CONSTRUCTION
INDUSTRY COUNCIL
建造業議會

CONSTRUCTION INDUSTRY COUNCIL

CIC GREEN PRODUCT CERTIFICATION

Assessment Standard

Electronic Ballast

CIC GREEN
PRODUCT CERTIFICATION

(Version 2.0)

ELECTRONIC BALLAST

Summary of Assessment Criteria

CORE CRITERIA

<table>
<tr><th rowspan="2">Criteria</th><th rowspan="2">Requirements</th><th rowspan="2">Verification</th><th colspan="2">Points</th><th rowspan="2">Index</th></tr>
<tr><th>Basic</th><th>+Bonus</th></tr>
<tr><td>Product Information</td><td>Provide following information with delivered products or made accessible to public:
• Country of origin
• Basic product specifications
• Installation method
• Instructions for consumer product disposal
• Operation & Maintenance Manual</td><td>Documentation including but not limited to product catalogue, technical datasheet, webpages</td><td>5</td><td>-</td><td>4.1.1</td></tr>
<tr><td colspan="6">ENVIRONMENT</td></tr>
<tr><td>Human Toxicity and Ecosystem Impact</td><td>Hazardous Substances:
Product shall comply the following requirements:
Cd: < 100 ppm
Pb, Hg, Cr(VI), PBB, PBDE: <1,000 ppm
The plastic parts used in the case weighing 25g or more shall not contain short-chain chlorinated paraffins (C=10~13)</td><td>Laboratory test report(s) and any relevant production documentation</td><td>10</td><td>-</td><td>4.4.3.1</td></tr>
<tr><td colspan="6">PERFORMANCE</td></tr>
<tr><td rowspan="2">Efficiency Metrics</td><td>Energy Efficiency:
15 Basic Points for meeting the Maximum Allowable Power Consumption, as outlined in Table 2.
5 Bonus Points are awarded for equipment that possesses a Recognition Type Energy Label under the Energy Efficiency Labelling Scheme of Electrical and Mechanical Services Department (EMSD).</td><td>Laboratory test report(s) and production documents</td><td>15</td><td>+5</td><td>4.5.1.1</td></tr>
<tr><td>Total Power Factor:
The total power factor shall meet:
<table><tr><th>Points</th><th>Ballast-lamp circuit total power factor</th></tr><tr><td>5 Basic + 15 Bonus</td><td>≥ 0.95</td></tr><tr><td>5 Basic + 5 Bonus</td><td>≥ 0.9</td></tr><tr><td>5 Basic</td><td>≥ 0.85</td></tr></table></td><td>Laboratory test report(s)</td><td>5</td><td>+5/
+15</td><td>4.5.1.2</td></tr>
</table>

<table>
<tr><th rowspan="2">Criteria</th><th rowspan="2">Requirements</th><th rowspan="2">Verification</th><th colspan="2">Points</th><th rowspan="2">Index</th></tr>
<tr><th>Basic</th><th>+Bonus</th></tr>
<tr><td>System Performance and Reliability</td><td>Technical Performance:
Meet the technical requirements set and tested with the listed IEC standards, as listed in Section 4.5.2.1.</td><td>Laboratory test report(s) for all relevant tests</td><td>10</td><td>-</td><td>4.5.2.1</td></tr>
<tr><td>Product Life</td><td>Durability:
The expected ballast service life shall meet:
<table><tr><th>Points</th><th>Expected service life (lighting hours)</th></tr><tr><td>5 Basic + 5 Bonus</td><td>≥ 60,000</td></tr><tr><td>5 Basic</td><td>≥ 50,000</td></tr></table>AND
The failure rate shall not exceed 0.2% per 1,000 hours, corresponding to a 10% of failure rate based on laboratory testing conditions.</td><td>Laboratory test report(s) on product life and guarantee certificate(s)</td><td>5</td><td>+5</td><td>4.5.3.1</td></tr>
<tr><td></td><td></td><td>Subtotal:</td><td>50</td><td>+25</td><td></td></tr>
</table>

