Technical requirements for environmental labeling products

Lighting Source

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This document is a translation of a Chinese original. In case of dispute, the original document should be taken as authoritative.
Foreword

This standard is formulated for the purposes of implementing the Environment Protection Law of the People's Republic of China, improving energy efficiency of lighting source, reducing adverse impacts of lighting source on the environment and human health in the processes of their production, use and recycling.

This standard specifies the requirements for environmental design, energy efficiency, limit of hazardous substances, production process, recovery and recycling, packaging materials and public information of lighting source products.

This standard amends the Technical Requirement for Environmental Labeling Products — Energy Saving Lamps (HJ/T 230—2006) with the following main changes:

-- Change the name of the standard;
-- Enhance energy-consumption index requirements;
-- Increase energy consumption requirements for environmental labeling low-carbon products;
-- Impose stricter limit for mercury;
-- Add the limits for harmful substances such as lead and arsenic;
-- Increase environmental protection requirements for production process;
-- Add the requirement for recycling management.

This standard is applicable to the certification of both China’s environmental labeling product and environmental labeling low-carbon product certification.

The development of this standard is organized by the Department of Science, Technology and Standards of the Ministry of Environmental Protection of China.

Main drafting organizations of this standard are Sino-Japan Friendship Center for Environment Protection, China Association of Lighting Industry, National Lighting Test Centre (Beijing), National Lighting Test Centre (Shanghai), Shanghai Yaming Lighting Co., Ltd., Zhejiang Yankon Group Co., Ltd., Philips (China) Investment Co., Ltd. and OSRAM (China) GMBH.

This standard was approved by the Ministry of Environmental Protection of China on July 3, 2012.

This standard takes effect as of October 1, 2012, replacing HJ/T 230-2006 as of the enforcement date. This standard shall be interpreted by the Ministry of Environmental Protection of China.
The previous versions replaced by this standard are HJBZ 15.1—1997, HJBZ 15.2—1997 and HJ/T 230-2006.
Technical requirement for environmental labeling products

Lighting Source

1 Applicable Scope

This standard stipulates the terms and definitions, basic requirements, technical contents and test methods for lighting source environmental labeling products.

This standard is applicable to single-capped fluorescent lamp, double-capped fluorescent lamp for general lighting, self-ballasted fluorescent lamp for general lighting, high-pressure sodium lamp, metal halide lamp, and self-ballasted LED lamp for general lighting.

2 Normative References

This standard quotes the provisions of the following documents. The valid version of any quoted document without a marked date shall be applicable to this standard.

GB 18871  Basic Standards for Protection against Ionizing Radiation and Safety of Radiation Sources
GB 19043  Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Double-capped Fluorescent Lamps for General Lighting Service
GB 19044  Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Self-ballasted Fluorescent Lamp for General Lighting Service
GB/T 10682  Double-capped Fluorescent Lamps — Performance Specifications
GB/T 13259  High Pressure Sodium Lamps
GB/T 16288  Labeling of Plastic Products
GB/T 17262  Single-capped Fluorescent Lamps — Performance Specifications
GB/T 17263  Self-ballasted Fluorescent Lamp for General Lighting Service — Performance Requirements
GB/T 18455  Package Recycling Making
GB/T 18661  Single-capped Metal Halide Lamps — Performance Specifications
GB/T 20861  Terminology of Abandoned Product Recycling
GB/T 23113  Mercury Level Measurement Methods of Fluorescent Lamps
GB/T 24458  Ceramic Metal Halide Lamps — Performance Specification
GB/T 24824  Measurement Methods of LED Modules for General Lighting
GB/T 24908  Self-ballasted LED Lamp for General Lighting — Performance Requirements
GB/T 26572  Requirements on Concentration Limits for Certain Restricted Substances in Electrical
and Electronic Products

QB/T 2940  Requirements for Concentration Limits for Certain Hazardous Substances in Lighting Equipments

Measures for Pollution Control of Electronic Information Products (Ministry of Information Industry File No. 39)

National Catalogue of Hazardous Wastes (Ministry of Environmental Protection File [2008] No. 1)

3 Terms and Definitions

The following terms and definitions shall apply to this standard.

3.1 Lighting source
It refers to any device converting electrical energy into optical radiant energy used for illumination.

3.2 Take-back
It refers to the activity collecting and storing waste products.

3.3 Recycling
It refers to the process of treatment of waste products to enable them to be reused as raw materials, but it does not include recovery and reuse of energy (GB/T20861).

4 Basic Requirements

4.1 The product quality and safety performances shall comply with the requirements of relevant product standards.

4.2 Pollutant emissions of product manufacturers shall meet national and local emission standards.

4.3 Product manufacturers shall strengthen clean production in the process of production.

5 Technical Contents

5.1 Requirements for environmental design

5.1.1 Plastic parts with a mass more than 25g or area over 200 mm² (except light transmitting cover) shall be marked with the material as required by GB/T 16288.

