AIRWORTHINESS NOTICES

Issue 27 dated 9 February 2022

ISSUED BY:
CIVIL AVIATION AUTHORITY OF SINGAPORE

Date: 9 February 2022

Civil Aviation Authority of Singapore

AIRWORTHINESS NOTICES
ISSUE 27 DATED 9 FEBRUARY 2022

Please be informed that the following Notices have been revised/cancelled:-

Notice No.	Issue	Date	Remarks
A0	27	9 February 2022	Revised
C29	2	1 July 2003	Cancelled
C55	1	1 February 2008	Cancelled

Issued by
SAFETY POLICY & PLANNING DIVISION
CIVIL AVIATION AUTHORITY OF SINGAPORE

AIRWORTHINESS NOTICES

RECORD OF REVISIONS

#A0 Issue No.	Date	Inserted by	#A0 Issue No.	Date	Inserted by
16	1 July 2003	CAAS			
17	1 April 2004	CAAS			
18	1 July 2004	CAAS			
19	1 July 2005	CAAS			
20	15 August 2006	CAAS			
21	1 June 2007	CAAS			
22	1 February 2008	CAAS			
23	16 November 2009	CAAS			
24	25 January 2018	CAAS			
25	5 October 2018	CAAS			
26	4 April 2020	CAAS			
27	**9 February 2022**	**CAAS**			

No. A0

Issue 27

9 February 2022

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

This Airworthiness Notice contains a list of the current Airworthiness Notices. This copy supersedes revision issue 26 dated 4 April 2020.

Notice No	Issue	Date	Subject
A0	27	9 February 2022	Contents
A1	5	25 January 2018	Foreword
A2	-	-	Cancelled
A3	-	-	Cancelled
B1	-	-	Cancelled
B2	-	-	Cancelled
B3	3	1 July 2003	Aircraft Engines, Engine Modules, APUs and Propellers obtained from sources not under the Airworthiness Control of CAAS
B4	-	-	Cancelled
B5	-	-	Cancelled
B6	3	15 August 2006	Manufacture and Inspection of Aircraft Parts and Approval of Materials for the Repair or Overhaul of Aircraft
B7	-	-	Cancelled
B8	-	-	Cancelled
B9	-	-	Cancelled
B10	-	-	Cancelled

Notice No	Issue	Date	Subject
B11	-	-	Cancelled
B12	-	-	Cancelled
C1	-	-	Cancelled
C2	-	-	Cancelled
C3	-	-	Cancelled
C4	-	-	Cancelled
C5	-	-	Cancelled
C6	-	-	Cancelled
C7	-	-	Cancelled
C8	2	1 July 2003	Microbiological Contamination of Fuel Tanks of Turbine Engine Aircraft
C9	-	-	Cancelled
C10	-	-	Cancelled
C11	2	1 July 2003	Carbon Monoxide Contaminations in Aircraft
C12	2	1 July 2003	Maintenance of Cockpit and Cabin Combustion Heaters and their Associated Exhaust Systems
C13	-	-	Cancelled
C14	-	-	Cancelled
C15	-	-	Cancelled
C16	-	-	Cancelled
C17	2	1 July 2003	Vertical Speed Indicators on Imported Aircraft
C18	-	-	Cancelled
C19	-	-	Cancelled
C20	-	-	Cancelled
C21	-	-	Cancelled

Notice No	Issue	Date	Subject
C22	-	-	Cancelled
C23	-	-	Cancelled
C24	2	1 July 2003	Overhaul and Inspection Requirements for Variable Pitch Propellers
C25	2	1 July 2003	Power Supply Systems for Aircraft Radio Installations
C26	-	-	Cancelled
C27	-	-	Cancelled
C28	2	1 July 2003	Electrical Generation Systems – Aircraft not exceeding 5700kg MTWA
C29	-	-	Cancelled
C30	-	-	Cancelled
C31	2	1 July 2003	Communications Transmitters in the VHF Radio Telephony Band 118-136 MHz
C32	-	-	Cancelled
C33	-	-	Cancelled
C34	-	-	Cancelled
C35	2	1 July 2003	Ground Operation of Aircraft Radar Equipment
C36	-	-	Cancelled
C37	-	-	Cancelled
C38	-	-	Cancelled
C39	-	-	Cancelled
C40	-	-	Cancelled
C41	2	1 July 2003	Electrical Generation Systems – Single Engine Aircraft
C42	2	1 July 2003	Acceptance of Aircraft Standard Parts by Users
C43	-	-	Cancelled
C44	2	1 July 2003	Tyre Bursts in Flight – Inflation Media
C45	-	-	Cancelled
C46	-	-	Cancelled

Notice No	Issue	Date	Subject
C47	-	-	Cancelled
C48	-	-	Cancelled
C49	-	-	Cancelled
C50	-	-	Cancelled
C51	-	-	Cancelled
C52	-	-	Cancelled
C53	-	-	Cancelled
C54	-	-	Cancelled
C55	-	-	Cancelled
C56	-	-	Cancelled

No.A1

Issue 5

25 January 2018

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

FOREWORD

1 General

1.1 Airworthiness Notices are issued by the Civil Aviation Authority of Singapore (CAAS) to circulate information of an administrative or technical nature to all concerned with the airworthiness of civil aircraft.

1.2 Airworthiness Notices replace all Notices to Licensed Aircraft Engineers and to Owners of Civil Aircraft previously issued by the former Department of Civil Aviation.

2 Contents List

2.1 Notice A0 is the contents page which contains a list of all the current Notices. When a Notice becomes redundant it will be withdrawn and shown as "Cancelled" in Notice A0.

2.2 Notice A0 is issued with every issue of Notices and the changes would be marked by marginal lines. The issue number of Notice A0 would increase by 1.

3 Arrangement

3.1 Each Notice is identified by an alphabet and a number, followed by an issue number and an issue date.

3.2 When a procedure which has already been the subject of a Notice is changed, the particular Notice is re-issued under the same number but bearing a new issue number and issue date.

3.3 Material differences between issues are marked by marginal lines.

3.4 All Notices are concerned with matters affecting the airworthiness of civil aircraft. The type of information contained therein is categorised as follows:

(a) Part A - General Administration
(b) Part B - Procedures
(c) Part C - Matters directly involving airworthiness.

