ITSO-C30c

Effective Date: XX-XX-2015

Government of India
Directorate General of Civil Aviation
Aircraft Engineering Directorate
New Delhi- 110003.

Indian Technical Standard Order

Subject: AIRCRAFT POSITION LIGHTS

1. PURPOSE

This Indian Technical Standard Order (ITSO) is for manufacturers of aircraft position lights applying for an ITSO Authorization (ITSOA).

2. APPLICABILITY

This ITSO affects new applications submitted after its effective date.

3. REQUIREMENTS

The aircraft position lights identified and manufactured under this ITSO must meet the Minimum Performance Standard (MPS) qualification of SAE standard AS8037C (Revision dated July, 2013), and the documentation requirements in this ITSO.

a. **Exceptions/ Additions to standard AS8037C:**

(i) The colours of the position lights shall be compliant to 14 CFR Part 23,25,27,29 § 2- .1397 having chromaticity coordinates as per (CIE 1931, 2 degrees observer) International Commission on Illumination.

(ii) The position lights only compliant to alternate colour definitions as detailed in SAE standard AS8037C without compliance to the CFR requirements will require an Equivalent Level of Safety Finding by the Directorate General of Civil Aviation, India in order to allow installation of the lights on DGCA certified/validated/accepted aircraft.

(iii) In addition to requirements in section 3.4 of standard AS8037C, the materials used should be self-extinguishing type when tested in accordance with Appendix F of 14 CFR Part 25.

b. **Functionality:** This ITSO standard apply to aircraft position lights that are intended to enable a pilot to locate another aircraft as well as help determine its direction of flight during the flight operations. The position lights when lighted also indicate aircraft extremities thus providing its relative position when parked or moved in close proximity in the flight operations area of an airport.

c. **Failure Condition Classifications:** Loss of function defined in paragraph 3.b. is considered to be a Minor failure condition. The lighting system should be designed to at least this failure condition classification.

d. **Functional Qualification:** Demonstrate the required functional performance and characteristics under the test conditions specified in Section 3of standardAS8037C.

e. **Environmental Qualification:** Demonstrate the required performance under the test conditions specified in Section 4.2 of AS8037C, using RTCA DO-160G, Standard Environmental Conditions and Test Procedures, issued on December 8, 2010 appropriate for the position lights.

f. **Software Qualification:** If the article includes software, develop the software according to RTCA, Inc. document RTCA DO-178C, Software Considerations in Airborne Systems and Equipment Certification, issued on December 13, 2011 to at least the software level consistent with the failure condition classification associated with the appliance.

g. **Electronic Hardware Qualification:** If the article includes complex custom airborne electronic hardware, develop the component according to RTCA, Inc. Document RTCA DO-254, Design Assurance Guidance for Airborne Electronic Hardware, issued on April 19, 2000 to at least the design assurance level consistent with the failure condition classification associated with the appliance. For custom airborne electronic hardware determined to be simple, RTCA DO-254, paragraph 1.6 applies.

h. **Deviations:** There are provisions for using alternate or equivalent means of compliance to the criteria in the MPS of this ITSO. If these provisions are invoked, it must be shown that the system maintains an equivalent level of safety. Apply for a deviation under the provision of CAR 21.610.

4. MARKING

a. Mark at least one major component permanently and legibly with all the information given in ;

(i) CAR 21.609(e) and 21.807(a)&(b)

(ii) Type I, II, or III (ref. SAE AS8037, Rev. C)

(iii) Nominal power input rating of the light assembly.

The marking must include the name of the manufacturer, serial number, part number and the ITSO number.

b. Also, mark the following permanently and legibly, with at least the manufacturer's name, sub-assembly part number and the ITSO number;

(i) Each component that is easily removable (without hand tools); and

(ii) Each sub-assembly of the article that is determined to be interchangeable.

5. APPLICATION DATA REQUIREMENTS

The applicant must submit to DGCA (AED), a Statement of Compliance (Form CA-35 of CAR-21) along with documents required under CAR 21.605 and one copy of each of the following technical data in support of design and production capability:

a. Manual(s) containing the following:

(i) Operating instructions and article limitations sufficient to describe the Equipment's operational capability.

(ii) Description in detail of any deviations.

(iii) Installation procedures and limitations sufficient to ensure that the position lights, when installed according to the installation or operational procedures, still meets this ITSO's requirements. Limitations must identify any unique aspects of the installation. The limitations must include a note with the following statement:

"This article meets the minimum performance and quality control standards required by Indian technical standard order (ITSO). Installation of this article requires separate approval."

b. For each unique configuration of software and airborne electronic hardware, reference the following:

(i) Software part number including revision and design assurance level.