NON-CORE CRITERIA

Criteria	Requirements	Verification	Points +Bonus	Index
CARBON				
CFP quantification/ EPD Report	Provide a life cycle assessment report with the carbon footprint of products (CFP), covering at least A1 to A3 endorsed by a third-party critical review OR provide an Environmental Product Declaration (EPD).	CFP quantification report **OR** Environmental Product Declaration (EPD)	+5	4.2.1
RESOURCE				
Circularity	Recyclability: Shall develop a recycling programme for the product and declared options for reuse, recycling, recovery and disposal.	Recycling plan	+10	4.3.1.1
	Packaging Requirement: The packaging materials shall not contain halogenated plastics; *OR* Shall be comprised of 100% recycled materials, readily recyclable materials or decomposable materials; *OR* shall not be impregnated, labelled, coated or otherwise treated in a manner, which would prevent or significantly limit recycling.	Documentation on packaging materials used	+5	4.3.1.2
Waste Management	Waste Management Plan: Implement effective Waste Management Plan detailing the policies, procedures and/or a waste management program covering manufacturing operations.	Waste management programme	+5	4.3.2.1
Water Management	Option A: Water Consumption Reporting: Report both potable and non-potable water usage in the production process of the past year.	Water consumption report	+5/ +10	4.3.3.1
	Water Recycling Program: Develop and implement water recycling program during the manufacturing process.	Documentation on water recycling		4.3.3.2
	Option B: Water Management System: Process valid certificate under ISO 14046: Water Footprint Assessment	ISO 14046 Certificate issued by accredited certification body		4.3.3.3

Criteria	Requirements	Verification	Points +Bonus	Index
Energy Management	Option A: Energy Management Plan: Implement effective energy management policies and procedures and/or an energy management programme.	Energy management plan	+5/ +10	4.3.4.1
	Option B: Energy Management System: Possess valid certificate under ISO 50001: Energy management systems.	ISO 50001 Certificate issued by accredited certification body		4.3.4.2
ENVIRONMENT				
Environmental Management	Environmental Management System: Possess valid certificate under ISO 14001: Environmental management systems OR EU Eco-Management and Audit Scheme (EMAS).	ISO 14001 or EMAS Certificate issued by accredited certification body	+5	4.4.1.1
Regional Product	Regional Manufactured Equipment: Products that are manufactured within 800km radius of HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation.	Location map	+5	4.4.2.1
Human Toxicity and Ecosystem Impact	Carcinogenic Substances: Substances listed in IARC Group 1, 2A and 2B shall be < 0.1% by weight of the product.	Laboratory test report(s), MSDS, self-declaration letter and production documents	+10	4.4.3.2
	Noise level: ≤ 24 dBA (i.e. Class A sound rating when installed).	Detailed report(s) of the operating noise	+10	4.4.3.3
INNOSMART				
Innovations & Additions	Adopt new practice, technology and strategy; OR Achieve exemplary performance	Narrative with supporting	+5	4.6.1
		Subtotal:	+80	

TABLE OF CONTENTS

1. INTRODUCTION

1.1 PURPOSE

The CIC Green Product Certification Scheme (the "Scheme") is a green product labelling scheme, owned by the Construction Industry Council (CIC) and implemented by the Hong Kong Green Building Council (HKGBC). The primary goal of the scheme is to support Hong Kong's transition to a low-carbon economy by encouraging the adoption of environmentally friendly construction practices.

With the Green Product Certification, various stakeholders, including consumers, building professionals, construction practitioners and policymakers, can easily and unequivocally identify environmentally preferable construction materials and building products. This certification serves as a reliable indicator of a product's sustainability, helping to drive market demand for greener options.

To ensure the credibility and effectiveness of the certification, the CIC and the HKGBC has jointly developed this Technical Assessment Standards (the "Standard"), which sets out the assessment criteria and their benchmarks to govern the application and award of a label under the Scheme. The comprehensive assessment evaluates the overall sustainability of construction materials and building products across multiple dimensions. These dimensions include environmental impact, resource efficiency, technical performance, and the use of smart manufacturing technologies.

