Civil Aviation Amendment Order (No. R93) 2004

I, WILLIAM BRUCE BYRON, Director of Aviation Safety, on behalf of CASA, issue the following Civil Aviation Order under regulation 31.001 of the *Civil Aviation Safety Regulations 1998*.

[Signed Bruce Byron]

Bruce Byron
Director of Aviation Safety and
Chief Executive Officer

12 December 2004

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1 Name of Order

This Order is the Civil Aviation Amendment Order (No. R93) 2004.

2 Commencement

This Order commences on gazettal.

3 Replacement of section 101.54 of the Civil Aviation Orders

Section 101.54 of the Civil Aviation Orders is omitted and a new section substituted as set out in Schedule 1.

Schedule 1 Substitution of section 101.54 of the Civil Aviation Orders

SECTION 101.54

AIRWORTHINESS CERTIFICATION REQUIREMENTS — MANNED FREE BALLOONS

1 APPLICATION

1.1 This section specifies airworthiness certification requirements for the purposes of regulation 31.001 of the *Civil Aviation Safety Regulations 1998* (CASR 1998).

3 DESIGN STANDARDS

3.1 Special conditions:

If CASA finds that the design standards specified in this subsection do not provide adequate or appropriate safeguards against particular features or characteristics of a balloon, CASA may issue such special conditions which add to or vary the design standards for that aircraft as it finds necessary to restore a level of safety equivalent to that otherwise established in the design standards.

3.2 Basic requirements and equivalent safety:

(a) the design standards which follow shall be complied with, as applicable, unless CASA has determined on the basis of evidence submitted that any item not complied with is compensated for by factors which provide an equivalent level of safety;

(b) imported balloons:

(i) FAR Part 31 or the BCAR Part 31 for manned free balloons against which compliance was required for original type certification by the competent authority in the State of manufacture; and

(ii) those requirements specified in paragraphs 3.3 and subsequent of this section;

Note: An intending purchaser of an imported balloon for which original type certification was to standards other than the FAR or the BCAR should consult CASA as to the acceptability of those other standards.

(c) balloons of Australian manufacture:

(i) FAR Part 31 or the BCAR Part 31 effective at the date of application for the type certificate; and

(ii) those requirements specified in paragraph 3.3 and subsequent of this subsection.

Note 1: Airworthiness Directives must be complied with before a certificate of airworthiness will be issued for an individual balloon.

Note 2: The requirement of FAR 31, paragraph 31.47 (d) and the requirements of BCAR Part 31, paragraphs 31.47 (d) to (g) inclusive are not applicable to balloons of Australian manufacture. In lieu of those requirements, the requirement of paragraph 3.3 of this subsection is to be complied with.

Note 3: The requirements of FAR 31, paragraph 31.65 and BCAR Part 31, paragraph 31.65 are not applicable to balloons of Australian manufacture.

Note 4: The requirements of FAR 31, paragraph 31.82 are not applicable to balloons of Australian manufacture.

HEATER

3.3 Heater endurance test:

(a) the heater system (including the burner unit, controls, fuel lines, fuel cells, regulators, control valves and other related elements) must be substantiated by an endurance test designed to reflect the limiting conditions likely to be encountered in service, both in kind and duration. The endurance test proposed by the manufacturer must be approved by CASA. In performance of the test, each element of the system must be installed and tested so as to simulate the actual balloon installation; and

(b) the test must also include at least 3 flameouts and restarts; and

(c) each element of the system must be serviceable at the end of the test; and

(d) the pilot light (or other means of ignition) must be shown to operate reliably in typical gusts and rain, must be readily accessible for relighting and must be easily relit.

Note 1: Appendix I to this section describes an acceptable means of demonstrating compliance with the requirements of this paragraph.

SYSTEMS

3.4 Instruments:

The balloon shall be provided with the following instruments installed in such a manner that they are clearly legible by the crew:

(a) all balloons:

(i) sensitive altimeter with barometric scale calibrated in millibars in increments of not more than 2 millibars; and

(ii) vertical speed indicator;

(b) hot air balloons:

(i) fuel quantity gauge or other means (such as isolated tanks which can be used in sequence) which enable the pilot to know the quantity of fuel remaining. The gauge or gauges must be calibrated in appropriate units or in percent of fuel cell capacity over a range from empty to at least 30% of capacity; and

(ii) envelope temperature indicator which may be of the continuous reading type or a type which gives a warning signal; and

(iii) outside air temperature thermometer**.**

DESIGN AND CONSTRUCTION

3.5 Basket:

3.5.1 The basket shall be provided with a sufficient number of hand-holds to provide at least 1 for each occupant. The hand-holds shall be so located that the risk of injury to the occupants using them is minimised.

3.5.2 The basket must be provided with drain holes which minimise the risk of accumulation of fuel within the basket.

Note: The basket and equipment carried therein should, as far as is practicable, be manufactured from non-magnetic materials.

