

**EXEMPTION FROM SUBPARAGRAPH 12.2(2)(b)(i) AND  
PARAGRAPH 12.3(2)(a) OF CHAPTER 12 OF STANDARD 621 –  
OBSTRUCTION MARKING AND LIGHTING MADE PURSUANT  
TO PARAGRAPH 601.24(2)(a) OF THE CANADIAN AVIATION  
REGULATIONS**

Pursuant to subsection 5.9(2) of the *Aeronautics Act*, and after taking into account that the exemption is in the public interest and is not likely to adversely affect aviation safety or security, I hereby exempt **Canadian wind farm owners/operators** from the requirements of subparagraph 12.2(2)(b)(i) and paragraph 12.3(2)(a), pertaining to the CL-864 light, of Chapter 12 of Standard 621 – *Obstruction Marking and Lighting* made pursuant to paragraph 601.24(2)(a) of the *Canadian Aviation Regulations* (CARs), subject to the conditions set out below.

Details of paragraph 601.24(2)(a) of the CARs and applicable provisions of Standard 621, Chapter 12, are set out in Appendix A of this exemption.

## **PURPOSE**

The purpose of this exemption is to allow the person who has responsibility for or control over a Canadian wind farm to install a Light Intensity Reduction [LIR] system to dim the intensity of the top CL-864 lights.

## **APPLICATION**

This exemption applies to the person who has responsibility for or control over a Canadian wind farm and who plans to install an LIR system to dim the intensity of the top CL-864 top lights required in subparagraph 12.2(2)(b)(i) and paragraph 12.3(2)(a) of Chapter 12 of Standard 621.

This exemption ceases to apply to a person who has responsibility for or control over a Canadian wind farm and who breaches a condition of the exemption.

## **CONDITIONS**

This exemption is subject to the following conditions:

The person who has responsibility for or control over a Canadian wind farm shall ensure that:

1. For new wind farms, proposal for installation of an LIR system is included in the submittal of an Aeronautical Assessment Form (AAF).
2. For existing wind farms, proposal for installation is communicated by correspondence to the applicable region, for purpose of record.

3. The installation is in accordance with the LIR system requirements contained herein in Appendix B.

## VALIDITY

This exemption is in effect until the earliest of the following:

- a) May 11, 2025 at 23:59 (EDT);
- b) The date on which the LIR system requirements are incorporated into Standard 621 – *Obstruction Marking and Lighting*; or
- c) The date on which the exemption is cancelled by the Minister, in writing, where he is of the opinion that it is no longer in the public interest or that it is likely to adversely affect aviation safety or security.

**DATED** at Ottawa, Ontario, on this 29<sup>th</sup> day of May 2020, on behalf of the Minister of Transport.



Nicholas Robinson,  
Director General  
Civil Aviation  
Transport Canada

## APPENDIX A

### Relevant provisions of the *Canadian Aviation Regulations*

#### Marking and Lighting of Obstacles to Air Navigation

**601.24 (1)** Any person who plans to construct or modify a building, structure or object, or launch a tethered object shall notify the Minister of the proposed construction, modification or launch in accordance with the requirements of Standard 621 if the building, structure or object, or tethered object, will constitute an obstacle to air navigation.

**(2)** A person who has responsibility for or control over a building, structure or object that constitutes an obstacle to air navigation shall

- (a)** mark and light the building, structure or object in accordance with the requirements of Standard 621; or
- (b)** use the equivalent marking and lighting approved by the Minister under subsection 601.27(2).

### Relevant provisions of Standard 621 – Obstruction Marking and Lighting

#### Chapter 12 - Marking and Lighting of Wind Turbines and Wind farms

##### **12.1 Scope.**

Chapter 12 governs the marking and lighting of wind turbines of a wind farm having overall heights (hub height plus vertical blade height) of up to 315 m, and of meteorological towers.  
[...]

##### **12.2 Wind turbines of Total Height Equal to or Less than 150 m**

[...]