5.1.2 The lighting source survival rate of high-pressure sodium lamp and metal halide lamp shall meet the requirements of Table 1. The survival rate of other product lighting sources shall comply with relevant national standards.

<table>
<thead>
<tr>
<th>Product category</th>
<th>Color rendering index</th>
<th>Nominal power (W)</th>
<th>12,000h lighting source survival rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>High pressure sodium lamp</td>
<td>—</td>
<td>—</td>
<td>≥ 95%</td>
</tr>
</tbody>
</table>
5.1.3 Requirements for hazardous substances in parts
5.1.3.1 Lead (Pb), arsenic (As) and antimony (Sb) shall not be artificially added to lamp tube and wick glass, and the content of each substance shall not exceed 0.1% of the total mass of the glass component.
5.1.3.2 The limit of hazardous substances in electronic components (except glass or ceramic capacitors), plastic components and solder shall meet the requirements of GB/T 26572.
5.1.3.3 Plastic components with a mass more than 5g shall not use the material with halogen polymers matrix, of which the contents of short-chain chlorinated paraffin (SCCPs) and hexabromocyclododecane (HBCD) shall not exceed 0.1% of the component mass, and the amount of organic fluorine additive in fluorine plastics shall not be over 0.5% of the component mass.
5.1.3.4 Gallium arsenide (GaAs) content in LED lamps shall not exceed 0.1% of the mass of LED component.
5.1.3.5 The radioactive activity of thorium-232 ($^{232}$Th) and krypton -85 ($^{85}$Kr) of metal halide lamps shall meet the requirements of GB 18871.

<table>
<thead>
<tr>
<th>Metal halide lamp</th>
<th>≥80</th>
<th>≤ 70</th>
<th>≥ 60%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&gt;70; ≤ 400</td>
<td>≥ 70%</td>
</tr>
<tr>
<td></td>
<td>&lt;80</td>
<td>&gt;150; ≤ 400</td>
<td>≥ 70%</td>
</tr>
</tbody>
</table>

5.2 Requirements for production stage
5.2.1 Fluorescent lamp and high-pressure sodium lamp shall not adopt liquid mercury technology.
5.2.2 Mercury collection and adsorption devices should be set up in the production process of fluorescent lamps, high-pressure sodium lamps and metal halide lamps, and planning and management requirements for reducing mercury content and mercury emission should be established.
5.2.3 Water-based powder coating technology shall be used for fluorescent lamps.
5.2.4 Lead-free welding technology should be adopted for welding with melting point lower than 450℃.
5.2.5 Chromium compounds, hydrochlorofluorocarbons (HCFCs), 1,1,1-trichloroethane (C$_2$H$_2$Cl$_3$), trichloroethylene (C$_2$HCl$_3$), dichloroethylene (CH$_2$CHCl$_2$), chloromethane (CH$_3$Cl), trichloromethane (CHCl$_3$), carbon tetrachloride (CCl$_4$) and bromopropane (C$_3$H$_7$Br) shall not be used as cleaning solvents.
5.2.6 Management requirements for waste take-back and recycling in production process shall be established to ensure classified waste treatment in production process. Hazardous waste listed in the national catalogue of hazardous waste shall be under innocuous treatment by qualified institutions.

5.3 Requirements for hazardous substances in products
Mercury content in single-capped fluorescent lamp, self-ballasted fluorescent lamp for general lighting, double-capped fluorescent lamp for general lighting, high-pressure sodium lamp and metal halide lamp shall meet the requirements in Table 2.
Table 2 Limit of mercury content in products

<table>
<thead>
<tr>
<th>Product type</th>
<th>Mercury limit (mg/lamp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-capped fluorescent lamp and self-ballasted fluorescent lamp for general lighting</td>
<td></td>
</tr>
<tr>
<td>Power ≤ 30W</td>
<td>≤ 1.5</td>
</tr>
<tr>
<td>Power &gt;30; ≤ 60W</td>
<td>≤ 3.0</td>
</tr>
<tr>
<td>Double-capped fluorescent lamp for general lighting</td>
<td></td>
</tr>
<tr>
<td>Tube diameter≤ 17mm</td>
<td>≤ 2.5</td>
</tr>
<tr>
<td>Tube diameter &gt;17mm</td>
<td>≤ 3.0</td>
</tr>
<tr>
<td>Long-life triphosphor double-capped fluorescent lamp (life longer than 25000h)</td>
<td>≤ 5.0</td>
</tr>
<tr>
<td>High pressure sodium lamp</td>
<td></td>
</tr>
<tr>
<td>Power ≤ 70W</td>
<td>≤ 12.5</td>
</tr>
<tr>
<td>Power &gt;70W; ≤ 150W</td>
<td>≤ 15</td>
</tr>
<tr>
<td>Power &gt;150W; ≤ 400W</td>
<td>≤ 20</td>
</tr>
<tr>
<td>&gt;400W</td>
<td>≤ 40</td>
</tr>
<tr>
<td>Metal halide lamp</td>
<td></td>
</tr>
<tr>
<td>Power ≤70W</td>
<td>≤ 10</td>
</tr>
<tr>
<td>Power &gt;70W; ≤ 150W</td>
<td>≤ 20</td>
</tr>
<tr>
<td>Power &gt;150W; ≤ 250W</td>
<td>≤ 30</td>
</tr>
<tr>
<td>Power &gt;250W; ≤ 400W</td>
<td>≤ 60</td>
</tr>
</tbody>
</table>

