Application of brush seals to steam turbine generators

- - Development of Brush Seal Technology for Steam Turbine Retrofit Applications

Description: -
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Mitigating and Managing J

Their high speed, however, made them unsuitable for other commercial applications.

Turbine

Bi-directional bristles are also available.

Turbine

This far exceeded the output of even the largest steam engines, making steam turbines the principal prime movers in central power stations after the first decade of the 20th century.

Brush seals for steam turbine applications

Bearings Plus has taken the technology beyond aerospace into the harsh and demanding environments of industrial turbomachinery. The unit cooled while stationary as the rotor could not be turned manually. The contract foresees a delivery of two SST-600 turbogenerators with a capacity of more than 310 megawatts MW.

Utility Steam Turbine Brush Seals

This increased heat generation is exacerbated, particularly during start-up, when there is no cooling steam flow.

Development of Brush Seal Technology for Steam Turbine Retrofit Applications

In addition we have introduced brush seals to centrifugal compressors, blowers and cryogenic turbo expanders. In a preferred embodiment according to the present invention, there is provided turbomachinery comprising a rotary component rotatable about an axis and a stationary component about the rotary component and the axis, the rotary component having a maximum radial excursion relative to the axis throughout the entire range of operation of the turbomachinery, including from a start condition of the turbomachinery, a brush seal about the axis carried by the

stationary component and having a plurality of bristles terminating in free ends spaced radially outwardly from the rotary component a radial distance relative to the axis in excess of the maximum radial excursion of the rotary component relative to the axis to maintain a radial clearance between the rotary component and the free ends of the bristles throughout the entire range of operation of the turbomachinery whereby the dynamic behavior of the rotary component is not affected by contact between the bristles and the rotary component.

Brush Tip Seals

Back to back experimental leakage testing of conventional single labyrinth fins, single thickness and double thickness brush seals was carried out on a purpose built test rig. In a still further preferred embodiment according to the present invention, there is provided in turbomachinery having a rotary component rotatable about an axis, a stationary component about the rotary component and the axis and a brush seal carried by the stationary component, a method of operating the turbomachinery comprising the step of operating the turbomachinery with a clearance between the bristle tips and the rotary component throughout the entire operating range of the turbomachinery to prevent dynamic behavior of the rotary component from being affected by contact between the bristles and the rotary component. Maintenance intervals were extended to three to four years, steam leakage rates reduced by nearly 70%, and bearing oil temperatures reduced by as much as 27°C 80°F.

Utility Steam Turbine Brush Seals

Also, the dynamic behavior of the rotary component is generally not affected by the contact between the rotary component and the brush seal, i.

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