##### **(2) Lighting Requirements – Twilight and Night Protection**

For Night Protection, a single wind turbine and wind turbines of a wind farm are lighted as illustrated in Figure 12-1 and as follows:

- (a)** For a single wind turbine:
  - (i)** A wind turbine is lighted with use of a CL-864 light unit for twilight and nighttime operation for horizontal turbines or a CL-865 light unit for daytime, twilight and nighttime operation for vertical turbines as shown in Figure 12-1; and

(ii) The lighting fixtures required under subparagraph (i) are mounted to ensure an unobstructed view by a pilot approaching from all angles of aircraft approach.

(b) For a wind farm:

(i) The group of wind turbines composing a wind farm is indicated to pilots by installation of CL-864 medium intensity red flashing lights on specified wind turbines on the perimeter of the wind farm.

[...]

(ii) The lights of subparagraph (i) are located so as to define the wind farm perimeter and spaced at a distance of approximately 900 m. Wind turbines at corners of the wind farm are lighted.

(iii) In addition to the CL-864 lights of subparagraph (ii) the dominant [highest height above mean sea level (AMSL)] wind turbine within the wind farm is also required to be lighted. This requirement for lighting is dependent upon the degree of dominance deemed to produce a hazard to air navigation. The Minister may require lighting on more than one inner wind turbine, depending upon the dimensions of the wind farm.

(iv) A tower or other structure within the wind farm, which in being lighted provides the same level of safety, may be used for installation of a CL-864 light to provide the 900 m spacing.

(v) Because of the variation in configuration of wind farms, the provision of lighting is also subject to an aeronautical assessment taking into account such factors as the general profile of the group, the location of the wind farm in relation to nearby aerodromes or recognized VFR flight routes, and the anticipated air traffic.

(vi) All CL-864 lighting provided for a wind farm flash simultaneously.