The Notice number will be prefixed with the relevant alphabet to denote the appropriate category.

4 Publication

4.1 The Notices are made available on CAAS website.

No.B3

Issue 3

1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

AIRCRAFT ENGINES, ENGINE MODULES, APUS AND PROPELLERS OBTAINED FROM SOURCES NOT UNDER THE AIRWORTHINESS CONTROL OF THE CAAS

1 Where aircraft engines, engine modules, APUs and propellers (hereafter called Powerplants) which have been overhauled, repaired or operated by organisations not under the airworthiness control of the CAAS (e.g. Government or foreign organisations) are obtained for use in aircraft for which a Singapore certificate of airworthiness is held or required, some form of acceptance by the CAAS is necessary so that paragraph 10 of the Air Navigation Order can be complied with. If the following facts (paragraph 1.1 to 1.3) can be established and the appropriate procedures of paragraphs 1.4 to 1.6 completed, the item may be regarded as having been operated, overhauled, repaired or modified in a manner, and with material of a type approved by the CAAS. Paragraphs 2.1 and 2.2 are appropriate to 'pool', 'lease', 'loan' or 'power-by-the-hour' powerplant in a similar way. The appropriate methods of signifying that items have been accepted under this Notice are prescribed in paragraph 3.

1.1 The powerplant shall be of a type approved by the CAAS, and the constructor shall, at the time of the original build, have been acceptable for the purpose to the CAAS.

1.2 The build standard shall be acceptable to the CAAS, i.e :

(a) A list of any modifications or repair schemes not approved by the original constructor shall be provided to the CAAS, which will determine whether any further investigation is required.

(b) Where military types are similar to a civil equivalent and have been modified to comply with civil requirements, this shall have been done in conjunction with the constructor in each particular case, unless agreed otherwise with the CAAS.

(c) All applicable Airworthiness Directives shall have been accomplished, including Airworthiness Directives of the State of Design.

(d) The last overhaul and any subsequent repairs shall have been undertaken to a specification and by an organisation or person, acceptable to the CAAS. Where an appropriate arrangement exists between the CAAS and the responsible authority of a foreign country, overhaul and repair organisations appropriately authorised by that authority would be acceptable to the CAAS.

1.3 In all cases, it shall be established, by the methods of (a) or (b) below, that the powerplant has not become unserviceable as a result of operational abuse, inadequate maintenance or unsuitable storage. Log books alone must not be regarded as sufficient evidence of serviceability because they do not always provide a complete record of defects and work carried out.

(a) It may be possible to make this judgement from the knowledge of the previous users. Where an appropriate arrangement exists between the CAAS and the responsible authority of a foreign country, a statement certifying serviceability issued by an organisation appropriately authorised by that authority will be acceptable. Failing this, reference shall be made to the CAAS, which will make a decision taking into account, such information as may be available from the responsible authority, the constructor and the previous operator.

(b) Where adequate assurance cannot be obtained under the methods of (a), the item shall be dismantled sufficiently (taking into account any recommendations issued by the constructor) to enable a judgement to be reached based on the revealed condition. If necessary, rectification action shall be taken before the item is regarded as complying with this paragraph 1.3. If it cannot be established that the engine powerplant are accurate and complete, all life limited parts must be scrapped. In addition, reference must be made to the CAAS for a decision on whether any other parts should be scrapped in the absence of satisfactory records.

NOTE: It will usually be difficult to establish serviceability of any item which has been used for type testing, or outside the disciplines of aviation regulations (e.g. in boats, hovercraft, power stations).

1.4 Where an assembly is broken down for use as individual parts, a statement of acceptability, in which the source of supply is indicated, shall be included in the release documents. For example, where an engine has been broken down into spares, the identity of the engine from which the part was taken should be referred to in the certification on the following lines - "Cylinder head removed from Gypsy Major 10 MK 2-2 engine, Serial No. 12345, checked for serviceability and modification standard, and the following work completed ...". Such a certification can be given by any organisation or person who can sign a statement in accordance with paragraph 3 of this Notice. In addition, the holder of an aircraft maintenance engineer's licence endorsed in Category "C" for the type of engine, may certify such spare parts as his licence permits him to dismantle, assemble and incorporate in engines.

1.5 Civil identification plates shall be fitted, where applicable, and log books or their equivalent, as appropriate, shall be issued. Original or certified true copies of any necessary documents (e.g. modification standard, test results) arising from construction or previous overhaul shall be provided with the release documents.

1.6 A statement of any limitations (e.g. overhaul periods, time used of any retirement or ultimate □scrap□ lives) shall be provided with the release documents.

2 Powerplants which fall into the categories defined in 2(a) and 2(b) are treated under different rules (see 2.1 and 2.2) which replace those in paragraph 1.

(a) 'Pool' powerplants:
engines interchanged between certain participating airlines on a temporary (get-you-home) basis limited to a maximum of 200 hours.

(b) 'Lease', 'Loan' or 'Power-by-the-hour' engines:
engines which are supplied to operators under various agreements for long-term periods, usually from the manufacturer or his agent, but which are not necessarily newly overhauled when supplied.

2.1 **Pool Powerplants**

2.1.1 The use of pool powerplants, for the limited purpose and period covered by the definition, is permitted provided:

(a) The conditions relating to airworthiness, which must apply for a pooling agreement to be entered into, are laid down in advance by the operator, agreed by CAAS and lodged permanently in some suitable record of procedures.

(b) The conditions require consideration not only of the local history of the engine but of the source of engine overhaul and repair where this is other than by the pool partner.

(c) Applicable mandatory directives, instructions and notices are met.

(d) The Singapore operator obtains from the overseas operator a signed statement certifying the powerplant is airworthy when released on loan, declaring any restrictions in cycles or hours, etc., relating to inspection, replacement, or overhaul as necessary to maintain the airworthiness of the item during the period of loan. He must also, with the Certificate of Release to Service for the installation of the engine, complete the statement as required by 3.3 below.

