Civil Aviation Authority

MANDATORY PERMIT DIRECTIVE

Number: 2018-003R1

Issue date: 02 December 2022

In accordance with 41(1) of Air Navigation Order 2016 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.

Design Approval Holder's Name:	**Type/Model Designation(s)**
N/A	Ex-military aircraft equipped with Aircraft Assisted Escape Systems

Effective Date:	16 December 2022
TADS / AAN (as applicable):	N/A
Revision	This MPD Revises MPD 2018-003 dated 13 April 2018

Pyrotechnic Component Life Limitations – Removal from Service

Manufacturer(s):

Various

Applicability:

Ex-military aircraft equipped with Aircraft Assisted Escape Systems

Definitions:

Term	Definition
Aircraft Assisted Escape Systems (AAES)	Within this MPD, AAES is defined as all components necessary for the occupants of an aircraft to safely escape from it. This includes the ejection seat and equipment fitted to it, systems for clearing the occupants' escape path, emergency escape parachutes and any associated mechanisms.
Pyrotechnic components	Includes power cartridges, rocket motors, miniature detonating cord and any other explosive device.

Total life	The maximum life from the manufacturing date, cure date or filling date, as applicable, including storage and installed life. This is usually a recommended life declared by the manufacturer.
Installed life	The maximum life (provided that Total Life is not exceeded) from the date of installation. This assumes that the items have previously been stored under satisfactory conditions. This is usually a recommended life declared by the manufacturer.
Acceptable organisation	This is an organisation that the CAA considers as having expertise in the design, analysis and testing of pyrotechnic components sufficient to develop a test programme and analyse the results of testing to determine the safely serviceability of pyrotechnic components. One such acceptable organisation is European Astrotech Ltd. The CAA will consider other organisations on request.

Reason:

Historically, the CAA has accepted that for Aircraft Assisted Escape Systems (AAES) in ex-military aircraft, pyrotechnic component lives are recommended by the responsible design organisation or manufacturer rather than being required fixed lives. Accordingly, the CAA has accepted that aircraft maintenance organisations can vary these recommended lives, subject to certain conditions.

As a result of the AAIB's investigation into the accident to Hawker Hunter G-BXFI on 22 August 2015 and the CAA's review of ejection seats in ex-military aircraft (the first phase of which concluded in December 2016), the CAA identified the potential for an unsafe condition to arise if the recommended lives of pyrotechnic components in AAES are exceeded without appropriate mitigating measures. The unsafe condition would be that the pyrotechnic component does not operate correctly when initiated.

This MPD mandates the manufacturers recommended lives of AAES pyrotechnic components for which appropriate mitigating measures are not in place.

This MPD also defines the conditions under which AAES pyrotechnic component life extensions will be accepted by the CAA.

This MPD has been revised in order to facilitate the option of a temporary limited extension to the total life of pyrotechnic components due to the Covid 19 pandemic causing 12 months delay to the manufacturing and procurement of new pyrotechnic components. A glossary of terms is provided in the Definitions section above and provides definitions of the underlined text.

Required Action(s) and Compliance Time(s):

Note: This MPD consists of two parts:

- Part 1 includes the required compliance actions for all applicable aircraft.

- Part 2 defines the procedure to allow some pyrotechnic components to continue in service beyond the total life for a period of up to 12 months, as applicable, from the effective date of this MPD. The CAA considers this an interim measure until newly manufactured replacement pyrotechnic components become available in 2023.

Part 1: Compliance: Required within 60 days of the effective date of this MPD

1. For all applicable aircraft, determine from the aircraft records and a physical inspection of the items, the status of the lives of each pyrotechnic component in the ejection seats on the aircraft. Compare the actual life status of each pyrotechnic component with its installed life and total life.

2. Remove from service, before further flight, any pyrotechnic component which has exceeded the installed life or total life.

3. Remove from service, before further flight, any pyrotechnic component for which the life status cannot be determined from the aircraft records or a physical inspection.

4. From the effective date of this MPD, do not install any pyrotechnic component which has exceeded the installed life or total life of any aircraft.