The Standard is divided into two main parts:

- General Requirements (Refer to General Requirements provided in separate document). This part introduces Scheme's framework, outlines the application procedure, and details the grades.

- Technical Requirements (This document refers). This part defines the principles, requirements and guides for quantifying and reporting the products' carbon footprint (CFP), along with other sustainability assessment criteria and scoring standards.

This Standard neither modifies nor supersedes laws and regulations. Compliance with this Standard is not a substitute for, and does not assure, compliance with any applicable laws or regulations. Compliance with all applicable laws and regulations is a prerequisite for the manufacturing and marketing of the product.

1.2 BACKGROUND

Ballast is a device used to provide the necessary starting and operating electrical conditions of fluorescent lighting systems. While fluorescent lighting systems are commonly used in all types of buildings and artificial lighting consumes approximately 15 to 30% of the total energy consumption in a building, the energy efficiency of electronic ballasts have been promoted worldwide, including U.S., Canada, Australia and China. According to the Natural Resources Canada, an energy saving of 3 PJ and a reduction in greenhouse gases emissions of 0.4 Mt can be achieved by 2020 in Canada under Canada's Energy Efficiency Regulations (EER) for electronic ballasts.

In addition to energy efficiency, the disposal of used ballasts shall be handled with great care as they contain hazardous substances such as polychlorinated biphenyl (PCB), di-2-ethylhexyl phthalate (DEHP) and other toxic components. Programme for proper collection, disposal and recycling is equally important to reduce the damage to the environment and human health. The purposes of the evaluation criteria developed for electronic ballasts are thus to conserve energy consumption, to minimise the impacts to both the environment and human health through stringent assessment criteria on the production process, use of materials and energy efficiency.

2. SCOPE

There are two common types of ballast, namely the magnetic type and electronic type. Between the two, electronic ballasts operate at a much higher frequency, resulting in 10% higher energy efficiency than the magnetic ballasts generally. Hence, this Standard covers the electronic ballasts used on standard fluorescent lamps (i.e. linear, circular and compact type), high-intensity discharge (HID) lamps, powered from either a 220V 50Hz AC supply or an appropriate DC power source. Ballasts that serve as the integrated parts of fluorescent lamps are excluded from this Standard.

Note:

ONE application is only eligible for **ONE** product series. All the related products have to be listed on the submitted documents. Each application should specify the product code / serial number.

3. DEFINITIONS

Applicant:	Organisations which apply for the label of the CIC Green Product Certification of the Construction Industry Council
Ballast efficacy factor /ballast efficiency factor (BEF):	Ratio of the ballast lumen factor, specified as a percentage, to the ballast input power in watts. The factor is used to compare the ballasts operating under the same type and number of lamps.

Ballast lumen factor (BLF):	Luminous flux of a fluorescent or high-intensity discharge (HID) lamp (or lamps) operated on the ballast divided by the luminous flux of the same lamp when operated on the reference ballast specified for rating lamp lumens
CIC:	Construction Industry Council
CNAS:	China National Accreditation Service for Conformity Assessment
HKAS:	Hong Kong Accreditation Service
HKGBC:	The Hong Kong Green Building Council Limited
HOKLAS:	The Hong Kong Laboratory Accreditation Scheme
IARC:	International Agency for Research on Cancer
ISO:	International Organisation for Standardisation
Maximum allowable power consumption:	The maximum ballast-lamp circuit power for each lamp power and ballast type
MSDS:	Material safety data sheet. To qualify as suitable, MSDS and information therein must not be more than 5-years old
Recyclable:	A characteristic of a product, packaging or associated component that can be diverted from the waste stream through available processes and programmes and can be collected, processed and returned to use in the form of raw materials or products (ISO 14021:2016)
Third-party:	An entity without any financial interest or stake in the sales of the product or service being evaluated or other conflict of interest
Total power factor:	The power factor of the combination of a ballast and the lamp (or lamps) for which the ballast is designed. It ranges from 0 to 1

4. EVALUATION CRITERIA

A product to be assessed shall meet all the minimum requirements of the "Core Criteria" in order to be awarded a "Green" (i.e. a "pass" grade) Label under the Scheme. Bonus points may be awarded if the product meets the "Non-core Criteria". "Bronze", "Silver", "Gold" or "Platinum" Label will be awarded according to the total points accumulated, as shown in Table 1.