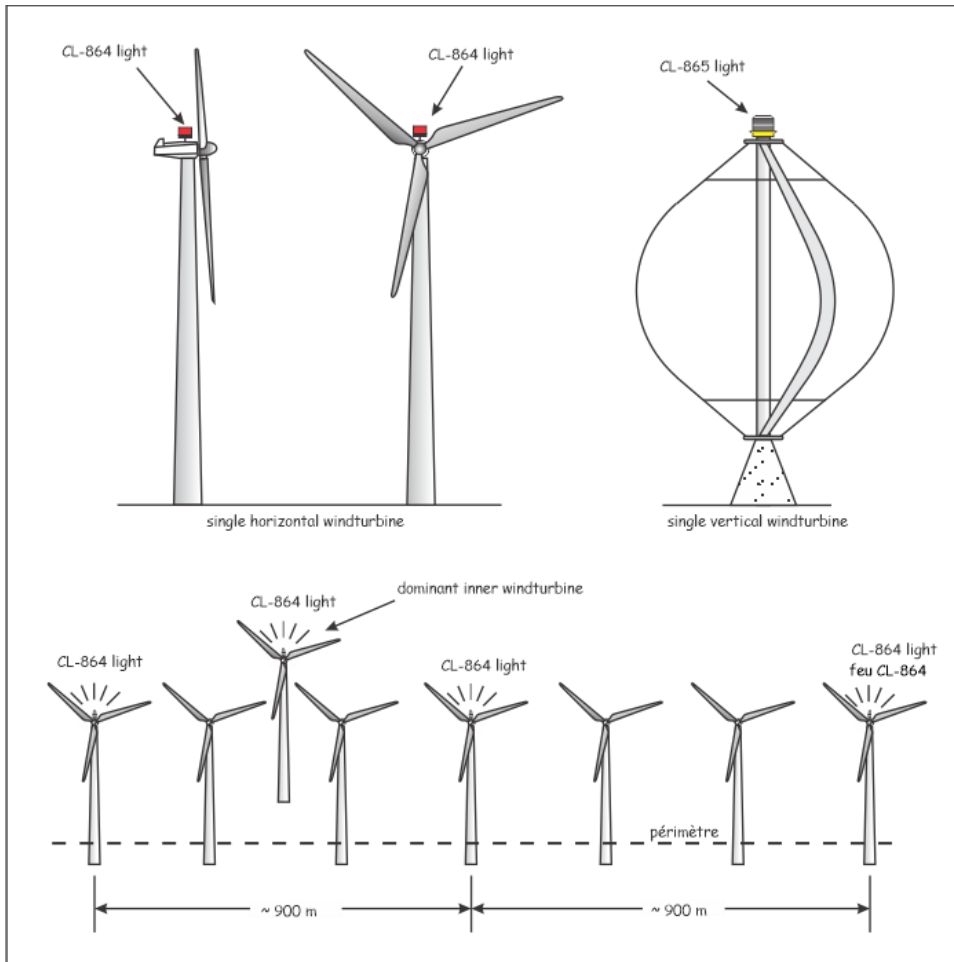


Figure 12-1: Lighting Wind Turbines; up to 150 m AGL

### 12.3 Wind turbines of total height exceeding 150 m

[...]

#### (2) Lighting Requirements

For wind turbines of more than 150 m to 315 m in overall height:

(a) Two CL-864 lights are installed on the nacelle, as illustrated in Figure 12-2. Only one light operates at a time; the second light serving as backup in case of failure of the operating light. The lights are installed on top of each other so that the output of an operating light is not blocked by the standby light for angles of approach or are installed with a horizontal separation of not less than 1 m.

(b) For a solid support mast, at least three CL-810 lights are installed for an intermediate level at half the nacelle height ( $\pm 10$  m) and configured to flash at the same rate as the CL-864 light on the nacelle.

- (c) The CL-864 lights are installed:  
 (i) in such a manner as to provide an unobstructed view for aircraft approaching from any direction.

[...]