4 DOCUMENTS

4.1 General:

CASA shall be supplied with a copy of each of the documents and data listed in paragraphs 4.2 to 4.4 inclusive. They shall be in the English language and either in document form or an acceptable microformat.

Note: Design data contained in manufacturers' documents will be treated as confidential information and will not be communicated to other persons without the written permission of the manufacturer concerned.

4.2 Design data:

The required design data for an imported aircraft is listed here, but the data required for an aircraft of Australian manufacture will be specified by CASA in determining the suitability of the design for the issue of a type certificate under regulation 21.029 of CASR 1998:

(a) summary report providing statements of the means of compliance with the requirement paragraphs of this section including, where applicable, a reference to other documents in which compliance is substantiated; and

(b) reports substantiating compliance with the requirement paragraphs of this section; and

(c) type certificate and type certificate data sheet or equivalent documents issued by the competent authority in the State of manufacture; and

(d) ground and flight type inspection reports or, where these do not exist, such other reports which summarise compliance of the aircraft by inspection and flight assessment, approved by the above competent authority; and

(e) a specimen flight manual for the balloon model, approved by the above competent authority; and

Note: An acceptable flight manual format is detailed at Appendix II.

(f) list of type design data, including reports, required by, or submitted to, the above competent authority in respect of the balloon, basket and heater system — some of these data may be required by CASA; and

(g) details of any additional requirements, including special conditions, and exemptions, exceptions, equivalent safety findings and any other deviations required or approved by the above competent authority; and

(h) type record or reports which summarise the design basic loads and the acceptability of the balloon against the structural design standards approved by the above competent authority; and

(i) all general assembly drawings and station diagrams for the balloon; drawings of all major structural elements and assemblies, and of all essential systems and services including heater systems; and

(j) complete drawing list.

4.3 Service documents:

All current field service documents and advice to operators which contain modifications or changes, or which establish or change inspections in respect of the envelope, basket, basket suspension system or heater system, together with statements from the manufacturers in which undertakings are given to supply CASA copies of all subsequent documents of that type.

4.4 Manuals:

(a) manufacturer's manuals dealing with airworthiness limitations as well as schedules and procedures for inspection, maintenance, overhaul and repair of the balloon, including its envelope, heater system, basket and its equipment, and basket suspension system; and

(b) manufacturer's manual detailing procedures for flight operation; and

(c) illustrated parts catalogues for the balloon including its envelope, basket, basket suspension system, heater system and its equipment; and

(d) manufacturer's documents detailing any additional or special operating characteristics and functional test procedures for services, systems and equipment, including equipment manufactured to commercial specifications.

APPENDIX I

HOT AIR BALLOONS — HEATER ENDURANCE TEST

1 HEATER AND ASSOCIATED EQUIPMENT

1.1 General

(a) This Appendix describes an acceptable means of demonstrating compliance with the requirement of subparagraph 3.3 of this section in the case of heaters which are provided with controls which have a means of modulating power output. The test will need to be modified for heaters with other types of controls.

(b) The test shall be conducted such that the complete heater system including the burner unit, controls, fuel lines, fuel cells, regulators, control valves and other related equipment are substantiated. Each element of the system must be installed and tested so as to simulate the actual balloon installation. The system shall complete the prescribed test without failure or malfunction

1.2 Heater System Test

(a) The test is to be so conducted such that the block of cycles in (b) is repeated 10 times.

(b) Each block is to consist of the following spectrum:

Segment	Power Setting (% maximum design output)	Number of cycles (seconds)	Duration of cycles
1	100	80	5
2	50	200	10
3	30	300	10
4	20	360	10
5	100	1	900

Note 1: Each segment is to be conducted in the sequence tabulated above.

Note 2: The test may be interrupted if necessary.

Note 3: Each cycle of each segment is to be repeated at the following intervals:

(a) power setting of 100% — not less than 100 seconds after the completion of the preceding cycle;

(b) power setting of less than 100% — not less than 50 seconds after the completion of the preceding cycle.

Note 4: Each block of test cycles, i.e., the spectrum defined in (b), is to be commenced at an interval of not less than 1 hour from the completion of the previous block.

Note 5: The burner is to be inspected for defects at the conclusion of each of the 10 blocks. Evidence of any defect or malfunction is to be regarded as a failure.

APPENDIX II

FLIGHT MANUAL

1 INTRODUCTION

1.1 This Appendix describes an acceptable method for presenting the data for the flight manual.

1.2 The content of the manual shall be based on data determined in accordance with the requirements of this section, on manufacturer's specifications and procedures and on such other data as are specified or approved by CASA.

1.3 The manual shall be in the English language.

1.4 If a flight manual is to be prepared specially for use in Australia, the data it contains should, where practicable, be presented in the following units:

weights	kilograms
balloon dimensions	millimetres
distance (e.g., landing)	metres
fluid quantities (e.g., liquids: fuel and oil)	litres
speeds	knots
altitudes and vertical distances	feet
rates of climb	feet/minute
pressure	kilopascals
temperatures	degrees Celsius

1.4.1 If a quantity expressed as a unit on the face of an aircraft instrument is to be presented in the flight manual for a balloon, it must be presented using the same system of unit as on the instrument.