Table 1 Benchmarks for grading

Points achieved	Grade to be awarded
90 or above	Platinum
80 – 89	Gold
70 – 79	Silver
60 – 69	Bronze
50 – 59	Green
Below 50	No label

All submissions and documentations shall be endorsed by the Chief Executive Officer or other authorised persons of the Applicant to demonstrate conformance to the assessment criteria. All certification, laboratory report and documentation must be valid during the assessment process and labelling period. The validity of all laboratory report and documentation shall be within 5 years from the date of issue. The chemical tests should be conducted by either a third party or the manufacturer, providing that they have obtained ISO 17025 certification or relevant national accreditations, such as HOKLAS or CNAS.

4.1 BASIC INFORMATION

4.1.1 Product Information – Core Criteria

The Applicant is required to achieve 5 Basic Points under this section.

Requirements

5 Basic Points for providing following information with delivered products or made accessible to public:

- Country of origin
- Basic product specifications
- Installation method
- Instructions for consumer product disposal
- Operation & Maintenance Manual

Verification

Documentation showing the product information and instructions, including but not limited to product catalogue, technical datasheet, webpages and/or any other information freely accessible by customers.

4.2 CARBON

4.2.1 CFP Quantification/ EPD Report – Non-core Criteria

The Applicant can achieve maximum 5 Bonus Points under this section.

Requirements

5 Bonus Points for providing life cycle assessment report for quantifying and reporting the carbon footprint of products (CFP), covering at least A1 (raw material supply), A2 (transport) and A3 (manufacturing process). This can be achieved by either of the following:

Conduct CFP study report in accordance with ISO 14067:2018, CIBSE TM 65 or equivalent

OR

Provide the product's CFP value from a product level EPD issued in accordance with ISO 14067:2018, ISO 21930:2017, GB/T 24067-2024 or BS EN 15804:2012+A2:2019.

Verification

CFP quantification report endorsed by a third-party critical review or Environmental Product Declaration fulfilling the above requirements

4.3 RESOURCE

4.3.1 Circularity

The Applicant can achieve maximum 15 Bonus Points under this section

4.3.1.1 Recyclability – Non-core Criteria

Requirements

10 Bonus Points for demonstrating that the manufacturer has developed a recycling plan for the product and declared options for reuse, recycling, recovery and disposal. The plan shall include the following and made available to public.

- Designate all homogeneous materials in the product as being intended for technical and/or biological cycles and define the intended cycling pathway(s) for each material.
- Identify potential partners for product reuse, recycling, recovery in accordance with the intended cycling pathway(s).
- For products and materials intended for municipal recycling, the product and/or material must be compatible for municipal cycling systems (e.g., painted plastics and plastic laminated paper are not currently compatible for municipal recycling).
- Instructions for how to cycle the product shall be made publicly available.

Verification

Documentation of recycling plan, including, but not limited to product catalogue, MSDS and written declaration.

4.3.1.2 Packaging Requirement – Non-core Criteria

Requirements

5 Bonus Points for minimizing the wastage from all primary packaging materials. The packaging materials shall achieve either of the followings.

The packaging materials shall not contain halogenated plastics

OR

The packaging materials shall be comprised of 100% recycled materials, readily recyclable materials or decomposable materials

OR

The packaging shall not be impregnated, labelled, coated or otherwise treated in a manner, which would prevent or significantly limit recycling.