2.2 **Lease/Loan/power-by-the-hour engines**

2.2.1 Where a powerplant is obtained from the original manufacturer or a CAAS approved overhaul organisation for long term loan or 'power-by-the-hour' lease and has been operated by a non-Singapore operator since the last time the engine was available to the manufacturer/overhauler for an assessment similar to that detailed in paragraph 1.3(b), it will be acceptable for the serviceability of the powerplant to be confirmed as follows :

(a) The manufacturer/overhauler or his authorised representative must issue certification of serviceability, having been satisfied at least that:

(i) The previous operator has declared the powerplant to be serviceable at the time of removal, or has stated known defects.

(ii) Any outstanding defected have been rectified.

(iii) All defects which were recorded during the term of the previous lease appear to have been rectified satisfactorily.

(iv) The powerplant's performance is satisfactory (This may be by reference to the previous operator's logged data where this is suitable).

(v) The powerplant has been stored satisfactorily and has not become deficient since removal from the aircraft due to the removal of any components.

(vi) The status of all life-limited components in the engine is clearly defined.

(vii) Inspection of the powerplant by the manufacturer or his authorised representative to a published schedule has been carried out to the extent necessary to confirm and certify that the powerplant is serviceable at the time of despatch.

(viii) All applicable Airworthiness Directives of the State of Design have been accomplished.

3 Statement(s) in accordance with 3.1(a); or paragraphs 3.1(b) and 3.2 (accompanied by a Certificate of Release to Service for the actual stripping, rectification and rebuilding carried out) or 3.3, as appropriate, shall be entered in the applicable engine or propeller log book, to enable Certificates of Release to Service to be issued when required by paragraph 10 of the ANO.

3.1 (a) "Part … S/N … has been accepted by the CAAS in accordance with Airworthiness Notice No. B3, paragraphs 1.1, 1.2 and 1.3(a)".

(b) "In respect of Part … S/N … compliance has been shown with Airworthiness Notice No. B3, paragraphs 1.1 and 1.2. The part will be accepted by the CAAS when compliance with paragraph 1.3(b) has been established." The statement shall be signed by a CAAS Airworthiness Officer.

3.2 "Part ... S/N ... has been examined in accordance with Airworthiness Notice No.B3, paragraph 1.3(b), and (no evidence of operational abuse, inadequate maintenance or unsuitable storage has been revealed)*, (appropriate action has been taken to restore serviceability)*."

This statement shall be signed either by an organisation accepted by the CAAS for the construction or overhaul, or by a licensed aircraft maintenance engineer accepted by the CAAS for the overhaul, of the item concerned.

3.3 "Part ... S/N ... has been accepted under procedures complying with Airworthiness Notice No. B3, paragraph 2.1* or 2.2*.

This statement shall be signed by the person issuing the Certificate of Release to Service for the installation of the item concerned.

4 **Cancellation**

4.1 This Notice cancels Airworthiness Notice B3, Issue 2, dated 1 July 1989, which should be destroyed.

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*Delete whichever is not applicable

No.B6

Issue 3

15 August 2006

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

MANUFACTURE AND INSPECTION OF AIRCRAFT PARTS AND APPROVAL OF MATERIALS FOR THE REPAIR OF OVERHAUL OF AIRCRAFT

1 The attention of all concerned is drawn to the fact that cases have occurred where:

(a) defective parts have been replaced by parts manufactured without reference to drawings, the defective parts being used as a pattern; or

(b) components, for which no certificate of compliance could be produced, have been embodied in civil aircraft. In some cases parts had been obtained from stocks which were surplus to the requirements of the Services, or from various sources other than the manufacturer.

2 In circumstances such as those referred to in paragraph 1(a) there is considerable risk of the new part being made to incorrect dimensions and/or of incorrect materials.

3 In every case where it is necessary to manufacture any detail or component of an aircraft for which a certificate of airworthiness has been issued or is to be issued or renewed, such replacements must be manufactured, inspected and installed to approved drawings.

4 Certification of any repair or replacement under the requirements of the Air Navigation Order should not be made unless either:

(a) the replacement parts have been approved by the manufacturers of the aircraft; or

(b) the parts have been manufactured and inspected to standard approved drawings (approved repair schemes issued by certain manufacturers coming under this heading); or

(c) the repair has been approved as a modification subsequent to the issue of a certificate of airworthiness.

5 The existence of an inspection stamp is not in itself sufficient evidence of approval of materials, details or components; approved certificates are also required, and these documents should be held available for examination when an aircraft is inspected for the issue or renewal of a certificate of airworthiness

No.C8

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

MICROBIOLOGICAL CONTAMINATION OF FUEL TANKS OF TURBINE ENGINED AIRCRAFT

1 Introduction

1.1 Reports have been received that aircraft regularly operating in climatic conditions such as those prevailing between latitudes 30º North and 30º South have been contaminated in the fuel tanks by a fungus. Another aircraft, regularly operating from the United Kingdom, was found to have localised areas of heavy growth when inspected after standing in a heated hangar for two months with fuel in the tanks. It is considered that the storage conditions were a contributory factor.

1.2 In one case contamination was found during an investigation into the cause of erratic fuel contents indication, when white crusty deposits and brown stains were seen on the probes. Further examination revealed the presence of brown/black slimes adhering to horizontal upward facing surfaces within the tanks. Examination by the Commonwealth Mycological Institute, Kew, confirmed that this substance was a fungal growth of the type Cladesporium Resinae.

2 Effects of Contamination

2.1 The problems associated with microbiological growths have been known for some years and research into their behavior has been conducted throughout the world. In the case of Cladesporium Resinae, the spores of the fungus can exist in a dormant state in kerosene fuels in most parts of the world. These will only develop when in contact with water in fuel at temperatures such as those reached when the aircraft or storage tanks are exposed to a warm ambient temperature such as radiation from the sun for long periods in a tropical or sub-tropical environment, or prolonged periods in a heated hangar. If developing fungus forms on water not drained off which adheres to the tank surfaces, the fungus is able to absorb water later introduced with fuel or condensing following a cold soak.

2.2 Where fungus has formed there is a probability that corrosion will occur. Corrosion has been found where fungus has formed on the bottom tank skin, on the chordal support member in the wing root and on fuel pipes within the tank. In some cases aircraft have been sufficiently affected to necessitate replacement of some component parts.