5. Pyrotechnic components, other than rocket motors, that have exceeded either or both of the installed life or total life can potentially be returned to service by completing an inspection procedure in accordance with Part 2 of this MPD.

6. Rocket Motors that have exceeded the installed life or total life cannot be returned to service.

Note:

1. Any pyrotechnic component life extensions which might previously have been approved or accepted by the CAA by means of an AMOC, by inclusion in a Company Exposition or Aircraft Maintenance Programme, prior to the effective date of this MPD will continue to be valid for a further 12 months from the effective date of this MPD, but should not exceed 9 years in total life for each pyrotechnic component.

2. Any installed life is deemed to have started from the date of first installation and runs continuously from that date, irrespective of whether it remains installed in the aircraft.

Part 2: Limited Life Extension of pyrotechnic components which have exceeded the installed life or total life

For pyrotechnic components, other than rocket motors, the CAA will consider applications for the extension of total life and/or installed life, subject to the following conditions:

1. The application must be made to the CAA by an Organisation approved under BCAR A8-25. Additionally, the application must be supported by an acceptable organisation.

2. The total life for each pyrotechnic component prior to the application for the life extension must not have been exceeded by 9 years.

3. Each pyrotechnic component must be inspected in accordance with a documented inspection programme to assess its integrity and indications of age-related degradation.

4. Such a programme must be developed by an Organisation approved under BCAR A8-23 A8-24 and an acceptable organisation, which is an organisation that the CAA considers as having appropriate expertise in the design, analysis and testing of pyrotechnics as defined in the Definitions section above. The programme must include as a minimum visual and radiographic inspection, and criteria for determining from the inspection results whether a life extension is appropriate.

5. The aircraft operator's Organisation Control Manual (OCM) and the aircraft maintenance programme must clearly identify the life status of the pyrotechnic components installed, including the date from which the total life was exceeded. The OCM must clearly identify the risks presented to the aircraft occupant(s) by AAES with pyrotechnic components which exceed the total life. This information must be presented in an Annex to the OCM.

6. Type specific military operations procedures to be followed by the aircraft occupant(s) in the event of an AAES failure or malfunction must be available and must be presented or referenced in the OCM.

Note: If no approved procedures exist, applications for life extension will not be accepted.

7. The aircraft occupant(s) must be suitably trained on emergency egress in the event of an AAES failure or malfunction for the particular aircraft flown and this training must correspond with the procedures referenced in paragraph 6 above. Evidence of completed aircrew training must be presented or referenced in the OCM.

8. The relevant section(s) of the OCM, together with copies of the procedures referenced at paragraph 6 must be presented to the CAA for acceptance.

9. No flight must take place unless the aircraft occupant(s) have signed a declaration acknowledging the life status of the AAES pyrotechnic components and awareness and acceptance of the associated risks. An example declaration must be presented in an Annex to the

10. Life extensions granted under this part will be valid for a period not exceeding 12 months from the effective date of this MPD.

ENSURE COMPLIANCE WITH THIS MPD IS RECORDED IN THE AIRCRAFT LOGBOOK

Reference Publications:

None

Remarks:

1. Based on the required actions and the compliance time, CAA has decided to issue this MPD and invite comments on its contents, within 30 days of the Effective Date of this MPD.

2. During discussion with industry throughout 2021, and the CAA ex-military jets forum consultation conducted in April 2022, a route to the manufacture and supply of new AAES pyrotechnic components has been identified. The completion and delivery of the components is approximately 12 months from the issue date of this MPD revision.

3. If requested and appropriately substantiated, the CAA may accept Alternative Methods of Compliance (AMOC) to this MPD for a period not exceeding 12 months from the effective date of this MPD.

4. Information about any failures, malfunctions, defects or other occurrences which may be similar to the unsafe condition addressed by this MPD, and which may have occurred or have occurred on a product, part or appliance not affected by this MPD, can be reported to the CAA aviation safety reporting system **Occurrence reporting | Civil Aviation Authority.** This may include reporting on the same or similar components, other than those covered by the design to which this MPD applies, if the same unsafe condition can exist or may develop on an aircraft with those components installed.

5. Enquiries regarding this MPD should be referred to: ga@caa.co.uk