The packaging requirements are relevant to all primary packaging materials, i.e. those being used to envelop the product and hold it. The primary packaging materials are

usually in direct contact with the contents and shall be in the minimal amount of distribution and /or use as they may eventually be disposed by the consumers.

Verification

Documentation describing the packaging materials used as well as their chemical composition (if any and where applicable), treatment process and recyclability.

4.3.2 Waste Management

The Applicant can achieve maximum 5 Bonus Points under this section.

4.3.2.1 Waste management Plan – Non-core Criteria

Requirements

5 Bonus Points for implementing effective Waste Management Plan detailing the policies, procedures and/or a waste management program covering manufacturing operations. The waste management plan should include but not limited to the following information:

- Initiatives taken to reduce waste generation and improve recovery/recycling of waste; and
- Initiatives implemented for recovery of post-consumer and/or pre-consumer waste that can be re-introduced into the manufacturing process; and
- Other environmental benefits or constraints associated with waste minimisation objectives and processes.

Verification

Documentation of waste management programme.

4.3.3 Water Management

The Applicant can achieve maximum 10 Bonus Points under this section.

The Applicants can select one of the options below and comply with any or all the requirements under that option to achieve associated points. Each option is eligible for a maximum 10 Bonus Points.

Option A:

4.3.3.1 Water Consumption Reporting – Non-core Criteria

Requirements

5 Bonus Points for reporting both potable and non-potable water usage in the production process of the past year.

Verification

Water consumption report, support by water usage data acquired from water meter, water sub-meter, water bill or other equivalent documents.

4.3.3.2 Water Recycling Program – Non-core Criteria

Requirements

5 Bonus Points for developing and implementing water recycling program during the manufacturing process.

Verification

Documentation demonstrating the implementation of water recycling program, support by drawings, water usage data acquired from water sub-meter or other equivalent documents.

Option B:

4.3.3.3 Water Management System – Non-core Criteria

Requirements

10 Bonus Points for possessing valid certificate under ISO 14046: Environmental management – Water footprint – Principles, requirements and guidelines.

ISO 14046 is a framework for assessing the water footprint of products, processes, and organizations. It provides principles, requirements, and guidelines for conducting and reporting water footprint assessments. It helps organizations evaluate and improve their water management practices.

Verification

A valid ISO 14046 certificate issued by accredited certification body.

4.3.4 Energy Management

The Applicant can achieve maximum 10 Bonus Points under this section.

The Applicants can select one of the options below and comply with any or all the requirements under that option to achieve associated points.

Option A:

4.3.4.1 Energy Management Plan – Non-core Criteria

Requirements

5 Bonus Points for implementing effective energy management policies and procedures and/or an energy management programme, including but not limited to the following items:

- Energy efficiency initiatives: Manufacturer should undertake specific initiatives to reduce energy use and improve energy efficiency throughout their operations. This could include upgrading to more efficient equipment, optimizing production processes, or implementing energy-saving technologies

- Supplier requirements: Manufacturers should extend their energy management efforts to their supply chain by establishing requirements or initiatives for suppliers and contract manufacturers to improve their energy performance where possible

Verification

Documentation of energy management plan detailing the above, supported by organizational policy or other equivalent documents.

Option B:

4.3.4.2 Energy Management System – Non-core Criteria

Requirements

10 Bonus Points for possessing valid certificates under ISO 50001: Energy management systems — Requirements with guidance for use.

ISO 50001 provides a framework for organizations to establish, implement, maintain, and improve an Energy Management System. The goal is to help organizations improve their energy performance, increase energy efficiency, and reduce energy costs and greenhouse gas emissions. By achieving ISO 50001 certification, manufacturers can demonstrate their commitment to energy efficiency and sustainability.

Verification

A valid ISO 50001 certificate issued by accredited certification body.

4.4 ENVIRONMENT

4.4.1 Environmental Management

The Applicant can achieve maximum 5 Bonus Points under this section

4.4.1.1 Environmental Management System – Non-core Criteria

Requirements

5 Bonus Points for possessing valid certificate under ISO 14001: Environmental management systems — Requirements with guidance for use or EU Eco-Management and Audit Scheme (EMAS).

