

## ES1006 501 pilotless nozzle conversion

Reduce carbon shedding to improve first and second stage turbine life



### Engineered solution purpose

This engineered solution reduces carbon build-up in nozzles by eliminating the pilot fuel circuit, thereby improving hot section reliability and reducing maintenance costs.

### Applicability

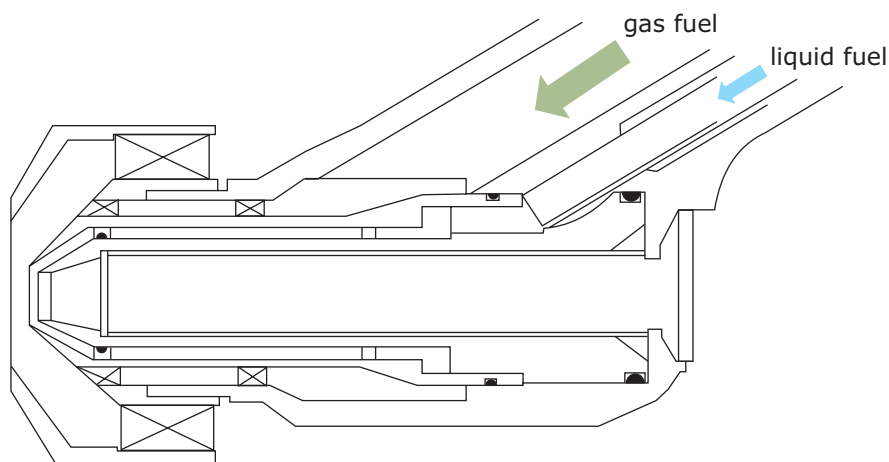
All 501 engines not employing Dry Low Emissions combustion technology

### Technical description

The pilotless fuel nozzle eliminates the pilot fuel circuit. The resultant reduction in carbon build-up alleviates first and second stage turbine erosion caused by carbon shedding.

### Benefits

Combustion liner distress from flame pattern distortion arising from fouled nozzle is reduced. Carbon shedding is also reduced with associated benefits to the life of the first and second stage turbine thereby reducing maintenance costs.



### Experience

This solution is the current build standard on all new production units.

Retrofit examples include:

Vermont Marble - 1 unit

Aramco - 8 units

Merck - 1 unit

Boeing - 4 units

Texaco - 8 units

Bohai - 4 units

### Scope of work

Install air manifold

Replace gas fuel manifold

Install air raft assembly (if liquid fuel application)

125 PSI, 90 SCFM air source is required for a 15 second period during starting only

### Bill of materials

Nozzles

Air manifold

Gas fuel manifold

Brackets

Air raft (for liquid fuel application only)

Control modifications

### Undertaken

At site

### Bundling opportunities

501 combustion liner upgrade (ES1001)

501 fuel manifold upgrade (ES1005)

Controls upgrade (ES6006)