

ES2003 Avon swirler burner kit

Eliminate combustion distress due to high hydrocarbon content fuel

Engineered solution purpose

The swirler burner has been introduced in response to specific customer issues relating to frequent high Engine Combustion Temperature (ECT) spread. This has led to premature engine removals as a result of combustion distress and rejection of turbine components at overhaul due to High Cycle Fatigue (HCF) damage. The origin of the HCF has been attributed to heavy hydrocarbon content in the gas fuel resulting in carbon formation on the burner nozzle exit faces and liquid carry over.

Applicability

All Avon Mk 1533, 1534, 1535 engines.

Technical description

Swirler burner technology helps reduce combustion instability associated with liquid hydrocarbon carryover from the gas fuel by directing compressor delivery air through the burner nozzle exit faces and flame tube swirler. This delivery system reduces the possibility of liquids forming on the nozzle face and atomises the liquids into fine particles thereby preventing the formation of carbon.

There are two modifications available. The modification required is dependent upon fuel type:

Modification A5000 - Gas only

Modification A4585 - Dual fuel



Benefits

By increasing the mean time between burner cleaning periods, equipment availability is significantly increased. Over a twelve-month period, the potential increase in availability can be as high as 3%. Reliability is also improved by minimising the effect of HCF on flame tubes, discharge nozzles and turbine components. This reduces the potential for premature engine removals. Experience has shown at overhaul that the secondary effects of HCF are also reduced, thus lowering overhaul costs.



Experience

The swirler burner kit is part of the current production standard and has accrued over 200,000 hours of operation with no reported hardware failures or distress. Mean Time Between Overhauls (MTBO) of 30,000 hours are now being realised without any High Cycle Fatigue damage reported at overhaul. The fleet leader has achieved MTBO in excess of 40,000 hours.

Customer experience includes:

Shell UK - 3 units

Total - 5 units

PTT - 3 units

MTBE - 1 unit

KPIC - 1 unit



Fact sheet

Scope of work

Replace existing hardware with the following items:

Mk 1534/1535 Gas fuel only engines (Mod A5000):

Swirler Burner

Flame Tubes

Flex Pigtails

Igniter

Mk 1533 Gas only engines:

Mod A5000 plus inlet snouts.

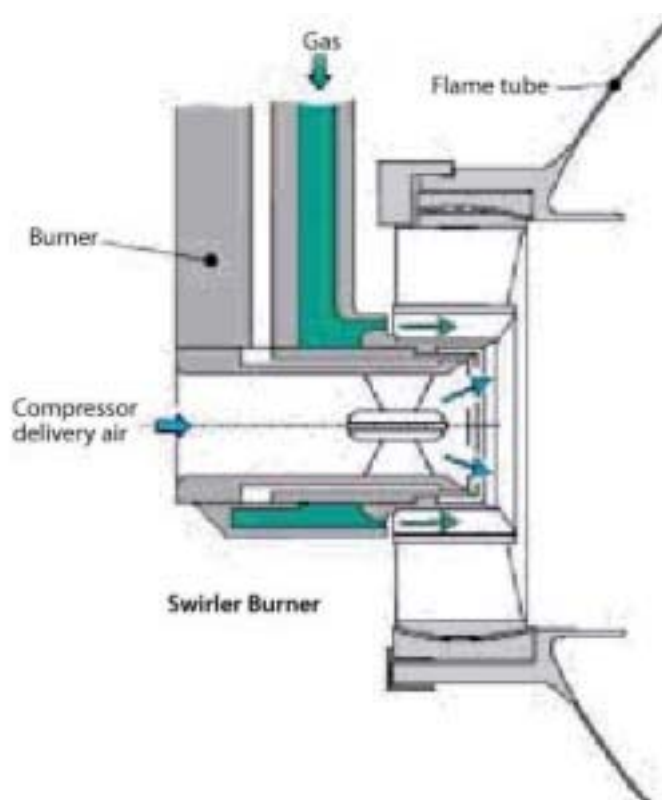
Mk 1533/1534/1535 Duel fuel engine (Mod A4585):

Mod A5000 plus -

3 way fuel valve (replaces on engine pressurizing valve)

Locating Pin Atomisers (LPAS)

Remove purge valve



Bill of materials

For Mod A5000:

Swirler Burner (Quantity 8)

Flame Tubes (male interconnectors) (Quantity 3)

Flame Tube (left hand igniter) (Quantity 1)

Flame tubes (female interconnectors) (Quantity 3)

Flame Tube (right hand igniter) (Quantity 1)

Information plate (Quantity 1)

Flex Pigtails (Quantity 8)

Screw (Quantity 16)

Bolt (Quantity 16)

Washer (Quantity 16)

Gasket (Quantity 8)

Shim (Quantity 8)

Bridge Unit (Cooper beams) (Quantity 8)

Igniter (Quantity 2)

Inlet snout (Mk 1533 gas only)

For Mod A4585

Includes all BOM for Mod 5000 plus -

3 way valve and associated pipe work.

LPA (quantity 8)

Undertaken

At overhaul

Bundling opportunities

Avon closed loop VIGV control (Mod A4601)

Avon swirler burner kit [ES2003]

RT48 to RT48S upgrade, where applicable [ES4001]

Complete package refurbishment [ES6001]

Fuel treatment system [ES6005]

Controls upgrade [ES6006]



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