the best combination of insulation materials capable of sustaining harsh environmental conditions that would not impact too much the overall selling price of the transformer.

Key features and benefits:

Meeting the requirements for the certification means that Tesar's transformers are suitable to work in environments close to the sea, desert areas or heavy pollution area and ones with extreme cold temperatures.

Thanks to this latest innovation, Tesar Italy took a step forward toward preserving our environment and meeting the also more strictly requests of the customers due to the increase of special installation.

* CESI is a world-leading technical consulting and engineering company in the field of technology and innovation for the electric power sector. Through its Division KEMA Labs, CESI is the world leader for the independent Testing, Inspection and Certification activities in the electricity industry. With a legacy of more than 60 years of experience, CESI operates in 70 countries around the world and supports its global clients in meeting the energy transition challenges. CESI also provides civil and environmental engineering services.

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