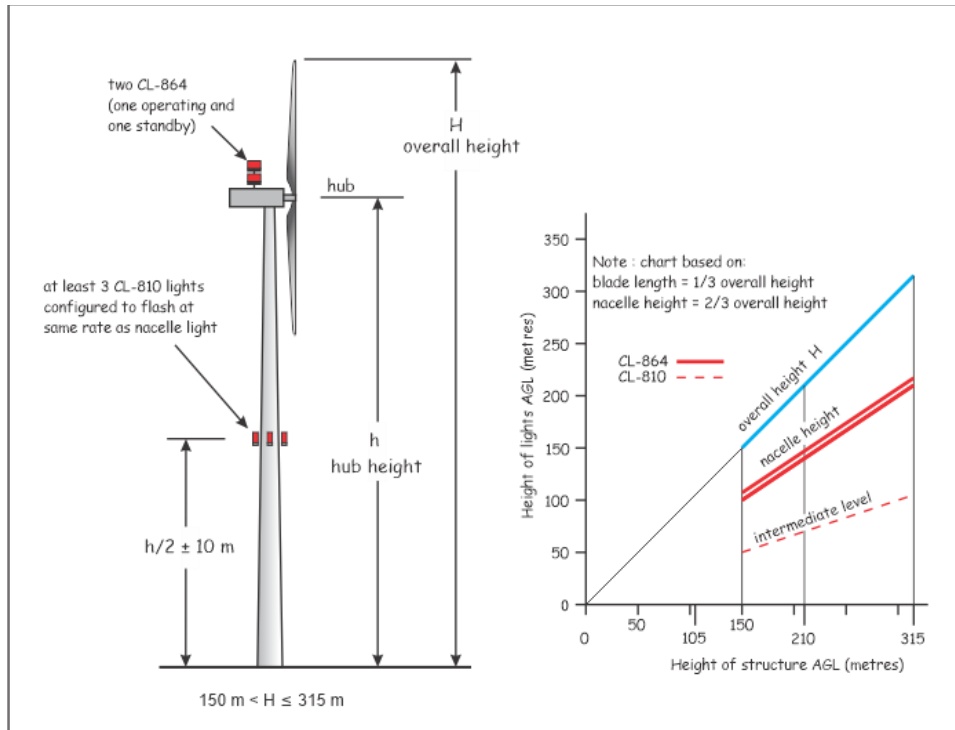


Figure 12-2: Lighting Wind turbines; Heights more than 150 m to 315 m

- (3) The provision of marking and lighting for wind turbines higher than 315 m is determined through means of an aeronautical assessment.

## APPENDIX B

### Requirements for Light Intensity Reduction (LIR) System

#### Scope

This document governs the Light Intensity Reduction (LIR) system intended as a means to reduce the intensity of obstacle lighting according to visibility measurements.

The LIR controls the lighting for reduced intensity only for the Night period of operation. During the Twilight period, the lighting is set at 100% intensity.

For wind turbines of more than 150 in overall height, The LIR is not applied to CL810 lights as installed at the mid-point of the mast of wind turbines of more than 150 m in height.

#### Installation

Visibility sensors are installed on the nacelle of selected wind turbines.

A wind farm is provided with a minimum of 2 visibility sensors.

**Information Note:** *A wind farm is defined as that having at least 3 wind turbines. A wind farm of minimum size might have all wind turbines within a circle of 1500 m. Such wind farm, however, would have not less than 2 visibility sensors. This standard is not intended to mean that a wind farm of any size might have 2 visibility sensors.*

Spacing: The distance between a wind turbine with a visibility sensor and wind turbines without a visibility sensors is not more than 1500m +10%. [refer **Figure 1**].

The visibility sensor shall conform to the specification given in ICAO Doc 9837, *Manual on Automatic Meteorological Observing Systems*, Appendix B.

#### Control System

The control system reduces the intensity of installed CL864 red obstacle lights according to the following criteria:

**Table1. Intensity Reduction according to Visibility (Night only)**

Visibility	Light Setting	Intensity (nominal)
$x \leq 5$ km	100%	2000
$5 \text{ km} < x \leq 10$ km	30%	600
$10 \text{ km} < x$	10%	200

The control system is remotely accessible so that it is possible to reset the lighting to maximum setting of 100%, should this be necessary.

The most unfavorable [lowest] visibility value obtained for any the sensors is used to determine the light intensity setting for the entire wind farm. For example, if the wind farm has 10 sensors with 9 reporting a visibility of 11 km and 1 reporting a visibility of 6 km, the system controls the lighting to the setting for 6 km or 30%.

- (1) The visibility sensors report their visibility measurement to the controller at least once per minute.
- (2) Should the report of visibilities indicate a change of setting, the change occurs within 60 seconds.

If a particular sensor fails to report to the control system, the absence of report is be taken to be the most unfavourable (e.g. less than 5 km) and this causes the obstacle lighting to be set at 100% intensity.

### **Light unit failure**

When there is failure of a light unit within the wind farm, the required NOTAM is issued, but the LIR system continues to operate normally so that it is capable of reducing the intensity of the remaining light units in accordance with measured visibility.

### **Data Record**

Data on the functioning [intensity change] of the LIR with corresponding visibility measurements of each individual sensor is recorded. The record is retained for a period of at least 4 weeks.