The target of the environmental management system shall be set to reduce the environmental impacts during the manufacturing process which include but not limited to the reduction of hazardous substance emissions, energy consumption, CO2 emissions, secondary environmental load, waste management, water management, etc.

ISO 14001 is the international standard which provides an outline of how to meet the environmental policy and objectives for the business of the applicant.

Eco-Management and Audit Scheme (EMAS) is an environmental management tool which enables organisations to assess, manage and continuously improve their environmental performance.

Verification

A valid ISO 14001 or EMAS Certificate issued by accredited certification body.

4.4.2 Regional Product

The Applicant can achieve maximum 5 Bonus Points under this section

4.4.2.1 Regionally Manufactured Equipment – Non-core Criteria

Requirements

5 Bonus Points for products that are manufactured within 800km radius of HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation. The distance is measured by the direct distance, not by actual travel distance.

Verification

Documents demonstrating the location of the manufacturer and a map showing the distance between the manufacturer and HKSAR.

4.4.3 Human Toxicity and Ecosystem Impact

The Applicant is required to achieve 10 Basic Points under this section. Additionally, the Applicant can achieve maximum 20 Bonus Points under this section

4.4.3.1 Hazardous Substances – Core Criteria

Requirements

10 Basic Points for complying with the maximum allowed levels of restricted substances of product components as listed below.

The use of the following substances shall comply with the European Commission's Directive on the restriction of hazardous substances in electrical and electronic equipment (2011/65/EU):

- Lead (Pb) < 1,000 ppm
- Mercury (Hg) < 1,000 ppm
- Cadmium (Cd) < 100 ppm
- Hexavalent chromium (Cr(VI)) < 1,000 ppm
- Polybrominated biphenyls (PBB) < 1,000 ppm
- Polybrominated diphenyl ether (PBDE) < 1,000 ppm

Additionally, plastic parts in the case that weigh 25g or more must not contain short-chain chlorinated paraffins (C=10~13) with a chlorine concentration over 50%.

Verification

Laboratory test report(s). Test report(s) shall be compiled according to the National and International test methods including but not limited to IEC 62321.

4.4.3.2 Carcinogenic Substances – Non-core Criteria

Requirements

10 Bonus Points for complying with the carcinogenic substance limits.

The product shall not contain any carcinogenic substances or chemicals that are classified as Group 1, 2A or 2B according to International Agency for Research on Cancer (IARC) 1 . Any such carcinogens which are known to be present as contaminants shall be less than 0.1% by weight of the product.

Verification

Laboratory test report(s) or, self-declaration letter.

4.4.3.3 Noise Level – Non-core Criteria

Requirements

10 Bonus Points for reporting the operating noise characteristic of electronic ballast, measured using a sound meter at 12 inches from the ballast in any directions.

The noise level shall not exceed 24 dBA.

Verification

Detailed report(s) of the operating noise of the electronic ballast.

4.5 PERFORMANCE

4.5.1 Efficiency Metrics

The Applicant is required to achieve 20 Basic Points under this section. Additionally, the Applicant can achieve maximum 20 Bonus Points under this section.

4.5.1.1 Energy Efficiency – Core Criteria

Requirements

15 Basic Points for meeting the Maximum Allowable Power Consumption, as outlined in Table 2.

5 Bonus Points for equipment that possess a Recognition Type Energy Label under the Energy Efficiency Labelling Scheme of Electrical and Mechanical Services Department (EMSD).

1 Agents Classified by the IARC Monographs, Volumes 1–137 – IARC Monographs on the Identification of Carcinogenic Hazards to Humans

The energy efficiency of a ballast-lamp circuit is measured by the total power input in the circuit. This is a function of lamp power and the type of ballast. The maximum allowable power consumption of a given ballast type is defined as the maximum lamp-circuit power for each lamp power and the ballast type, as defined in the Voluntary Energy Efficiency Labelling Scheme for Electronic Ballasts administered by the Electrical and Mechanical Services Department of the HKSAR Government (EMSD, 2012).

