GT13E2 MXL part upgrade, suitable for TBO extension to 48 kEOH

Sulzer provides design and manufacturing of new gas turbine components in both hot and cold sections. We focus on lifetime extension and performance improvement of your equipment. We have unique insight into designing a high-quality product that is compatible and interchangeable with the original equipment. All combustion and turbine parts include installation hardware suitable for installation in ALSTOM GT13E2 MXL gas turbines.

The Alstom GT13E2 MXL gas turbine is operating at a turbine inlet temperature (TIT) of 1250°C at an interval period of 36 kEOH.

It is beneficial for maintenance costs for gas turbine users if interval periods can be extended. The current OEM design is not suitable to extend the interval period beyond 36 kEOH. Therefore, Sulzer has developed an upgrade package to be able to operate the turbine for an interval period of 48 kEOH, both for base load conditions as for cyclic operation.

Burners

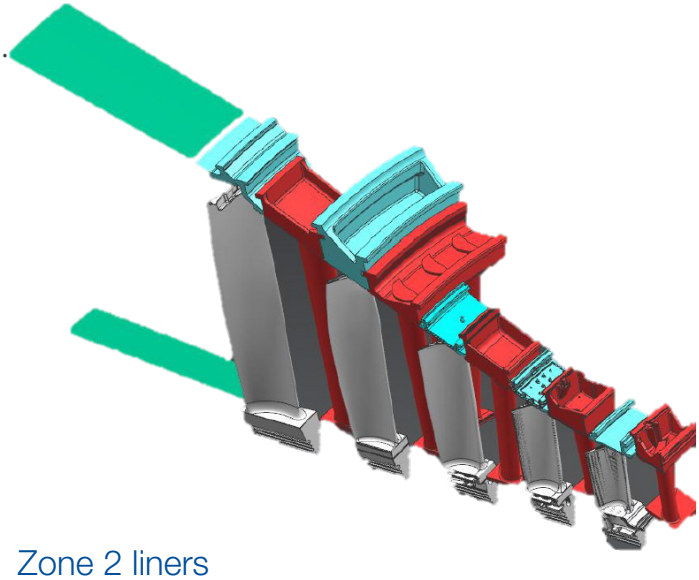
Neither for the EV burners, nor the AEV burners an upgrade is required to be able to extend the operation interval to 48 kEOH. However, the EV type burners can be modified to a Sulzer redesigned version, equivalent to the EV-α design of the OEM. This design reduces NOx levels similar to OEM version.

Front segments

For the front segments an improved sealing is required which includes the side seals and the piston ring. In addition, the assembly hooks are modified to reduce wear.

Zone 1 inner and outer heat shields

The zone 1 inner and outer heat shields do not require an upgrade for interval extension. However, Sulzer applies an advanced TBC that has improved LCF behavior in combination with a dense MCrAlY coating that gives additional anti-corrosion protection to the base material. Furthermore, the heat shields can be modified to a configuration that optimizes the use of cooling air.



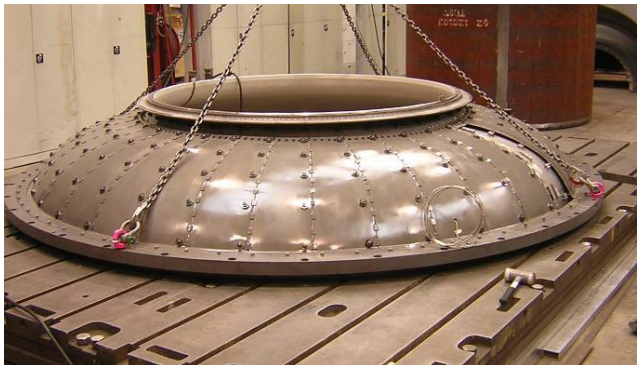
Zone 2 liners

For the zone 2 liners Sulzer offers an upgrade comparable to the OEM ZIP configuration. The upgrade can be applied during repair and on new components.

The inner liner has an improved cooling air distribution in combination with a cooled split line. Further, the tile segments are coated with a wear resistant carbide coating.

The cooling air distribution for the outer liner has also been improved, where the impingement plates have been modified. In this new design, the split line is also cooled.

In addition, a tailormade TBC coating system is applied. Moreover, in the outlet section it is combined with a dense MCrAlY base coating that offers optimal protection against corrosion.



1st stage blade

The original design of the first stage blade cannot be upgraded during a repair cycle for operating in an increased TBO interval of 48 kEOH. The first stage blade is the only component that has to be replaced with a newly designed blade.

The Sulzer designed blade is manufactured from the nickel based EEQ111 material that has superior mechanical properties as compared to the original base material. In addition, Sulzer has redesigned the squealer tip to remove the failure sensitive letter boxes. Moreover, the airfoil is fully covered with an advanced thermal barrier coating that significantly delays crack initiation at the cooling holes. As a result, the cycle life of the component has significantly been improved.

2nd stage blade

The second stage blade can be upgraded during a repair cycle. The upgrade consists of the removal and restoration of the tip plates. This makes the tip section less susceptible for the notorious letter box cracking. In addition, the second stage blade is coated with a TBC which offers the component a longer interval life and design life. Moreover, the TBC gives additional protection against LCF.

3rd stage blade

Also, for the third stage blades, the tip plates are removed and restored during repair. Next, a more corrosion resistant MCrAlY coating is applied, which gives the blade additional protection during the extended service interval.

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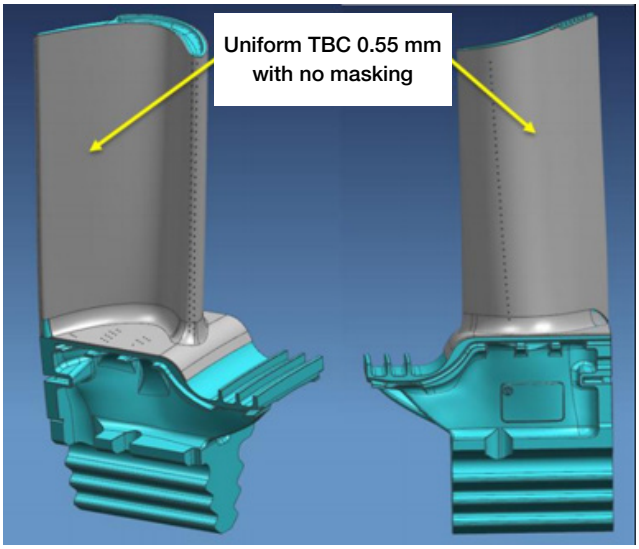

1st stage vane

The trailing edge and the platform cooling holes of the first stage vane are prone to corrosion and subsequent cracking. A TBC that covers the full gas path area (including trailing edge) in combination with a more corrosion resistant MCrAlY coating extends the cycle life of the first stage vanes.

3rd stage vane

Like the third stage blade, the third stage vane is coated with a more corrosion resistant coating which gives the airfoil additional protection during the extended service interval.

Remaining turbine components

The remaining components (other stages of blades and vanes, rotor heat shields and stator heat shields), typically show damages that are related to operation conditions. These damages are not life limiting and have a very good reparability. As a result, these components can also withstand an extended service interval of 48 kEOH, both in base load as under cyclic conditions.

Services

- Component refurbishment
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