1.5 The manual shall have a protective cover and shall be in such a form as can be readily amended.

1.6 The manual shall be specifically identified and this identification shall appear on each page of the manual together with the date of issue of that page. Each page shall be marked or otherwise identified as being approved by CASA, except section 7, the contents of which are separately approved by a weight control officer or other authorised person.

1.7 The flight manual may form part of another manual.

2 CONTENTS OF FLIGHT MANUAL

2.1 The manual shall comprise the following distinct sections and each section shall be clearly identified and separated from each other section.

Section 1 — General
Section 2 — Limitations
Section 3 — Normal procedures

Section 4 — Emergency procedures
Section 5 — Mandatory equipment list
Section 6 — Radio systems
Section 7 — Weight and balance
Section 8 — Supplements.

2.2 **Section 1 — General** — shall contain the following:

(a) an approval page which shall include:
  (i) name of the manufacturer; and
  (ii) balloon type and model; and
  (iii) balloon serial number; and
  (iv) nationality and registration markings of the balloon; and
  (v) airworthiness certification category; and
  (vi) number of the associated certificate of airworthiness; and
  (vii) provision for the signature of a delegate of CASA signifying his or her approval of the manual, together with the date of his approval;

(b) a table of contents which shall clearly indicate those parts of the manual which are approved;

(c) pages for the recording of both general and particular amendments including a description of the amendment system;

(d) an introduction page specifying the applicability of the manual, the requirement for its carriage in the balloon and the manner of issue of amendments;

(e) definitions of the following terms:
  (i) airfield pressure altitude;
  (ii) any other term used in the manual which may not be readily understood;

(f) general data appertaining to the balloon which shall include the following:
  (i) approved fuel types and grades;
  (ii) total and usable capacity of each fuel cell.

2.3 **Section 2 — Limitations** — shall contain the following limitations together with any other item established as being a limitation on the operation of the balloon:

(a) the maximum weight of the balloon determined in accordance with the requirements of section 31.14 of Part 31 of the Federal Aviation Regulations or of the British Civil Airworthiness Requirements, as applicable;

(b) the empty weight of the balloon determined in accordance with the requirements of section 31.16 of Part 31 of the Federal Aviation Regulations or of the British Civil Airworthiness Requirements, as applicable;

(c) the rate of climb of the balloon determined in accordance with section 31.17 of Part 31 of the Federal Aviation Regulations or of the British Civil Airworthiness Requirements, as applicable;

(d) the maximum vertical velocity of descent of the balloon, the altitude loss required to attain that velocity and the altitude loss required to recover from a descent at that velocity, when determined in accordance with section 31.19 of Part 31 of the Federal Aviation Regulations or of the British Civil Airworthiness Requirements, as applicable;

(e) miscellaneous:

(i) minimum flight crew;

(ii) maximum permissible number of occupants;

(iii) a statement of any restriction on smoking in the balloon;

(iv) maximum permissible operating altitude;

(v) maximum permissible envelope temperature;

(vi) maximum certificated weight;

(vii) a statement of the inscription on, and the location of, each placard which is required to be displayed, together with an explanation of the significance of any instrument colour markings.

2.4 **Section 3 — Normal Procedures —** shall contain recommended procedures and information necessary for the safe operation of the balloon, and shall include at least the following:

(a) check lists as appropriate to the operation of the balloon;

(b) procedures and limitations in the use of all balloon systems.

2.5 **Section 4 — Emergency procedures —** shall contain those operating procedures for flight and system emergency conditions which are essential for the continued safe operation of the balloon. The procedures shall be presented as briefly as possible commensurate with maximum clarity.

2.6 **Section 5 — Mandatory equipment list —** The instruments and indicators which must be installed and serviceable to ensure compliance with the basis of airworthiness certification of the balloon shall be listed.

2.7 **Section 6 — Radio systems —** shall provide for listing radio communication and navigation systems installed in the balloon, together with their maximum altitude limitations applicable to the types of operation for which the balloon radio system is approved.

2.8 **Section 7 — Weight and balance —** shall contain the following:

(a) information necessary to ensure loading of the balloon within the limitations specified in section 2 of the manual, including:

(i) a load data sheet; and

(ii) an equipment list; and

(iii) where appropriate, a loading system including such instructions as are necessary to ensure correct use of the system;

(b) where a loading system is not required, the flight manual shall contain a statement to this effect;

(c) where the loading system takes the form of a placard in the crew compartment, the flight manual shall contain a statement of the inscription on and the location of the placard.

Note 1: Flight manual loading data approved by a weight control officer should not bear additional indication of CASA approval

2.9 **Section 8 — Supplements —** shall contain in the form of supplements, information applicable to any installed equipment or operation of the balloon not covered by the body of the manual. Each supplement shall describe the equipment or operation of the balloon to which it is related and shall list any additions to or revisions of the limitations and procedures of the basic manual.