Advisory Circular

Subject: **Mixing Aeronautical Ground Lighting Technologies**

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1.0 INTRODUCTION

(1) This Advisory Circular (AC) is provided for information and guidance purposes as a result of numerous queries from stakeholders looking for guidance on the application of the standard. It may describe an example of an acceptable means, but not the only means, of demonstrating compliance with regulations and standards. This AC on its own does not change, create, amend or allow deviations from regulatory requirements, nor does it set up standards.

1.1 Purpose

(1) This AC discusses the use of different AGL technologies (solid state vs incandescent) within AGL installations.

1.2 Applicability

(1) This document applies to all aerodrome operators. This information is also available to the aviation industry for information purposes.

1.3 Description of Changes

(1) Not applicable

2.0 REFERENCES AND REQUIREMENTS

2.1 Reference Documents

(1) It is intended that the following reference materials be used in conjunction with this document:

- (a) Transport Canada Publication, TP 312 – Aerodrome Standards and Recommended Practices;
- (b) Canadian Aviation Regulations; Standard 325.

2.2 Cancelled Documents

(1) Not applicable.

(2) By default, it is understood that the publication of a new issue of a document automatically renders any earlier issues of the same document null and void, unless an earlier issue remains valid under coming into force provisions by regulation.

2.3 Definitions and Abbreviations

(1) The following **abbreviations** are used in this document:

- (a) **AC:** Advisory Circular
- (b) **AGL**: Aeronautical Ground Light
- (c) **ATC**: Air Traffic Control
- (d) **ICAO**: International Civil Aviation Organization
- (e) **LED**: Light Emitting Diodes
- (f) **NOTAM**: NOtice To AirMen
- (g) **TCCA**: Transport Canada Civil Aviation

3.0 BACKGROUND

(1) The efficiency and effectiveness of solid state lights, such as those having Light Emitting Diodes (LED), over that of incandescent lights have led to a steady increase in the use of LED in aerodrome lighting. The challenge for aerodromes operators looking to convert their incandescent lighting to LED lighting is when, where and how to introduce the new technology. For large installations, such as runway edge lights, approach lighting systems, etc, project implementation timelines may create a potential for having a mix of technologies in individual installations, which could lead to differences in the perception of the lighting by aircrew.

(2) LED fixtures contain electronics to ensure that their response will mimic that of incandescent lighting. Yet even though the measured intensity and distribution of LED can be the same as an incandescent fixture, an LED fixture will be perceived as brighter, which could affect the depth perception of aircrew. In particular LED fixtures produce a more saturated colour that remains essentially the same with brightness step selection whereas an incandescent light fixture will tend to shift to a different colour temperature. For example, a white incandescent fixture will shift towards yellow as the filament is operated at lower setting while an LED fixture will remain white.

4.0 MIXING TECHNOLOGIES

(1) Because mixing LED and incandescent lighting technologies may lead to differences in display, the basic principle is that the conversion from incandescent to LED technology is limited to individual installations to avoid the mixing of technology within the same installation. If a specific conversion project is such that mixing LED and incandescent technologies within an installation is unavoidable, the exposure is minimized and operational procedures are implemented to provide an equivalent level of service and to advise aircraft operators of the mixed technology configuration, via NOTAM or ATC advisories.

(2) An individual AGL installation is one that performs a specific visual aids function. The following is a list of individual AGL installations within which the same technology should be used:

(a) Pair of elevated runway guard lights (RGL), both sides;

(b) Inset RGL;

(c) Stop Bar lights;

Note 1: Where elevated supplemental stop bar lights are installed, each pair are of the same technology on both sides of the taxiway. However, they may be of a different technology than the inset stop bar lights.

Note 2: Individual RGL and stop bars installations at one runway/taxiway intersection can be of different technologies from that at other runway/taxiway intersections.

(d) Touchdown Zone Lights;

(e) Runway Centerline Lights, including the red portion within the end of runway caution zone;

(f) Runway Edge Lights, including the yellow portion within the end of runway caution zone;

(g) Runway threshold lights;

(h) Runway end and stopway lighting;

Note : The lights of runway edge, runway threshold, runway end and stopway lighting may each be of different technology from that of the associated runway centreline and touchdown zone lighting.

(i) Signage: Per location, sign elements making an array of signs are of the same technology.

(j) Runway holding position signs (both sides);

(k) Intermediate holding position signs (both sides);

(l) Rapid Exit Taxiway Indicator Lights (RETIL);

(m) Precision Approach Path Indicator (PAPI) – (both sides of a runway, if installed);

(n) Approach Lighting Systems: Per runway end, the white steady burning lights of an approach lighting system are of same technology;

Note 1: All the lights of RAIL of an approach lighting system are of same technology, but may be of a different technology than the white steady burning lights.

Note 2: All the lights of Cat 2/3 red supplemental lighting are of same technology, but may be of a different technology than the white steady burning lights.

Note 3: All the lights of the green threshold and wing bar lighting of an approach lighting system are of same technology, but may be of a different technology than the white steady burning approach lights.

(o) Taxiway lighting per "segment";

Note 1: A "segment" is defined as a taxiway portion delimited by intersections with other taxiways or runways and the tangential points of the start/end of curves.

Note 2: In the case of long taxiways serving a runway and with many intersecting taxiways, it may be preferable that all segments of the long taxiway be of the same technology.

Note 3: Taxiway centreline and edge lighting within a segment may be of different technologies.

(p) Where provided, Runway Status Lighting (RWSL), including takeoff and hold lighting (THL), runway entrance lighting (REL) and runway intersection lighting (RIL);

Note 1: RWSL may be of different technology than the runway centreline or touchdown zone lighting on the same runway.

Note 2: Individual components of RWSL (ie THL, REL and RIL) can be of different technologies.

(q) Heliport approach and take-off direction lighting systems;

(r) Final Approach and Take-off (FATO) perimeter lights; and

(s) Touchdown and Lift-Off (TLOF) perimeter lights.

5.0 INFORMATION MANAGEMENT

(1) Not applicable.

6.0 DOCUMENT HISTORY

(1) Not applicable.

7.0 CONTACT OFFICE

For more information, please contact the appropriate TCCA Regional Office listed at the following address:

http://www.tc.gc.ca/eng/regions.htm

Suggestions for amendment to this document are invited, and are submitted via:
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