



PROPOSED MANDATORY PERMIT DIRECTIVE

**Number: 16-02**

Issue date: 16 March 2016

In accordance with Article 22(1) of The Air Navigation Order 2009, as amended, the following action required by this Mandatory Permit Directive (MPD) is mandatory for applicable aircraft registered in the United Kingdom operating on a UK CAA Permit to Fly.

Type Approval Holder's Name:

Rolls-Royce

Type/Model Designation(s):

Avon Mk 1 and 100 Series Engines**Title:**

Engine Stage 1 - 4 Compressor Blades and Discs - Inspection

Manufacturer:

Rolls-Royce

Applicability:

Avon Mk 1, Avon Mk 100 series

Reason:

CAA has been notified of a complete loss of thrust event on an Avon 100 series powered aircraft as a result of a compressor blade failure. The failure has occurred in a blade pin-hole attachment lug and was initiated by corrosion leading to subsequent fatigue. This region of the blade is below the platform and cannot be inspected by any in-situ inspection permissible under AMOC to MPD 2001-001. Other blades in the set were cracked due to corrosion and there have been other reports of corrosion initiated fatigue leading to failure in the forward stages of these engines in military service. The manufacturer developed modifications for protection of the blade attachment lugs during military operation. The failure occurred on an engine with a modification incorporated but over the extended time period of operation, which was not foreseen at the time the modification was developed, the protection had broken down and was no longer effective in protecting the pin-holes from corrosion.

Compressor blade failure results in total thrust loss and, depending on flight phase, may result in loss of the aircraft. This MPD is raised to require an inspection of blade lugs on the first 4 stages of Avon Mk 1 and 100 series compressor blades. The discs are also to be inspected. This inspection requires engine removal and at least partial disassembly.

Effective Date:**(TBD upon issue of final MPD)**

Compliance/Action:	1. Determine from engine records when the engine was last overhauled. For any engine which exceeds 20 years since last overhaul, carry out the following inspections within 6 months or 20 flight hours from the effective date of this MPD, whichever limit is reached first. For any engine with less than 20 years calendar time since last overhaul on the effective date of this MPD, carry out the inspections when the engine reaches 20 years since last overhaul. Note: The inspections specified may only be carried out by an A8-23 approved organisation with capability to carry out Rolls-Royce Avon series engine partial strip or overhaul under their terms of approval. 2. Remove the engine from the airframe in accordance with published aircraft manual instructions. Carry out a partial strip of the compressor in accordance with engine overhaul manual requirements to permit inspection of the individual stage 1-4 blades and discs. Visually inspect individual blades and discs against manual limits permitted for further processing. Reject from service any blades or discs which do not satisfy these limits. 3. Carry out cleaning and NDT inspection of all remaining blades and discs in accordance with manual requirements or other inspection process approved by CAA. Reject from service all stage 1 to 4 blades and discs which do not pass corrosion acceptance limits or NDT inspection. 4. For remaining serviceable blades, protect stage 1-4 blade pin holes by applying protective coating in accordance with manufacturer's published data or other method approved by CAA. 5. Reassemble the engine incorporating serviceable blades in accordance with engine manual requirements. Re-install and carry out a pass-off run in accordance with airframe manufacturer's published data. 6. Repeat inspect stage 1-4 blades and discs at intervals not to exceed 5 years, if the engine hour Time Between Overhaul limit has not been reached in that time. The above tasks do not constitute a full overhaul of the compressor or the engine and the Time Since Overhaul may not be re-set as a result of this shop visit. If operators wish to carry out a complete engine overhaul at this point then to qualify as a newly overhauled engine the complete overhaul cycle as defined in the relevant manufacturer's overhaul manuals must be accomplished by an appropriately approved A8-23 organisation with Avon 1 or 100 series overhaul capability.
ENSURE COMPLIANCE WITH THIS MPD IS RECORDED IN THE AIRCRAFT LOGBOOK	
Reference Publications:	Nil