The maximum power loss of the electronic ballast shall not be higher than those tabulated in Table 2. Whenever a lamp power of ballast falls between two values as indicated in Table 2, the maximum power input power of ballast-lamp circuit shall be calculated by linear interpolation between the two values of the maximum input power for the two closest lamps power an indicated in Table 2.

Table 2: Maximum allowable power loss of electronic ballasts

Ballast Category	Rated Lamp Power		Maximum Allowable Power Consumption
	50 Hz	High Frequency (HF)	
For linear fluorescent lamps	4 W	3.4 W	6 W
	6 W	5.1 W	8 W
	8 W	6.7 W	11 W
	13 W	11.8 W	15 W
	15 W	13.5 W	16 W
	18 W	16 W	19 W
	30 W	24 W	31 W
	36 W	32 W	36 W
	38 W	32 W	38 W
	58 W	50 W	55 W
	70 W	60 W	68 W
	--	14 W	17 W
	--	21 W	24 W
	--	24 W	27 W
	--	28 W	32 W
	--	35 W	39 W
	--	39 W	43 W
	--	49 W	55 W
	--	54 W	60 W
	--	80 W	88 W
For compact 2 tubes fluorescent lamps	5 W	4.5 W	7 W
	7 W	6.5 W	9 W
	9 W	8 W	11 W
	11 W	10 W	14 W
	13 W	12 W	16 W

Ballast Category	Rated Lamp Power		Maximum Allowable Power Consumption
	50 Hz	High Frequency (HF)	
	18 W	16 W	19 W
	24 W	22 W	25 W
	36 W	32 W	36 W
	--	40 W	45 W
	--	55 W	61 W
For compact 4 tubes flat fluorescent lamps	18 W	16 W	19 W
	24 W	22 W	25 W
	36 W	32 W	36 W
For compact 4 tubes fluorescent lamps	10 W	9.5 W	11 W
	13 W	12.5 W	14 W
	18 W	16.5 W	19 W
	26 W	24 W	27 W
For compact 6 tubes fluorescent lamps	18 W	16.5 W	19 W
	26 W	24 W	27 W
	--	32 W	36 W
	--	42 W	47 W
For compact 2 D fluorescent lamps	10 W	9 W	11 W
	16 W	14 W	17 W
	21 W	19 W	22 W
	28 W	25 W	29 W
	38 W	34 W	38 W
	--	55 W	61 W
For circular fluorescent lamps	22 W	19 W	22 W
	32 W	30 W	35 W
	40 W	32 W	37 W
	--	22 W	26 W
	--	40 W	45 W
	--	55 W	61 W
For HID lamps	35 W	--	43 W
	70 W	--	80 W
	150W	--	165 W
	250W	--	270 W
	400W	--	430 W

Verification

Relevant laboratory test report(s) and production documentation. Tests shall be conducted in accordance with EN 50294.

4.5.1.2 Total Power Factor – Core Criteria

Requirements

The total power factor of an electronic ballast-lamp circuit shall not be less than 0.85. Bonus points will be awarded for a higher power factor according to Table 3.

Table 3: Limits of power factor of ballast-lamp circuit and associated points

Points	Ballast-lamp circuit total power factor
5 Basic + 15 Bonus	≥ 0.95
5 Basic + 5 Bonus	≥ 0.90
5 Basic	≥ 0.85

Verification

Laboratory test report(s) on power factor

4.5.2 System Performance and Reliability

The Applicant is required to achieve 10 Basic Points under this section.

4.5.2.1 Technical Performance – Core Criteria

Requirements

10 Basic Points if the electronic ballasts comply with all the technical requirements stated below.

- Ballast-lumen-factor* (BLF) from 0.95 to 1.00;
- Ballast safety shall be tested and comply with International Electrotechnical Commission (IEC) 61347-2-3;
- Ballast shall be tested and comply with IEC-60929:2006;
- Constant luminous flux generated by the fluorescent lighting system shall be guaranteed; and
- Lamp-operating frequency shall be > 25 kHz but not in the range of 30 to 40 kHz.