2.3 The fungus itself, if dislodged by fuel during refueling can obstruct fuel filters.

3 Inspection

3.1 Operators uplifting fuel or operating regularly in areas having high normal ambient temperatures and high humidity or where fungus development is known to have been encountered, are advised to scrutinise tank areas for signs of fungus whenever access is gained for any purpose. It is further recommended that, for aircraft operation under these conditions, maintenance schedules should be amended to include visual internal tank checks at periods prescribed by the aircraft constructor.

It is also important, whenever fuel tanks are inspected, to ensure that all passage ways between rib cleats, etc., are not obstructed, so that a drainage path for water is maintained at all times. If the aircraft has been standing in a heated hangar for prolonged periods the fuel in the tanks should be treated with a biocide (see paragraph 4).

3.2 If contents gauges give suspect indications, immediate consideration should be given to the possibility that tank probes may be contaminated with water and/or fungus and appropriate inspections should be carried out.

3.3 Whenever fuel filters are checked they should be closely examined for the presence of slimes of any colour.

3.4 The need to prevent water collection by good maintenance practices and control of fuel supplies is emphasised. A high degree of protection can be maintained by strict adherence to water drain checks before and after refueling and, if the aircraft has been standing for any length of time, again before the next flight. Fuel quality control checks should be rigorously applied.

4 Treatment

4.1 If fungus is discovered, the fuel system should be cleaned as soon as possible by a method approved by the aircraft constructor and the engine manufacturer. It must be appreciated that if the fungus is allowed to develop, cleansing and rectification could become a major operation involving grounding of the aircraft for a long period.

4.2 It is strongly recommended that when aircraft operate in an area where fungal growth can be encountered, of where there is any possibility of temperature in the fuel tanks frequently rising above 25^{o}C, a fungicide additive should be used in the fuel as approved by the aircraft constructor and the engine manufacturer. The frequency of treatment and the dilutions prescribed by the aircraft constructor and the engine manufacturer must be adhered to. Introduction of an unapproved fungicide or inhibitor may jeopardise the safe operation of the aircraft.

No.C11

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

CARBON MONOXIDE CONTAMINATIONS IN AIRCRAFT

1 All concerned are warned of the possibility of dangerous carbon monoxide concentrations in aircraft. All aircraft types may be affected, but this Notice relates mainly to light aircraft.

Note: Carbon Monoxide (CO), a poisonous gas, is a product of incomplete combustion and is found in varying degrees in all smoke and fumes from burning carbonaceous substances. It is colorless, odourless and tasteless.

2 There are two main sources of contamination:

(a) Modifications, such as those involving the introduction of additional openings in the fuselage or the removal of windows and doors, e.g. for camera installations or parachutists: before approval can be given for such modifications, aircraft must be tested to ensure that the cockpit/cabin is free from unacceptable concentrations. Aircraft modified in accordance with an approved scheme must also be subjected to a similar test.

(b) Defective heating systems of the type which utilise an exhaust heat exchange: physical inspections of such systems should be carried out according to manufacturer's instructions at the intervals specified and whenever carbon monoxide contamination is suspected.

3 The other possible sources of contamination:

(a) Apertures in fire walls of single-engined aircraft, ineffective seals at fuselage strut attachments, defective exhaust manifold slip joints, exhaust system cracks or holes, discharge at engine breathers, defective gaskets in exhaust system joints and faulty silencers: aircraft should be carefully examined for defects of this nature during routine inspections which should occur at sufficiently regular intervals.

(b) Exhaust from other aircraft during ground holding and taxying: the obvious precaution in this case is that ground holding and taxying should be carried out cleared of the exhaust area of preceding aircraft.

4 The CAAS should be contacted in cases where the presence of carbon monoxide is suspected and a test for concentration is considered desirable.

5 **Cancellation**

5.1 This Notice cancels Airworthiness Notice No.C11, Issue 1, dated 1 August 1973, which should be destroyed.

No.C12

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

MAINTENANCE OF COCKPIT AND CABIN COMBUSTION HEATERS AND THEIR ASSOCIATED EXHAUST SYSTEMS

1 Introduction

1.1 Investigations of a fatal accident to a large transport aircraft had revealed that the flight crew might have been suffering from carbon monoxide poisoning brought about by the gas escaping from combustion heaters of their associated exhaust systems.

Note: Carbon monoxide (CO), a poisonous gas, is a product of incomplete combustion and is found in varying degrees in all smoke and fumes from burning carbonaceous substances. It is colourless, odourless and tasteless.

1.2 Fitment of oversize nozzles to combustion heaters will increase the concentrations of carbon monoxide in exhaust gases and may cause operating difficulties with the heater. Therefore it is imperative that the only nozzles of the type quoted by the manufacturer are fitted and that servicing, overhaul and inspection standards of combustion heaters and their associated exhaust systems are maintained at a high level.

1.3 This Notice has been raised to provide realistic inspection requirement by introducing heater hours as an alternative criterion. However, the aircraft operator is allowed some flexibility by permitting aircraft hours to be used to establish inspection intervals in place of heater hours.

2 Servicing and Overhaul

2.1 The requirements of this paragraph 2 are applicable to all aircraft whether maintained to an approved maintenance schedule or not.

2.2 Except where otherwise agreed by the CAAS, servicing, overhaul and inspection of combustion heaters and their associated exhaust systems shall be in accordance with the instructions contained in the appropriate manuals produced by the aircraft constructor and the equipment manufacturer. If the instructions in the aircraft constructor's manual differ from those in the equipment manufacturer's manual, those of the aircraft constructor shall be assumed to be overriding.

2.3 In addition to compliance with the provisions of the approved maintenance schedule and appropriate instructions, compliance shall (unless already accomplished in the course of aircraft maintenance) also be shown with (a) and (b), at intervals not exceeding 500 heater operating hours or two years, whichever is sooner (but see paragraph 2.4).

(a) Combustion heaters and their exhaust system shall be completely dismantled and inspected, and restored to the extent necessary to ensure continued safe operation. Combustion chambers shall, in addition, be pressure tested.

