

## ES1010 501-KB second stage turbine enhancement

Superior materials increase power and extend in-service life

**energy**

### Engineered solution purpose

This engineered solution increases the mean time between overhaul and the available power of 501 engines employed in power generation applications.

### Applicability

All 501-K and 501-KH engines

### Technical description

The second stage blades are replaced with new platinum aluminide (Pt-Al) coated, MAR-M247 material blades. The second stage vanes are coated with Pt-Al and have honeycomb interstage seals. To realise the full potential for power improvement, engines using Turbine Inlet Temperature (TIT) control should be converted to Turbine Outlet Temperature (TOT). Please see [ES1011](#) for more details.

### Benefits

Improved second stage turbine hardware will realise the following benefits provided first stage turbine enhancement has been undertaken ([ES1009](#)):

- Power - 11% expected improvement
- Heat rate - 2% expected improvement
- Durability - 30% increase (30k to 40k thermal life improvement)



By reducing the number of commonly replaced parts, overall life cycle costs are reduced whilst the honeycomb interstage seals provide for an improved fit and increased rub tolerance.

### Experience

Standard on all new units. Introduced in the early 1990s, this proven enhancement has accumulated millions of hours of operational experience and is the current production standard on all new units

### Scope of work

Replace second stage turbine blades and vanes

### Bill of materials

Second stage turbine blades, MAR-M247, Pt-Al

Second stage turbine vanes, MAR-M247LC, Pt-Al

### Undertaken

At overhaul

### Bundling opportunities

501 KB/KH TOT thermocouple conversion [\[E1011\]](#)

Controls upgrade [\[ES6006\]](#)



Second stage turbine blade