

# MS3002K Uprate

## Benefits

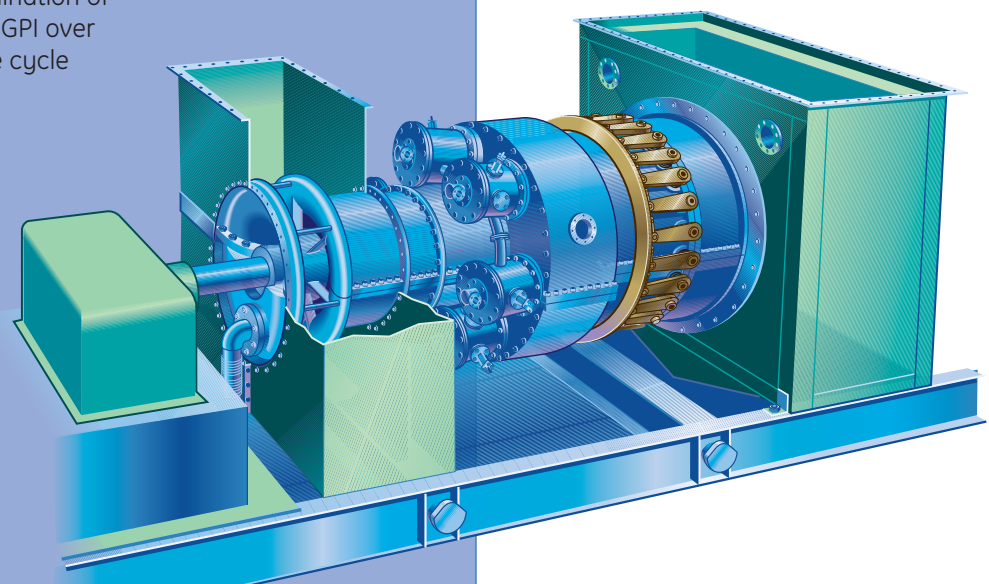
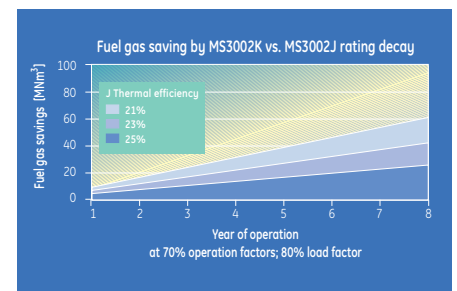
- ■ ■ Increased production
- ■ ■ Higher efficiency
- ■ □ Compliance with environmental regulations
- ■ ■ Availability and Reliability
- ■ ■ Life extension

The performance improvements delivered by the K uprate are:

- Maintenance interval extension up to 24,000 hours referred to a new MS3002J at ISO conditions
- An 8.6% increase in power output, yielding an additional 8,100 MWh per year when compared with the MS3002J under the same operating conditions
- Increased thermal efficiency of 8.6% resulting in reduced fuel consumption when compared with the MS3002J under the same operating conditions
- By means of the lean head end combustor design, emission levels of NO<sub>x</sub> have been reduced by 40% (compared with the MS3002J) without water or steam injection
- Reduced maintenance cost of greater than \$0.5M (1% availability increase) through elimination of two combustion inspections and an HGPI over the scope of a complete maintenance cycle (nominal 48,000 fired hours)



The first "K" module being shipped for operation in a re-injection plant in North America

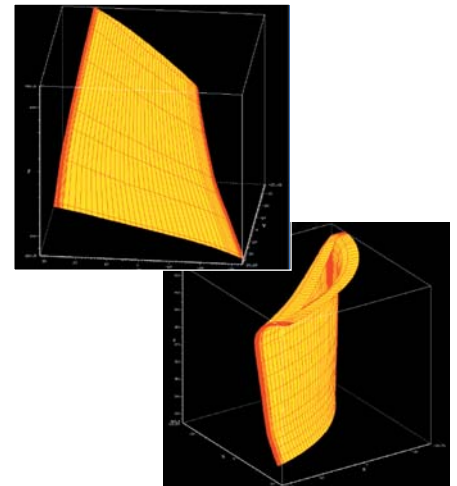


## What it is

Many significant advances in gas turbine technology have been made since the MS3002J was first introduced in 1969. An MS3002K upgrade incorporates much of this new technology, to the large fleet of MS3002 machines installed around the world.

For just a limited incremental investment over the cost of a

standard major overhaul, this latest uprate delivers significant performance benefits. The upgrade has been designed for an optimum level of interchangeability and commonality with the original machine. This maximizes the reusability of existing components and minimizes the impact on plant configuration both of which help to reduce costs.



Axial compressor blades

## How it works

The new MS3002K design is the product of the extensive know-how of GE team in the application of advanced aerodynamics, super alloys, coatings, cooling and sealing systems, as well as other critical advanced technologies. The K uprate completely replaces the high pressure compressor module and the entire combustion system with a new generation of technology that has been proven on modern GE machines. The axial compressor designed with 3-D computer tools and the new combustion system, improve performance, efficiency and maintenance requirements. The compressor has a slightly higher pressure ratio, which allows an increase in firing temperature.

To minimize the incremental costs, the MS3002K uprate was designed to be implemented during a major overhaul with minimal modification of the existing base plate and piping.

### Scope of Supply

The MS3002K uprate kit for conversion from the J model includes:

#### Axial Compressor

- Disks
- Rotor blades
- Tie bolts

- Forward and aft stub shaft
- Anti-surge device and piping
- Stator blades and associated hardware

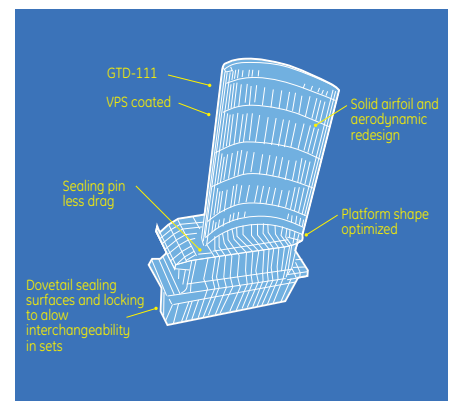
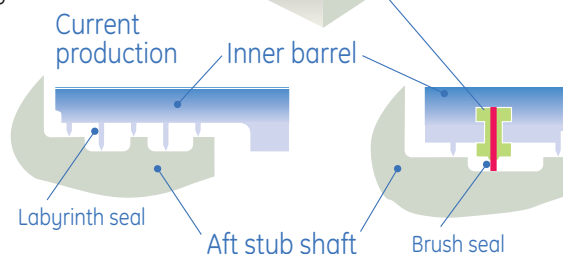
#### Thrust bearing #1

- Brush seals and inner barrel
- 1<sup>st</sup> stage shrouds with spline seals
- 1<sup>st</sup> stage nozzle and associated hardware
- Support ring
- GTD111 DS 1<sup>st</sup> stage buckets and associated hardware
- HP turbine wheel (optional)
- Thrust bearing #4

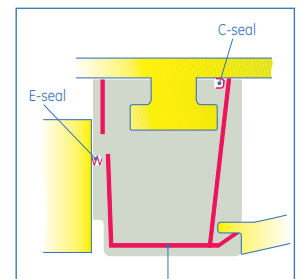
#### Combustion System

- Combustion wrapper
- Combustion chamber casing
- Burners
- Cap and liners
- Transition pieces
- Cross fires tubes
- Spark plug
- Fuel manifold

#### New Sealing Kit



"K" first stage bucket



GE imagination at work