(b) The hot air outlet ducting adjacent to the heater shall be inspected for exhaust contamination and appropriate action shall be taken where there is any evidence of contamination.

2.4 Unless equipment which records heater operating hours is installed, it must be assumed that heater hours are equal to aircraft flying hours, or some percentage of flying hours that has been agreed with the CAAS. Applications for the agreement of a flying hour percentage should be made to the Airworthiness Section of the CAAS.

3 Maintenance Schedule Amendment

3.1 Appropriate 'B' amendments must be submitted by all holders of CAAS approved maintenance schedules affected by these revised requirements.

4 Proprietary carbon monoxide detectors are available. Whilst the use of such detectors may be an aid to the detection of carbon monoxide contamination in aircraft, their use is not considered to be a satisfactory substitute for the procedure detailed in this Notice.

No.C17

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

VERTICAL SPEED INDICATORS ON IMPORTED AIRCRAFT

1 Introduction

1.1 An incident to a light aircraft has shown the possible danger of the presentation of false information to the pilot due to reversed indication by the vertical speed indicator during a fast rate of descent.

1.2 United Kingdom approved instruments and instruments complying with the United States TSO specification C8b are fitted with stops to prevent such occurrence. It is not known whether other instruments, particularly those likely to be installed in imported aircraft of less than 5 700 kg maximum weight are similarly equipped.

2 Action

2.1 Before issue or renewal of the certificate of airworthiness of an imported aircraft, it shall be established whether the vertical speed indicator is fitted with limit stops. This may be done by test or reference to the manufacturer.

2.2 If stops are not fitted, either the vertical speed indicator shall be replaced by an instrument that has stops, or alternatively the placard defined in paragraph 3 shall be fitted.

3 Placard

3.1 The following placard shall be fitted adjacent to a vertical speed indicator not fitted with stops:

"This indicator is not fitted with limit stops and a rate of change of altitude in excess of the maximum calibration will cause indication in the reverse sense."

3.2 The placard may, as a temporary measure, be typewritten on white card, but shall be replaced by a more permanent placard as soon as possible.

4 Record

4.1 A record of the action taken to comply with paragraph 2 above shall be made in the aircraft log book, quoting the serial number of the instrument.

No.C24

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

MAINTENANCE REQUIREMENTS FOR VARIABLE PITCH PROPELLERS

1 Introduction

1.1 For most propeller types the propeller manufacturer will publish overhaul periods and any necessary maintenance inspection instructions which will be applied by the operator at the periods specified unless varied by the Approved Maintenance Schedule.

1.2 It has been recognized though that there are a few proper types where the manufacturer has not published overhaul lives in terms of hours or calendar period. In order to ensure that these propellers are being maintained in a satisfactory condition, the inspection of this Notice are required to be applied at the periods stated.

1.3 A situation also exits where, for a low utilization operation, the calendar period can be reached when a propeller has run only a small percentage of its operating hours limit. Under these circumstances, wear would not be expected to be a problem while degradation of seals and corrosion are more likely to exist. This Notice introduces an alternative maintenance policy which, subject to intermediate inspections, as specified in the appendix, will monitor the condition of a propeller such that it can be operated beyond its calendar period to achieve its operating hourly limit.

1.4 Any overriding mandatory requirements in respect of particular propellers, issued either by the Airworthiness Authority of the country of manufacture of a propeller, or by the CAAS will take precedence over this Notice. For the purpose of compliance with an AD which specifies requirements as a function of overhaul, the bare blade inspection required by paragraph 4.2.2 shall be deemed as an overhaul.

2 Applicability

2.1 The requirements of this Notice are applicable to variable pitch propellers, variable pitch propellers which have been locked and to ground adjustable propellers.

3 **Compliance**

3.1 The maintenance policy defined in either paragraph 3.1(a) or (b) or (c) must be applied to all variable pitch and ground adjustable propellers.

(a) Overhaul at the operating hours or calendar period recommended by the manufacturer, whichever occurs first, unless varied by the Approved Maintenance Schedule.

(b) The hub/blade and bare blade inspections specified in paragraphs 4.2.1 and 4.2.2 of this Notice must be applied when:

(i) No calendar or operating hour overhaul intervals are recommended by the manufacturer, or

(ii) Only operating hour overhaul intervals are recommended by the manufacturer with no associated calendar recommendation.

(c) For a propeller fitted to an aircraft which has a low utilization, and for which the manufacturer has specified overhaul periods in terms of operating hours and calendar periods, the calendar life limitation only may be exceeded subject to compliance with the hub/blade and bare blade inspections specified in paragraphs 4.2.1 and 4.2.2 of this Notice.

3.2 The periods of operation or elapsed calendar time prescribed in the appendix to this Notice shall be calculated from the date of the initial installation of the propeller on an aircraft following manufacture or complete overhaul of the propeller and may be preceded by a period of storage of up to 2 years which has been carried out in accordance with the manufacturer's recommendations.

3.3 The applicability and compliance requirements of this Notice are summarized in the appendix to this Notice Tables 1 and 2.

4 **Propeller Inspections**

4.1 The inspection of propellers required by Tables 1, 2 or 3 must be undertaken by an organisation approved by the CAAS for the purpose. However, with the exception of aircraft used for commercial air transport, the inspections required by Table 2 may, subject to prior approval of CAAS, to be undertaken by an aircraft maintenance engineer licensed in Category C for the type of engine to which the propeller is fitted.

4.2 The inspections and re-work shall be carried out in accordance with the manufacturer's instructions and as a minimum shall include:

4.2.1 Hub/blade inspection

(a) Dismantling of the propeller sufficiently to gain access to the blade root bearing assemblies.

(b) Thorough cleaning of the blade root assemblies.

(c) Examination for pitting, fretting, corrosion, cracking and other damage of the hub, bearings, blade roots and housing, together with replacement if any disturbed seals. All of the blade surfaces shall be examined for damage, delamination (where applicable), and the presence of corrosion, removing the paint finish as necessary. In cases where de-icer boots or overshoes are installed on the blades, a detailed examination for corrosion around their edges shall be carried out, and if any evidence is found, the boots/overshoes shall be removed to permit a full inspection of the masked areas. Any corrosion shall be removed and the blades re-protected. In cases where de-icer boots/overshoes are removed, replacement parts shall be installed using the facilities prescribed and under conditions and procedures specified, in the relevant manufacturer's Overhaul Manual.

