

GR No. 16 Tyre Bursts In Flight – Inflation Media

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1 Applicability

This Generic Requirement is applicable to all UK registered aeroplanes with a Maximum Take-off Weight Authorised (MTWA) exceeding 5700 kg, with retractable landing gear.

NOTE: For American registered aeroplanes the FAA have published Airworthiness Directive 87-08-09, which requires that not more than 5% Oxygen by volume is contained in tyres inflated and mounted on braked wheels of particular aeroplane types.

2 Introduction

- 2.1 JAR 25.729(f), BCAR Chapter D4-5 paragraph 1.2 and TSS Standard 5-6 paragraph 9, require equipment to be protected from the effects of tyre burst. In addition the CAA requires the operational hazards due to tyre bursting in flight be minimised.
- 2.2 The majority of in-flight tyre bursts have been attributed to the tyre carcass being weakened by foreign object damage, scuffing, etc., such that a rapid release of pressure takes place. Such failures are usually experienced when the gear has been retracted for some time and the effects of brake heat transfer, internal tyre temperature and differential pressure are combined.
- 2.3 A fatal accident involving cabin decompression and fire has highlighted another mode of tyre failure in flight where a tyre may fail explosively without any significant prior degradation. A tyre inflated with air and subjected to excessive heating, possibly caused by a dragging brake, can experience a chemical reaction resulting in release of volatile gases. Such a chemical reaction in the presence of the oxygen in the contained air may result in a tyre explosion in a landing gear bay and/or an in-flight fire since it appears that the protection normally afforded by conventional pressure relief devices in the wheel would be incapable of responding adequately to the rapid increases in temperature and gas pressure associated with auto-ignition.
- 2.4 Laboratory material and tyre burst testing indicates that the risk of auto-ignition can be reduced by using an inert gas for tyre inflation and servicing.
- 2.5 Other potential benefits may accrue from the use of Nitrogen as it will tend to reduce wheel corrosion, tyre fatigue and the risk of fire when fusible plugs melt due to brake overheating.

3 Compliance

- 3.1 With effect from 1 April 1988, all braked wheels of retractable landing gear units on aeroplanes defined in paragraph 1 will be required to have tyres inflated with Nitrogen, or other suitable inert gas, and maintained such as to limit the Oxygen content of the compressed gases to not greater than 5% by volume.
- 3.2 To ensure compliance with this requirement suitable inflation and servicing procedures must be adopted in consultation with the airframe constructor. At airfields where suitable inert gases are not normally available it is acceptable to use air for inflation or servicing provided that a suitable entry is made in the Technical Log and that the tyre is re-inflated or serviced in accordance with the agreed procedure at the earliest opportunity or within 25 flight hours, whichever is the sooner.

4 Additional Information

In addition to compliance with the requirement of paragraph 3 above, tyre and wheel assemblies should be maintained such that greases, solvents, powders and rubber dust are excluded as far as practicable from within the inflation volume.