

The dangers of excessively high air temperature in steam turbine generators

How does inlet steam temperature affect the efficiency of a turbine?

Raising the inlet steam temperature also reduces the wetness of the steam in the later stages of the turbine and improves the turbine internal efficiency. In steam cycle, the thermal efficiency increases gradually with increase in turbine inlet steam temperature which thereby increases the quality of steam at the turbine exhaust.

What happens if a steam turbine reaches a higher temperature?

At higher steam inlet temperatures, heat extraction by the turbine will also be increased. An increase of about 100 °F (55 °C) will reduce the steam consumption by about 6.6% in a condensing steam turbine and 8.8% in a back pressure turbine.

What are the dangers of a steam turbine?

The remaining dangers have more immediate effects on the plant. They are detected by systems that depressurize the hydraulic pressure of the governing system. This results in shutting the steam valves and disconnecting of the generator. The preceding list includes dangers that only affect the turbine.

What happens if steam pressure is raised without raising inlet temperature?

If steam pressure is raised without raising inlet temperature, the wetness fraction of the low-pressure (LP) turbine increases, which results in wetness loss increase at the LP turbine. When wetness fraction of the LP turbine becomes 8%-12%, the countermeasure against drain erosion to the long blade of the LP turbine is required.

What factors affect the performance of a turbine?

Turbines are designed for a particular operating conditions like steam inlet pressure, steam inlet temperature and turbine exhaust pressure/exhaust vacuum, which affects the performance of the turbines in a significant way. Variations in these parameters affects the steam consumption in the turbines and also the turbine efficiency.

How does pressure affect steam turbine performance?

The effect on efficiency for 10% increase in pressure is about 1.5% for a condensing steam turbine and 0.45% for a back pressure steam turbine. Turbine steam inlet temperature is another major parameter affecting turbine performance.

Typically, high-purity hydrogen is circulated through non-magnetic ducts that are set end to end in the turbine, removing heat from the stator and rotor windings, bearing and other rotating parts, ...

Applications: Gas Turbines, High-Temperature Environments; Properties: Excellent thermal and chemical stability. High strength at elevated temperatures. Lighter weight compared to metal alloys. Suitable for high ...

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An optimized blade design and the direct coupling of the turbine and generator ensure that the micro steam turbine is not only significantly more compact than conventional steam turbines, it ...

Therefore, when the steam expands, its temperature drops. Steam Turbine Working Principle. A steam turbine works on the basic principle of the Rankine cycle. The basic principle of a steam ...

Delving deep into the topic of steam turbines, this comprehensive piece posits a multi-faceted exploration of these vital power generators. From their basic principles and historical context to ...

A high-temperature open cycle gas turbine/low Btu coal gasification combined cycle plant can be expected to achieve the high efficiency needed to offset the energy losses ...

particular operating conditions like steam inlet temperature and turbine exhaust pressure/exhaust vacuum, steam inlet pressure, which affects the performance of the turbines in a significant way.

However, the very nature of their operation subjects steam turbines to extreme conditions, such as high temperatures, pressures, and the potential for corrosive environments. These factors can lead to wear and tear, reducing efficiency ...

The higher the ambient temperature the greater the amount of air flow through the radiator is required. When the ambient temperature rises above that calculated for NTP the maximum ...

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