(d) Checking the track of the propeller after refitting, then functioning throughout its operational range by means of an engine run to verify correct performance, and to establish that any vibration is within acceptance limits.

4.2.2 Bare blade inspection

In addition to the hub/blade inspection ref 4.2.1:

(a) Remove of all de-icing boots or overshoes and fairings
(b) Removal of all paint and erosion protection
(c) Removal of all blade root bushings and plugs
(d) Inspection of the complete blade surface for the pressure of corrosion. Any corrosion shall be removed and the blades re-protected and prepared for the re-installation of the blade fittings
(e) Full dimensional inspection of all blades

5 Record of accomplishment

5.1 A comprehensive record of the inspection and work done in accordance with paragraph 4 of this Notice shall be retained and an entry, making a cross reference to this document, shall be inserted in the Propeller Log Book.

6 Cancellation

6.1 This Notice cancels Airworthiness Notice C24, Issue 1, dated 1 October 1986 should be destroyed.

No. C24 Appendix 1

Issue 2

1 July 2003

Propellers shall be maintained in accordance with either (a) or (b) of the appropriate following Table:

Table 1 - Propellers fitted to Commercial Air Transport, Public Transport, Aerial Work and Private Category Aircraft; MTWA above 5700kg

(a)	Overhaul Period	Whichever occurs first of operating hours or calendar period as published by the propeller manufacturer unless varied by the Approved Maintenance Schedule
(b)	Overhaul Period	Operating hours as published by the propeller manufacturer or on condition where no life has been published subject to (i) and (ii) below
	(i) Hub/blade inspection period	Inspect at 3 years since new or overhaul or period inspection (ii) below; repeat at 1 year intervals
	(ii) Bare blade inspection period	Not to exceed 6 years since new, overhaul or last bare blade inspection.

Table 2 – Propellers fitted to Commercial Air Transport, Public Transport, Aerial Work and Private Category Aircraft; MTWA below 5700kg

(a)	Overhaul Period	Whichever occurs first of operating hours or calendar period as published by the propeller manufacturer unless varied by the Approved Maintenance Schedule
(b)	Overhaul Period	Operating hours as published by the propeller manufacturer or on condition where no life has been published subject to (i) and (ii) below
	(i) Hub/blade inspection period	Inspect at 3 years since new or overhaul or inspection (ii) below (but may be phased to next annual check or Certificate of Airworthiness Renewal provided period does not exceed 4 years)
	(ii) Bare blade inspection period	Not to exceed 6 years since new, overhaul or last bare blade inspection.

Note : Hub/blade inspections and bare blade inspections are to be in accordance with the procedures of paragraph 4 of this Notice.

No.C25

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

POWER SUPPLY SYSTEMS FOR AIRCRAFT RADIO INSTALLATIONS

1 Introduction

1.1 This Notice draws attention to the dangers of operation of aircraft in which the entire radio installation was supplied via a single electrical feeder circuit, and states that certificates of airworthiness will not be issued or renewed in respect of aircraft in the transport category and of multi-engined aircraft in any category certificated with such systems.

2 Requirement

2.1 The electrical feeder arrangements shall be such that:

(a) where more than one radio system is installed, no likely single failure (e.g. fuse or a relay) will result in the loss of all radio systems;

Note: It is strongly recommended that such a failure should only result in the loss of one radio system.

(b) where duplicate radio systems, or radio systems which can duplicate a function, are installed, no likely single failure (e.g. a fuse or a relay) will result in the loss of both systems.

3 Interpretation

3.1 In examining electrical feeder arrangements to establish compliance with paragraph 2, the examination for likely single failures should include:

(a) the mechanical and electrical aspects of the supply circuit, including the return path of the electrical supply;

(b) the location within the electrical circuit of fuses, circuit breakers and power switching relays, their physical location in the aircraft and the manner in which they are interconnected;

(c) panels for integrated control of radio systems, audio integration systems, and dimmer control equipment for electronic displays.

No.C28

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

ELECTRICAL GENERATION SYSTEMS - AIRCRAFT NOT EXCEEDING 5 700 KG MTWA

1 Introduction

1.1 Investigation into accidents and incidents involving total loss of generated electrical power to aircraft, the MTWA of which does not exceed 5700 kg, have shown certain inadequacies in the failure warnings and indications provided. Experience has shown that the loss of generated electrical power can remain undetected for a significant period of time, resulting in the serious depletion of the available battery capacity and reduced duration of supplies to essential services under these conditions.

1.2 The purpose of this Notice is to publish requirements for certain aircraft to ensure that a clear and unmistakable warning of loss of generated electrical power is given, and to preserve or provide sufficient electrical energy to operate essential services for an adequate period of time in the event of such a loss occurring.

2 Requirement

2.1 For all multi-engined aircraft, the MTWA of which does not exceed 5700 kg, compliance with paragraphs 2.2, 2.3, 2.4 and 2.5 of this Notice, or with a CAAS approved alternative providing an equivalent level of airworthiness, is required.

2.1.1 Where it can be shown that an aircraft is fitted with such limited electrical and radio equipment, or is certificated to operate under such limited conditions (e.g. VMC day only) that the loss of generated electrical power would not significantly prejudice safe flight, the CAAS will, on application, waive the requirements of this Notice where it is satisfied that compliance would not be justified in the circumstances of a particular case.

2.2 Clear visual warning shall be provided, within the pilot's normal line of sight, to give indication of either

(a) reduction of the generating system voltage to a level where the battery commences to support any part of the main electrical load of the aircraft; or

(b) loss of the output of each engine driven generator at the main distribution point or busbars.