(ii) Airborne electronic hardware part number including revision and design assurance level, and,

(iii) Functional description.

c. A summary of the test conditions used for environmental qualifications foreach component of the article.

(i) Software part number including revision and design assurance level.

(ii) Schematic drawings and wiring diagrams, and any other documentation necessary for installation of the position lights.

(iii) List of replaceable components by part number that makes up the position lights.

d. Instructions covering periodic maintenance, calibration and repair for the continued airworthiness of the position lights. Include recommended inspection intervals and service life, as appropriate.

e. If the article includes software; a plan for software aspects of certification (PSAC), software configuration index, and software accomplishment summary.

f. If the article includes simple or complex custom airborne electronic hardware; a plan for hardware aspects of certification (PHAC), hardware verification plan, top-level drawing, and hardware accomplishment summary (or similar document, as applicable).

g. A drawing depicting how the article will be marked with the information given in paragraph 4.

h. Identify functionality or performance contained in the article not evaluated under paragraph 3 (i.e., Non-TSO/ITSO functions). Non-TSO/ITSO functions are accepted in parallel with the ITSO authorization. For those non-TSO/ITSO functions to be accepted, applicant must declare these functions and include the following information with ITSO application:

(i) Description of the non-TSO/ITSO function(s), such as performance specifications, failure condition classifications, software, hardware, and environmental qualification levels. Include a statement confirming that the non- TSO/ITSO function(s) does not interfere with the article's compliance with the requirements of paragraph 3.

(ii) Installation procedures and limitations sufficient to ensure that the non TSO/ITSO function(s) meets the declared functions and performance specification(s) described in paragraph 5.h.(i).

(iii) Instructions for continued performance applicable to the non-TSO/ITSO function(s) described in paragraph 5.h.(i).

(iv) Interface requirements and applicable installation test procedures to ensure compliance with the performance data defined in paragraph 5.h.(i).

(v) Test plans, analysis and results, as appropriate, to verify that performance of the hosting ITSO article is not affected by the non-TSO/ITSO function(s).

(vi) The quality system description required by subpart G or Subpart F of CAR 21, including functional test specifications. The quality system should ensure that holder of ITSOA will detect any change to the approved design that could adversely affect compliance with MPS of this ITSO, and reject the article accordingly.

i. Material and process specifications list.

j. List of all drawings and processes (including revision level) that define the article's design.

k. Manufacturer's ITSO qualification report showing results of testing accomplished according to paragraphs3.dofthis ITSO.

6. MANUFACTURER DATA REQUIREMENTS

In addition to the above application data, each manufacturer must make the following technical data available to DGCA (AED) for review:

a. Functional qualification specifications for qualifying each production article to ensure compliance with this ITSO.

b. Article calibration procedure

c. Schematic drawings.

d. Wiring diagrams.

e. Material and process specifications.

f. The results of the environmental qualification tests conducted according to paragraph3.e.

g. If the article includes software, the appropriate documentation defined in RTCA DO-178C including all data supporting the applicable objectives in RTCA DO-178C *Annex A, Process Objectives and Outputs by Software Level*.

h. If the article includes complex custom airborne electronic hardware, the appropriate hardware life cycle data in combination with design assurance level, as defined in RTCA DO-254, Appendix A, Table A-l. For simple custom airborne electronic hardware, the following data; test cases or procedures, test results, test coverage analysis, tool assessment and qualification data, and configuration management records, including problem reports.

i. If the article contains non-TSO/ITSO function(s), applicant must also make available items 6.a. through 6.h. pertaining to the non-TSO/ITSO function(s).

7. FURNISHED DATA REQUIREMENTS

a. If furnishing one or more articles manufactured under this ITSO to one entity (such as an operator or repair station), provide one copy or on-line access to the data in paragraphs 5.a. and 5.b. Add any other data needed for the proper installation and continued airworthiness of the position lights with this ITSO.

b. If the article contains declared non-TSO function(s), include one copy of the data mentioned in paragraphs 5.h.(i) through 5.h. (vi).

8. HOW TO GET REFERENCED DOCUMENTS:

(1) Copies of SAE standard AS8037Cmay be purchased on-line through web site: www.sae.org

(2) Copies of RTCA documents may be purchased on-line through web site: www.rtca.org

(3) Copies of CAR 21 are available on DGCA website www.dgca.nic.in .

(Lalit Gupta)
Joint Director General
for Director General of Civil Aviation