

# Generator stator cooling air temperature

How to calculate stator temperature field in generator normal operating?

Based on calculated additional copper losses, turbulent movement in the ventilation ducts and boundary conditions of the model, stator temperature field in the generator normal operating is calculated via finite volume method (FVM). The obtained results are compared with the measurements to verify the accuracy of the calculation method.

What temperature should a generator be cooled to?

The peak temperature of a generator should typically be maintained below 130 °C. Depending on overall heat removal and installation requirement, air or hydrogen is used for the cooling medium. Often, air is preferred for its availability and safety to handle compared to hydrogen.

What is the stator ventilation system of a 150 MW generator?

The stator ventilation system of the 150 MW generator is designed for air intake on both sides and radial ventilation ducts with unequal tooth spacing in the axial direction, and is symmetrical along the center of the shaft, as shown in Fig. 2. The air pressurized by the fan comes out of the cooler, and then is divided into three paths.

What causes aging in a generator?

Insulation aging in large generators is one of critical fault sources for machines. About 1/3 of generator faults are caused by critical temperature under stator winding insulation faults, especially stator ground-wall insulation shelling fault.

How does a stator radial ventilation duct affect temperature distribution?

The stator radial ventilation duct is the main path for the stator winding to dissipate heat and directly affects the stator winding and core temperature distribution. The heat dissipation capability of the stator core and yoke back is also the main factor affecting the stator winding and core temperature.

How to solve high thermal load of generator windings?

Therefore, a good ventilation system with air as a cooling medium is also the main way to solve the high thermal load of the generator windings. To improve the cooling effect of the stator winding, radial ventilating ducts with different widths are adopted in the axial direction of the stator core.

In order to solve the problems of severe heating and cooling difficulty in the stator of air-cooled turbo-generator, a novel stator teeth internal ventilation structure with axial vents in the ...

This paper presents the effectiveness of generator auxiliary system such as seal oil system, stator cooling water system and gas control system with continuous hydrogen scavenging operation for ...

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Turbine generators operate with complex cooling systems due to the challenge in controlling the peak temperature of the stator bar caused by Ohm loss, which is unavoidable. Therefore, it is important to characterize and ...

The water velocity was studied when the water cooling winding was blocked in turbo-generators and the stator 3D temperature field was calculated by the thermal network method. The result showed ...

About 1/3 of generator faults are caused by critical temperature under stator winding insulation faults, especially stator ground-wall insulation shelling fault.

Compared with the traditional air cooling generator, the large capacity generator with immersion type evaporative cooling technology features the similar simple and reliable structure as the air ...

Both the temperature distribution of the axial section as well as the stator winding show that the stator end winding temperature at the air outlet side drops significantly after installing the air deflector, and the overall temperature distribution of the stator winding is improved. ... The enhancement mechanism for the stator winding cooling ...

Generators used in power generation applications can be placed in three major design classifications based on the cooling medium used: air, hydrogen or liquid cooled. How well the armature winding of a generator is cooled has a significant influence on the overall size of a synchronous generator. The cooling of the armature winding is

speed, environment and nacelle temperature, generator stator winding and cooling air temperature amongst many others; in total 47 parameters are recorded. At the same time, the SCADA system keeps a record of wind turbine operation and fault information, such as start up, shutdown, generator over temperature, pitch system fault, etc.

high temperature of generator cooling air. ... GUO Ruiqian, AN Zhihua, et al. Air cooled generator stator temperature field . ICEECT 2021. Journal of Physics: Conference Series 2030 (2021) ...

A 2 MW direct-drive (DD) high temperature superconducting (HTS) wind power generator with HTS wires in the rotor field windings and copper transposed conductor in the stator coils was explored for ...

In a hydrogen cooling system, a blend of hydrogen and air circulates through the active parts of the generator, such as the rotor and stator. The heat is dissipated into water coolers, as explained above.

Generator unit No.1 in an electric power plant cannot run at full load owing to the high temperature of generator cooling air. Analysis has proved that the problem lay in the large cooling load and low air side heat transfer coefficient, and thus, the cooling requirement cannot be meet in summer. Therefore, a generator air cooler with circular fin structure is optimized under ...

Generator Cooling System Operating Guidelines: Cooling System Maintenance and Performance Guidelines During Start-up, Operation, and Shutdown, 2001. Electric Power Research Institute, Palo Alto, CA, U.S.A., 1004004. [26] Conversion to Deaerated Stator Cooling Water in Generators Previously Cooled with Aerated Water: Interim Guidelines, 2000.

What is Radial Flow Ventilation System? A radial flow ventilation system is described as a cooling system in which the cool air passes from the ducts present in the stator core via air gaps, followed by which the cool air is passed to the back of the stator where it is released to the atmosphere.. Advantages of a Radial flow ventilation . The loss of energy whilst the cooling process is ...

Taking a 2-pole 150 MW air-cooled turbo-generator as the research object, the surface heat transfer coefficient distribution of the stator radial ventilation duct and stator ...

The use of high purity water results in relatively few chemistry and materials issues in generator water cooling. Of the few problems that arise, flow restrictions by copper oxide deposits have ...

The introduction of large air-cooled gas turbine generators, and the ever-larger hydrogenerators, has caused the re-engineering of the GCM for application in air-cooled machines [17]. The device is installed in the air-cooling system in a totally enclosed fan cooled machine, and a cloud chamber principle is used to detect the particulates.

This article deals with the stator cooling of an air-cooled, synchronous generator with a power rating of 400 kVA, which has been improved by adding two radial vents to the stator. To ensure an optimal vent design, a novel combined thermal and electromagnetic modelling approach is developed. A parametric 3D Conjugate Heat Transfer Computational Fluid ...

In this paper, taking a 150 MW air-cooled turbo-generator as an example, the temperature field of the main insulation ... [Show full abstract] was studied after the stator main insulation shelling ...

**AIR-COOLED GENERATORS** Air-cooled generators are produced in two basic configurations: open ventilated (OV) and totally enclosed water-to-air-cooled (TEWAC) . In the OV design, outside air is drawn directly from outside the unit through filters, passes through the generator and is discharged outside the generator.

Number of water-cooled generators worldwide and type of stator water chemistry. These figures are approximate [12]. Review of Alkaline Treatment for Generator Stator Cooling Water Systems

Temperature Sensitivity: Air-cooled generators may be more sensitive to ambient temperature fluctuations, requiring additional measures to ensure optimal cooling in extreme conditions. Where an Air-Cooled Generator ...

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Air Cooling system in hydropower generator stator Wonogiri does not work optimal due to deposit of oil, dirt and dust blocking the air passage to spread throughout the insulation layer of generator. The condition above causes the temperature of air is over maximum standard limit of 55&#176;C. 5.

Interpretation of Stator Cooling Water Chemistry Data PPCHEM PowerPlant Chemistry 2018, 20(3) 155  
Copper Regular copper analyses in grab samples give reference spot values for trending. More ...

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