2.3 The battery capacity shall be such that in the event of a complete loss of generated electrical power, adequate power will be available for a period of not less than 30 minutes following the failure, to support those services essential to the continued safe flight and landing of the aircraft, (see paragraph 3.1). This includes an assumed period of not less than 10 minutes from operation of the warning specified in paragraph 2.2, for completion of the appropriate drills. This delay may be reduced to not less than five minutes if the warning system is provided with "attention getting" characteristics (e.g. a flashing light). For the purpose of calculations it shall be assumed that the electrical load conditions at the time of failure warning are those appropriate to normal cruising flight at night (see paragraph 3).

2.4 Where all gyroscopic attitude reference instruments, i.e. bank and pitch indicator and turn and slip indicators, are dependent on electrical power for their operation, at least one of these instruments shall continue to operate without crew action for the prescribed 30 minute period.

Notes: (a) For certain aircraft types a turn and slip indicator may not be acceptable as the sole remaining attitude reference instrument.

(b) Certain aircraft are equipped with both electrically operated and air driven attitude reference instruments. In such cases the air driven instruments will be accepted as providing the emergency attitude information provided that the requirements of paragraph 2.4.1 are met.

2.4.1 The instruments with which the requirement of paragraph 2.4 will be met shall be clearly designated, and

(a) shall be so located on the instrument panel that it will be visible to, and usable by, the pilot from his normal position;

(b) shall be provided with means of indicating that the power supply to the instrument is operating correctly.

2.5 Precise drills covering crew action in the event of electrical general system failures and malfunctions shall be included in the appropriate aircraft manuals, together with a statement of battery endurance under specified load conditions.

3 **Additional Information**

3.1 When ascertaining that the installed aircraft battery capacity is adequate for compliance with paragraph 2.3, the following loads should be taken into account :

(a) Attitude information (where applicable in accordance with paragraph 2.4).

(b) Essential Radio Communication.

Note: For the purpose of calculations it will normally be accepted that intermittent use of single VHF communication equipment satisfies this requirement. Utilisation on the basis of a total 15 minutes reception plus 3 minutes transmission in the 30 minute period would be an acceptable interpretation.

(c) Essential cockpit lighting.

(d) Pitot head heater (applicable only to those aircraft certificated for flight in icing conditions)

(e) Any other services essential for the continued safe flight and landing of the particular aircraft.

(f) Those services which cannot readily be shed when carrying out the drills required under paragraph 2.5

3.1.1 In order to ensure that the essential services, taken into account in accordance with paragraph 3.1, will function adequately for the prescribed period, the calculation of the duration of battery supply should normally be based on the following assumptions:

(a) Only 75% of the "name plate" rating of the battery is available (this is to take into consideration loss of capacity with age, and a realistic state of charge).

(b) The voltage/time discharge characteristic of the battery, appropriate to the load of the listed services, is not extended beyond a battery terminal voltage of 21.5 volts on a 24 volt system, pro rata for 12 volt systems, (this is to ensure that the voltage available throughout the prescribed period is adequate for satisfactory operation of the services).

Note: Only where compliance with this Notice cannot be shown within the criteria of paragraphs 3.1 and 3.1.1, will consideration have to be given to the fitment of additional, or larger capacity, batteries to particular aircraft.

3.2 Applications for the approval of modifications necessary to ensure compliance with the requirements of this Notice should be made in the manner specified in the Singapore Airworthiness Requirements, Section 4, Chapter 4.7. Owners and operators are recommended to contact the constructor concerned or the main agent for information regarding suitable modifications.

No.C31

Issue 2

1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

COMMUNICATIONS TRANSMITTERS IN THE VHF RADIO TELEPHONY BAND 118-136 MHz

1 Introduction

1.1 ICAO Annex 10, Vol. 1, Part 1, paragraph 4.7.1.1, introduced by amendment 52 dated 23 May 1974, states:

"Where 25 kHz channel spacing is introduced, the radio frequency of operation shall not vary more than plus or minus 0.003 per cent from the assigned frequency for new transmitters installed after 1 January 1974, and for all transmitters after 1 January 1981".

2 Requirement

2.1 All VHF transmissions for Singapore registered aircraft shall comply with the frequency tolerance limits of $\pm$ 0.003 per cent prescribed by ICAO.

3 Implementation

3.1 New installations of VHF communications equipment in aircraft will be approved only if the equipment manufacturer's specification for the equipment shows the transmitter frequency tolerance to be within the limits prescribed in paragraph 2.

3.2 Approval of existing installations of equipment agreed prior to 1 July 1982 will remain valid provided the actual transmissions conform to the required new tolerance.

3.3 The CAAS will continue to monitor aircraft transmissions and to inform any operator whose equipment is observed as failing to comply with paragraph 2.

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1 July 2003

Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

GROUND OPERATION OF AIRCRAFT RADAR EQUIPMENT

1 The requirements of this Notice shall apply to all radar equipment with a nominal peak power output rating in excess of 25 kW.

2 During all ground operation, including testing and maintenance of aircraft radar equipment, the operator or person in charge of such equipment shall ensure the following:

2.1 The equipment is not energised in its normal mode (antenna rotating and radar transmitter operative) unless the sector area scanned by the radar beam is clear of the following objects to a distance of 40 metres from the antenna:

(a) aircraft being refuelled or defuelled;

(b) fuel tankers, fuel tanks or fuel storage areas;

(c) persons or cargo;

(d) any other aircraft or aircraft hangar.

Note: For each radar installation the sector area should be defined in terms of readily distinguishable dimensions preferably related to some feature of the aircraft and should appear in the aircraft maintenance manual.

2.2 The equipment is not energised with the antenna stationary when the radar transmitter is operative and the antenna directed towards any of the objects specified in paragraph 2.1 unless the distance separating them from the antenna is in excess of 70 metres.

2.3 The distance specified in paragraphs 2.1 and 2.2 may be reduced by 75 per cent when a CAAS approved beam attenuating device is used between the antenna and any object specified in paragraph 2.1.

2.4 The equipment is not energised in any radiating mode of operation when the aircraft in which the equipment is fitted is in a hangar or other enclosure unless a suitable microwave energy absorbing shield is fitted over the antenna.

2.5 The equipment is not operated in any aircraft during fuelling operations.

Note: During all testing of aircraft radar equipment the beam should, whenever possible, be directed with maximum upward tilt toward a clear area.

