

**CRITERIA FOR AWARDING THE ENERGY SAVING PROCEL SEAL  
TO LED STREET LIGHT LUMINAIRES**

(DOCUMENT COMPLEMENTARY TO THE REGULATION FOR AWARDING  
THE ENERGY SAVING PROCEL SEAL)

**Review 01  
26/10/2018**



## Index

<b>1 INTRODUCTION.....</b>	<b>2</b>
<b>2 SCOPE .....</b>	<b>2</b>
<b>3 CRITERIA FOR AWARDING THE PROCEL SEAL.....</b>	<b>2</b>
3.1 CERTIFICATION .....	3
3.2 LUMINAIRE TOTAL POWER.....	3
3.3 INITIAL LUMINOUS FLUX.....	3
3.4 ENERGY EFFICACY FOR LED LUMINAIRES .....	3
3.5 CORRELATED COLOR TEMPERATURE – CCT .....	3
3.6 CONTROLLER.....	4
3.7 SURGE PROTECTION DEVICES (SPD).....	4
<b>4 WARRANTY .....</b>	<b>5</b>
<b>5 RESULTS CONFIRMATION.....</b>	<b>5</b>
<b>6 RE-EVALUATION OF PRODUCT CHARACTERISTICS.....</b>	<b>6</b>
<b>ANNEX .....</b>	<b>7</b>

## 1 Introduction

This document is complementary to the “Regulation for Awarding the Energy Saving Procel Seal”. Its goal is to define the criteria that must be met by **LED street light luminaires**, or, for the purpose of this text, simply LED luminaires, in order to earn the Energy Saving Procel Seal.

## 2 Scope

Luminaires intended for public lighting, consisting of a light source of one or more LED modules, a removable internal power supply and control device (“driver”), or for the purpose of this text, simply controller, which operate on Alternating Current (AC) or Direct Current (DC) power supply.

**Note:** The LED street light luminaires are intended for illumination of public streets, streets, squares, avenues, tunnels, subterranean passages, gardens, roads and footbridges, according to NBR 15129.

## 3 Criteria for awarding the Procel Seal

The supplier company shall prove, through the presentation of the test reports prepared by one of the laboratories indicated by Procel, the fulfillment of the requirements presented below.

### NOTES:

- All electrical and photometric measurements must be performed after the luminaire stabilization time. Stabilization is achieved when the variation (maximum and minimum) of at least three successive readings of luminous flux and electrical power over a period of 30 minutes, taken at a 15-minute interval between each reading, is less than 0.5%, as specified in item 5 of IES LM 79-08. The time required for the luminaire stabilization shall be measured and recorded on the test report. All samples to be tested shall stabilize within 2 hours;
- The luminaires shall be tested at a voltage of 220V, except for luminaires which operated in direct current, which shall be tested at their nominal voltage.

### **3.1 Certification**

The supplier shall send to Procel the conformity certificate of the luminaire, as established by Ordinance Nº 20, dated February 15<sup>th</sup>, 2017. The test reports listed in the conformity certificate must be prepared by one of the laboratories indicated by Procel.

### **3.2 Luminaire total power**

The measured total power shall not differ by more or by less than 10% from the total power declared by the supplier. The measurements must follow the requirements of IES LM 79-08.

Measured total power: measured power of the complete luminaire set (LED module and controller, Surge Protection Device (SPD) and other items that compose it), in watts, at the end of the luminaire stabilization time.

Declared total power: power of the complete luminaire set (LED module and controller, SPD and other items that compose it), in watts, declared by the supplier.

### **3.3 Initial luminous flux**

The initial luminous flux shall not be less than 95% of the nominal luminous flux declared by the supplier. The measurements must follow the requirements of IES LM 79-08.

Initial luminous flux: luminous flux, in lumens, measured at the end of the luminaire stabilization time.

Declared luminous flux: luminous flux, in lumens, declared by the supplier.

### **3.4 Energy efficacy for LED luminaires**

LED luminaires shall present a measured and declared energy efficacy value of at least 110 lm/W.

Measured energy efficacy: ratio between the initial luminous flux (lm) and the measured total power (W).

Declared energy efficacy: ratio between the declared luminous flux (lm) and the declared total power (W).

### **3.5 Correlated color temperature – CCT**

For the nominal voltages declared by the supplier, the declared nominal correlated color temperature shall be between 2700 K and 5000 K.

The measured CCT value of a LED luminaire shall not exceed the tolerances set out in the table below, according to the norm ANSI C78.377-2015.

### **Correlated color temperature (K)**

<b>Nominal CCT (K)</b>	<b>Objective CCT and Tolerance (K)</b>
2700	2725 ± 145
3000	3045 ± 175
3500	3465 ± 245
4000	3985 ± 275
4500	4503 ± 243
5000	5029 ± 283

### **3.6 Controller**

The supplier shall send a test report proving that the controller applied to the luminaire complies with the norms NBR IEC 61347-2-13 and NBR 16026. In substitution of NBR 16026, tests according to IEC 62384 shall be accepted, as long as the power factor is met according to item A.5.4 of the annex I-B of the Ordinance Nº 20, dated February 15<sup>th</sup>, 2017.