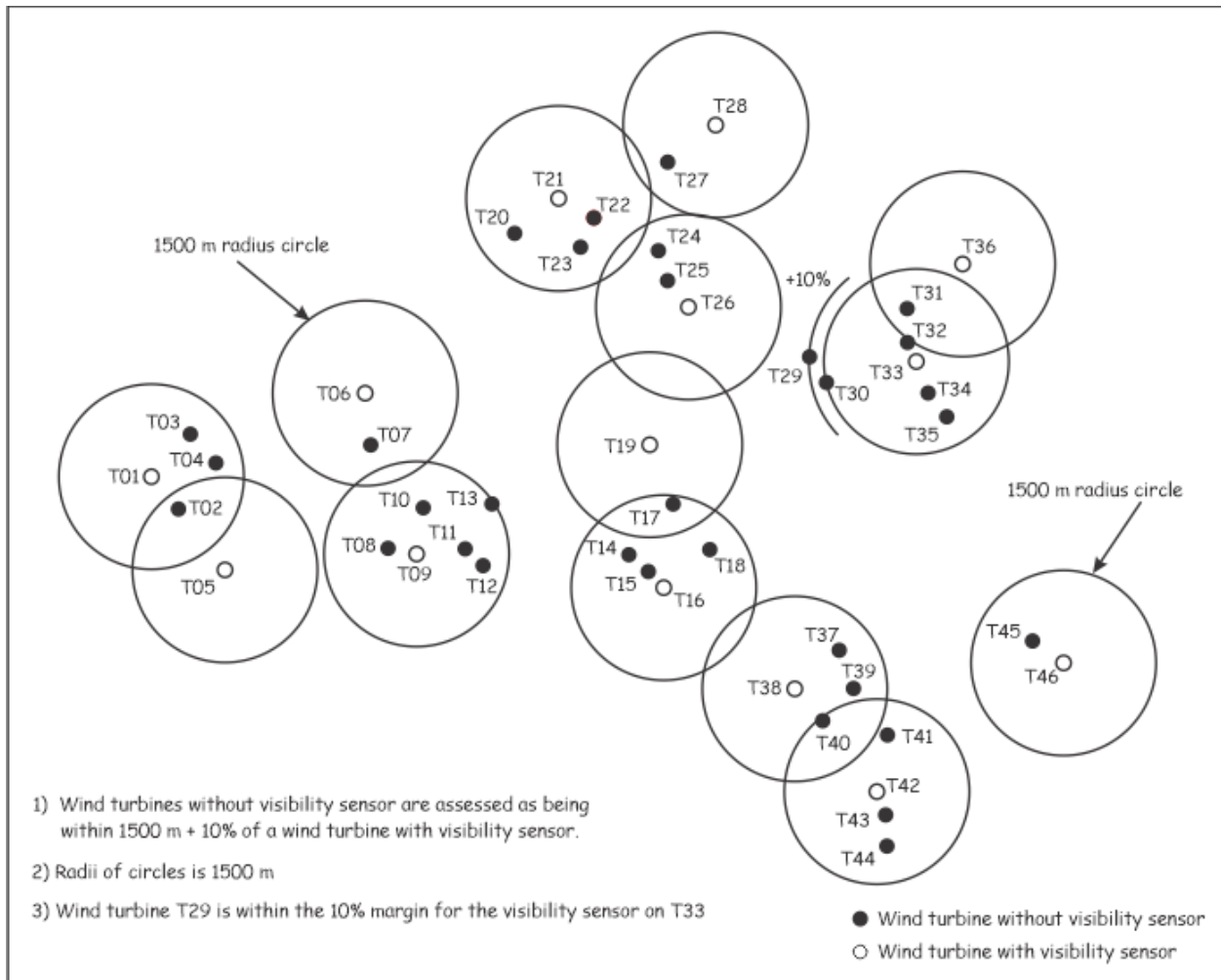
The data record includes a date/and time stamp indicating when the system requested a change in light intensity level. The records also show a date/time stamp where the lights are confirming what actual intensity level they are operating in

### **Test Device**

The LIR system is provided with a means to in-situ verify or re-calibrate [if necessary] each visibility sensor in relation to the required dimmed intensity level specified in Table 1.

***Information note:*** *The visibility sensors should be tested at least once per year, or more frequently in areas where the atmosphere may readily contaminate the sensor.*





**Figure 1. Application of visibility sensors for a wind farm**