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Civil Aviation Authority of Singapore

Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

ELECTRICAL GENERATION SYSTEMS – SINGLE-ENGINED AIRCRAFT

1 Applicability

1.1 When Airworthiness Notice C28 was introduced, it was considered inappropriate to impose the whole or part of those requirements on single-engined aircraft. However, systems which were once fitted only in the more complicated twin-engined general aviation aircraft have now been developed and fitted to single-engined aircraft. Thus, greater reliance is being placed on the integrity of the electrical power supplies for such aircraft.

1.2 Recent investigations into accidents and incidents involving loss of electrical power on single-engined aircraft have shown that the standards for warning of failures of generated power have not kept pace with such system developments and inadequacies are all too often apparent.

1.3 The purpose of this Notice is to publish a requirement that clear and unmistakable warning of the loss of generated electrical power shall be provided on single-engined aircraft as detailed in paragraph 2.1.1, by the introduction, where necessary, of retrospective modifications.

2 Requirements

2.1 For all single-engined aircraft fitted with systems or equipment as defined in paragraph 2.1.1 of this Notice, compliance with paragraphs 2.2 and 2.3, or with a CAAS approved alternative providing an equivalent level of airworthiness, is required.

2.1.1 Compliance with this Notice will be required on single-engined aircraft equipped with electrically-operated systems or equipment the loss of which could prejudice continued safe flight and landing. Such systems or equipment include:

(a) electrically-powered mandatory flight instruments where no acceptable alternatives are provided;

(b) electronic ignition;

(c) electrically-operated landing gear;

(d) a minimum radio fit;

(e) any other system which could prejudice continued safe flight and landing.

2.2 A clear and unmistakable red visual warning shall be provided, within the pilot's normal scan of vision, to give indication of the reduction of the voltage at the aircraft bus-bar to a level where the battery commences to support all or part of the electrical load of the aircraft.

2.3 Guidance shall be given in the appropriate aircraft manual(s) on any actions to be taken by the pilot should the warning operate. See also paragraph 3.2.

3 Additional information

3.1 The recommended voltage levels for operating the warning required under paragraph 2.2 of this Notice are 25 volts to 25.5 volts for a nominal 24 volt dc system and 12.5 volts to 13 volts for a nominal 12 volt dc system.

3.2 The battery duration should be sufficient to make a safe landing and should not be less than 30 minutes, subject to the prompt completion of any drills. This duration need only be a reasonable estimate and not necessarily calculated by a detailed electrical load analysis. However, when making this estimate, only 75% of the battery name plate capacity should be considered as available because of loss of battery efficiency during service.

3.3 Owners and operators are recommended to contact the aircraft constructor or main agent for information regarding suitable means of compliance with this Notice.

No.C42

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Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

ACCEPTANCE OF AIRCRAFT STANDARD PARTS BY USERS

1 Introduction

1.1 This Airworthiness Notice is issued for information and guidance for users to cover procurement of aircraft standard parts and should be read in conjunction with the appropriate Chapters in the Singapore Airworthiness Requirements.

1.2 For the purpose of this Notice the following definitions apply:-

(a) **Aircraft Standard Parts** are items intended for incorporation into an aircraft, its engines, propellers, or equipment, being items made to National Specifications (AN, MS, etc) and called up by the design organisation as such.

(b) **The User** is the person or organisation incorporating the aircraft standard part into an aircraft, its engines, propellers, or equipment.

(c) **A Design Organisation** is an organisation approved or recognised by the CAAS as competent to design complete aircraft, engines, propellers, equipment, or modifications to such parts.

2 User Responsibilities

2.1 The user of aircraft standard parts is responsible for ensuring that the parts are serviceable and confirm to the standard determined by the appropriate Design Organisation as being suitable for the intended application. In order to discharge this responsibility, the user must when obtaining aircraft standard parts from suppliers ensure that his purchase order contains accurate definitions of the aircraft standard parts to be met by the supplier in satisfying the order.

2.2 No aircraft standard parts certification given by manufacturers and distributors can relieve the user of his responsibility for ensuring that purchased aircraft standard parts are to the required build standard and are of acceptable manufacturing origin.

2.3 The following paragraphs give guidance on acceptable means by which these basic responsibilities may be met.

3 Determination of Quality Control and Certification Requirements

3.1 When an aircraft standard part, as defined in this Notice, is manufactured to a National Specification it should be identified by a description and part number provided either by the Design Organisation directly responsible for the part or by the Design Organisation responsible for the application of the aircraft part.

3.2 The supplier should give some form of certification of conformance of the standard parts with the applicable specification and quoting identifying part numbers.

3.3 Compliance with the requirement for the user to be satisfied, to an extent appropriate to the application, that aircraft standard parts are genuine and serviceable at the time of use will always require some degree of inspection or test.

4 Purchase Order Requirements

4.1 Purchase orders placed on suppliers of aircraft standard parts should specify the following:

(a) The full description and identify of the parts to be supplied; including part numbers and/or specifications, any special finishes and features.

(b) That a certification be made by the supplier, if it is the manufacturer, when despatching the aircraft standard parts that the parts supplied comply in all respects with the description.

(c) In the case where the supplier is a distributor, that a certification from the manufacturer, when despatching the aircraft standard parts that the parts supplied comply in all respects with the description.

5 Verification Procedures

5.1 The user must institute adequate receipt procedures to confirm that aircraft standard parts and their accompanying documentation comply with the terms of the Purchase Order.

5.2 Documentation checks should include verification that part numbers, type numbers, and standards are correct, that the parts were obtained from the sources quoted with correct certification.

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Singapore Changi Airport, P O Box 1, Singapore 918141, Republic of Singapore, Tel: 65421122, Telefax No : 65421231

AIRWORTHINESS NOTICE

TYRE BURSTS IN FLIGHT - INFLATION MEDIA

1 Applicability

1.1 This Airworthiness Notice is applicable to all Singapore registered aeroplanes over 5700 kg MTWA.

2 Introduction

2.1 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.

2.2 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.

2.3 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.

2.4 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 immediate effect 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 reinflated or serviced in accordance with the agreed procedure at the earliest opportunity or within 25 flight hours, whichever is the sooner.

4 Additional Information

4.1 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.