The lab responsible for the tests shall be accredited by Inmetro or by an accreditation body which is signatory to a mutual recognition agreement to which Inmetro is also a party.

### **3.7 Surge Protection Devices (SPD)**

The LED luminaire shall have a voltage surge protection device external to the controller. The supplier shall send a test report proving that the device supports the declared nominal and maximum surge levels in accordance with the norms ANSI / IEEE C.62.41.1-2002, IEC 61643-11 and ABNT NBR IEC 61643-1: 2007.

The lab responsible for the tests shall be accredited by Inmetro or by an accreditation body which is signatory to a mutual recognition agreement to which Inmetro is also a party.

## 4 Warranty

The supplier company shall guarantee its product to be free from manufacturing defects by repairing or exchanging the defective product upon presentation of the invoice by the consumer, within a period not less than 05 (five) years after invoice issuance, as defined in the Brazilian Consumer Protection Code.

## 5 Results confirmation

In order to prove that the model in question meets the requirements defined in item 3, the supplier must request the certifier to send to Procel the following documents:

- certificate of conformity of the luminaire;
- technical specification sheet(s) (attached model) completed and signed by the legal representative of the company and by the certifier;
- type test reports - energy efficiency and safety, according to Table 1 and Table 2 of Annex II of Inmetro Ordinance Nº 20/2017;
- LM-80 certification report;
- controller test report, as specified in item 3.6;
- test report of the surge protection device (SPD), as specified in item 3.7;
- list of critical components of the luminaire;
- controller datasheet;
- IES file of each model; and
- external and internal photos of all tested models and their components (secondary optics, LED module, heat sink, controller and SPD).

**Note:** To be awarded with the Procel Seal, all models in the family certified by Inmetro shall perform the tests of: luminous flux, total circuit power, energy efficiency, power factor, supply current, output voltage and current, classification of light intensity distributions, light distribution control, CCT and CRI. The number of samples tested must be in accordance with the Ordinance of Inmetro nº 20/2017 for the respective tests, being a total of 3 samples per model. The test report shall include the polar diagram and the isocandela curves of each model tested. All submitted reports must be listed on the certificate.

The models approved for the Procel Seal will be available in the table of LED luminaires, on the Procel Info Web Portal ([www.procelinfo.com](http://www.procelinfo.com)), along with the IES files and the photos of the tested models.

The submission may be made by electronic mail ([procel@eletrobras.com](mailto:procel@eletrobras.com)).

## **6 Re-evaluation of product characteristics**

If requested, annually, in order to continue making use of the Procel Seal in its models, the supplier shall prove, as described in item 5 of this document, that they maintain their declared technical characteristics and they keep meeting the criteria required in item 3 of this document.

## Annex

### Technical specifications worksheet

<b>FAMILY DEFINITION</b>	
<b>FAMILY <sup>(1)</sup></b>	
<b>LUMINAIRE SUPPLIER</b>	
<b>LUMINAIRE BRAND</b>	
<b>LED BRAND</b>	
<b>LED MODEL</b>	
<b>LUMINAIRE INGRESS PROTECTION DEGREE (IP)</b>	
<b>CONTROLLER INGRESS PROTECTION DEGREE (IP)</b>	
<b>DECLARED LIFE</b>	
<b>LM -80 REPORT NUMBER</b>	
<b>CERTIFICATE NUMBER</b>	

(1) Family name as established in the certificate

<b>MODEL DEFINITION</b>		
<b>MODEL NAME</b>		
<b>BAR CODE</b>		
<b>LUMINOUS FLUX (lm)</b>		
<b>TOTAL POWER (W)</b>		
<b>ENERGY EFFICIENCY (lm/W)</b>		
<b>COLOR REPRODUCTION INDEX - CRI</b>		
<b>NOMINAL VOLTAGE (V)</b>		
<b>CORRELATED COLOR TEMPERATURE (K)</b>		
<b>PERFORMANCE TEST REPORT NUMBER</b>		
<b>SAFETY TEST REPORT NUMBER</b>		
<b>CONTROLLER SUPPLIER</b>		
<b>CONTROLLER MODEL</b>		
<b>CONTROLLER TEST REPORT NUMBER</b>		
<b>SPD SUPPLIER</b>		
<b>SPD MODEL</b>		
<b>SPD</b>	<b>Open circuit voltage (kV)</b>	
	<b>Nominal discharge current (kA)</b>	
	<b>Maximum discharge current (kA)</b>	
<b>SPD TEST REPORT NUMBER</b>		

<b>DATE</b>	<b>SIGNATURE OF THE SUPPLIER</b>	<b>STAMP AND SIGNATURE OF THE CERTIFIER</b>