Transport Canada Transports Canada

Advisory Circular

Subject: **Mid-point tolerance for wind turbines of more than 150 m in height.**

Issuing Office:	Civil Aviation, Standards	Document No.:	AC 601-001
File Classification No.:	Z 5000-34	Issue No.:	01
RDIMS No.:	12199008-v6	Effective Date:	2016-10-04

TABLE OF CONTENTS

1.0 INTRODUCTION 2
1.1 Purpose 2
1.2 Applicability 2
1.3 Description of Changes 2
2.0 REFERENCES AND REQUIREMENTS 2
2.1 Reference Documents 2
2.2 Cancelled Documents 2
2.3 Definitions and Abbreviations 2
3.0 BACKGROUND 3
4.0 DISCUSSION 3
5.0 INFORMATION MANAGEMENT 4
6.0 DOCUMENT HISTORY 4
7.0 CONTACT OFFICE 4

1.0 INTRODUCTION

(1) This Advisory Circular (AC) is provided for information and guidance purposes. It describes 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 permit deviations from regulatory requirements, nor does it establish minimum standards.

1.1 Purpose

(1) The purpose of this Advisory Circular (AC) is to assist wind turbine designers in the positioning of side lights by providing an acceptable quantitative interpretation of "mid-point".

1.2 Applicability

(1) This document is applicable to owners of windfarms and windturbine manufactures. It may also be of interest to suppliers of lighting for windturbines.

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) *Aeronautics Act* (R.S., 1985, c. A-2);

(b) Part VI, Subpart 01 of the *Canadian Aviation Regulations* (CARs) — *Orders Regarding the Marking and Lighting of Hazards to Aviation Safety*;

(c) Standard 621 of the *Canadian Aviation Regulations* (CARs) — *Standards, Obstruction Marking and Lighting*.

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.

2.3 Definitions and Abbreviations

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

(a) **CD:** Candela. A unit of intensity of visually evaluated radiant energy

(b) **Side Lights:** The intermediate level of lighting on a windturbine of more than 150 m in height

(c) **CL-810:** A light specified in Standard 621 as having a minimum intensity of 32 Candel (cd)

(d) **CL-864:** A light specified in Standard 621 as having a nominal intensity of 2000 cd

(e) **AGL:** Above Ground Level

3.0 BACKGROUND

(1) Standard 621 requires provision of an intermediate level of lighting for windturbines of more than 150 m in overall height. This lighting, commonly referred to as "side lights", is composed of a level of at least 3 CL-810 lights that are caused to flash at the same rate as the top CL-864 light. The specification of location for side lights in Standard 621 is put simply as "at half the nacelle height". Although, the meaning may appear obvious, it is more a qualitative statement than quantitative. Also, it may not be practical to put the side lights at exactly the mid-point due to a number of factors related to the design of the windturbine. Thus the need for guidance as to interpretation for application of tolerances.

4.0 DISCUSSION

(1) Side lights may be applied with the following tolerances:

(a) Height of the nacelle. The height of the nacelle is the hub height AGL. It is the point about which the blades rotate.

(b) Location of the level of intermediate or side lights. As shown in Figure 1, the side lights should be located as close as possible to the mid-point or half the nacelle height, and may be located within a tolerance of ± 10 m of the mid-point to resolve design issues.

(c) Positioning of individual side lights when at the selected level. The nominal positioning of the side lights for windturbines having a tubular mast, is determined by dividing the circumference by the number of lights. As shown in Figure 1, a tolerance of ± 0.3 m horizontal [along the circumference] may be applied to the nominal position of each light to avoid weld seams or other critical features of the mast.

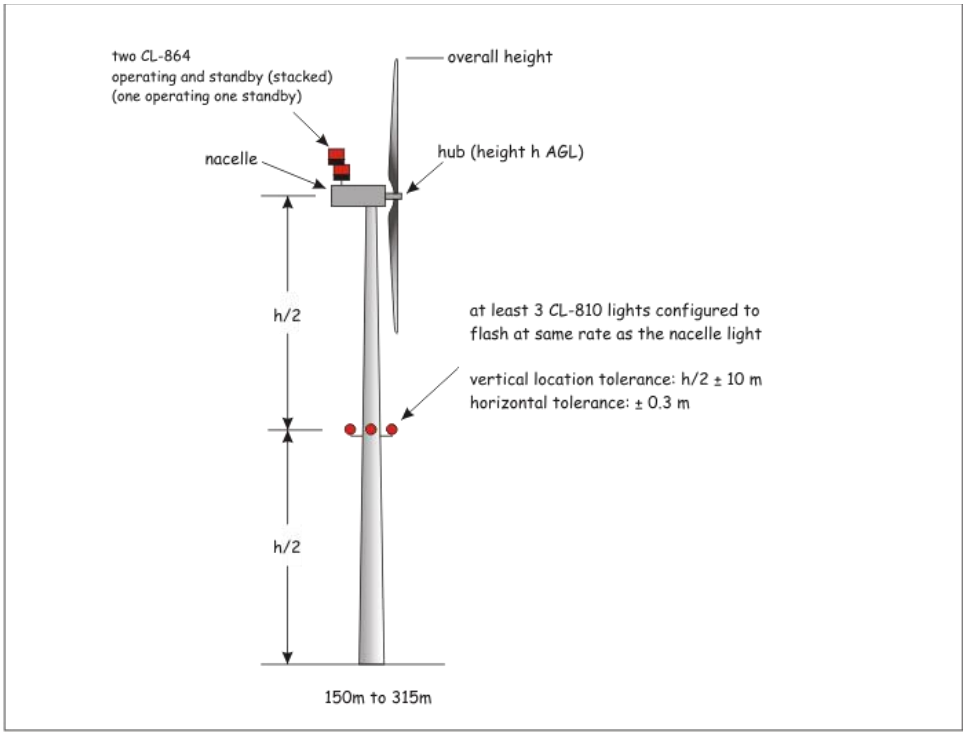


Figure 1 – Lighting of windturbines of more than 150 m in overall height.

5.0 INFORMATION MANAGEMENT

(1) Not applicable.

6.0 DOCUMENT HISTORY

(1) Not applicable.

7.0 CONTACT OFFICE

For more information, please contact:
http://www.tc.gc.ca/eng/regions.htm

Suggestions for amendment to this document are invited, and should be submitted via:
TC.FlightStandards-Normsvol.TC@tc.gc.ca

[original signed by]

Robert Sincennes
Director, Standards
Civil Aviation