* The type, number and size of reference lamp(s) shall be clearly indicated.

Verification

Laboratory test report(s) for all relevant tests.

- Information Include (Rated luminous flux (in lumens)
- Lumen maintenance curve
- Ballast specifications
- Operating conditions
- Measurement methodology and frequency

4.5.3 Product Life

The Applicant is required to achieve 5 Basic Points under this section. Additionally, the Applicant can achieve maximum 5 Bonus Points under this section

4.5.3.1 Durability – Core Criteria

Requirements

The minimum expected service life of electronic ballast is 50,000 lighting hours, at the maximum permissible measuring-point temperature and under standard network conditions. Bonus points will be awarded for longer expected lifetime according to Table 4.

Table 4: Expected ballast service time and associated points

Points	Expected service life (lighting hours)
5 Basic + 5 Bonus	≥ 60,000
5 Basic	≥ 50,000

AND

The failure rate shall not exceed 0.2% per 1,000 hours, corresponding to a 10% of failure rate based on laboratory testing conditions.

Verification

Laboratory test report(s) on product life and guarantee certificate supplied with the product or made available to the public, e.g. through manufacturer's website.

4.6 INNOSMART

The Applicant can achieve maximum 5 Bonus Points under this section.

4.6.1 Innovations & Additions – Non-core Criteria

Requirements

5 Bonus Points for achieving significant, measurable environmental performance using new practices, technology and strategy not addressed in this Standard.

OR

Incorporating various smart technologies to improve efficiency, reduce energy consumption, and optimize performance as, exemplified by the following examples:

- BMS Integration
- Predictive Maintenance using AI/ML
- Integrated Optimization with Building Automation System (BAS)

Verification

Report with a maximum length of 1,000 words, outline the objectives, solution and evaluation of the performance achieved by proposed Smart and Innovative Technologies.

AND

Include attachments that provide evidence of implementation, along with relevant technical specification that support the claims made in the report.

5. SCORING

The points for meeting each criterion stated in this Standard are summarized below.

Table 5: Points to be awarded under the assessment criteria of this Standard

Label	Evaluation Criteria		Points		Related BEAM Plus Credits
			Basic	+Bonus	
	Product Information [CORE]		5	-	
Carbon	CFP Quantification/ EPD Report		-	+5	MW 10
Resource	Recyclability	Recyclability	-	+10	
		Packaging Requirement	-	+5	
	Waste Management	Waste Management Plan	-	+5	
	Water Management	Water Consumption Reporting	-	+5/+10	
		Water Recycling Program			
		Water Management System			
	Energy Management	Energy Management Plan	-	+5/+10	
		Energy Management System	-		
Environment	Environmental Management	Environmental Management System	-	+5	
	Regional Product	Regionally Manufactured Equipment	-	+5	MW 8
	Human Toxicity and Ecosystem Impact	Hazardous Substances	10	-	
		Carcinogenic Substances	-	+10	
		Noise Level	-	+10	
Performance	Efficiency Metrics	Energy Efficiency [CORE]	15	+5	EU2, 3
		Total Power Factor [CORE]	5	+5/+15	
	System Performance and Reliability	Technical Performance [CORE]	10	-	
	Product Life	Durability [CORE]	5	+5	
InnoSmart	Innovations & Additions		-	+5	IA
		Total:	**50**	**+105**	

Related BEAM Plus Credits refer to these relevant credits under BEAM Plus New Buildings Version 2.0, as listed below.

- MW 8: Regional Materials
- MW 10: Life Cycle Assessment
- MW 9: Use of Green Products
- EU 2: Reduction of CO2 Emissions
- EU 3: Peak Electricity Demand Reduction
- Innovations & Addition