5.4 Requirements for energy consumption

5.4.1 The initial luminous efficiency and lumen maintenance of single-capped fluorescent lamp environmental labeling product shall meet Level II energy efficiency index specified in GB19415. The energy efficiency performance of environmental labeling low carbon product shall meet Level I energy efficiency index described in GB19415.

5.4.2 The initial luminous efficiency and lumen maintenance of self-ballasted fluorescent lamp environmental labeling product shall comply with Level II energy efficiency index specified in GB19044, and the energy efficiency performance of environmental labeling low carbon product shall meet Level I energy efficiency index described in GB19044.

5.4.3 The initial luminous efficiency and lumen maintenance of double-capped fluorescent lamp environmental labeling product shall comply with Level II energy efficiency index specified in GB19043, and the energy efficiency performance of environmental labeling low carbon product shall meet Level I energy efficiency index described in GB19043.

5.4.4 The initial luminous efficiency and lumen maintenance of high-pressure sodium lamp environmental
labeling and environmental labeling low carbon product shall meet the requirements in Table 3.

### Table 3 Requirements for high pressure sodium lamp products

<table>
<thead>
<tr>
<th>Nominal power/W</th>
<th>Environmental labeling</th>
<th>Environmental labeling low carbon</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average initial luminous efficiency (1m/W)</td>
<td>2000h Lumen maintenance</td>
</tr>
<tr>
<td>≤50</td>
<td>≥73</td>
<td>≥85%</td>
</tr>
<tr>
<td>&gt;50; ≤70</td>
<td>≥81</td>
<td>≥85%</td>
</tr>
<tr>
<td>&gt;70; ≤100</td>
<td>≥88</td>
<td>≥85%</td>
</tr>
<tr>
<td>&gt;100; ≤150</td>
<td>≥98</td>
<td>≥90%</td>
</tr>
<tr>
<td>&gt;150; ≤250</td>
<td>≥110</td>
<td>≥90%</td>
</tr>
<tr>
<td>&gt;250; ≤400</td>
<td>≥120</td>
<td>≥90%</td>
</tr>
<tr>
<td>&gt;400; ≤1000</td>
<td>≥130</td>
<td>≥85%</td>
</tr>
</tbody>
</table>

5.4.5 The initial luminous efficiency and lumen maintenance of metal halide lamp environmental labeling and environmental labeling low carbon products shall meet the requirements in Table 4.

### Table 4 Requirements for metal halide lamp products

<table>
<thead>
<tr>
<th>Nominal power /W</th>
<th>Environmental labeling</th>
<th>Environmental labeling low carbon</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average initial luminous efficiency (1m/W)</td>
<td>2000h Lumen maintenance</td>
</tr>
<tr>
<td>CRI≥80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤70W</td>
<td>≥80</td>
<td>≥80%</td>
</tr>
<tr>
<td>&gt;70; ≤150</td>
<td>≥85</td>
<td>≥80%</td>
</tr>
<tr>
<td>&gt;150; ≤250</td>
<td>≥85</td>
<td>≥85%</td>
</tr>
<tr>
<td>&gt;250; ≤400</td>
<td>≥90</td>
<td>≥85%</td>
</tr>
<tr>
<td>CRI&lt;80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;150; ≤250</td>
<td>≥88</td>
<td>≥85%</td>
</tr>
<tr>
<td>&gt;250; ≤400</td>
<td>≥93</td>
<td>≥85%</td>
</tr>
</tbody>
</table>

5.4.6 The 3,000h lumen maintenance of non-directional self-ballasted lamp environmental labeling and environmental labeling low carbon products shall be no less than 96%. The color rendering index shall comply with the requirements specified in GB/T24908. The initial luminous efficiency shall meet Level I requirements of GB/T24908.

5.4.7 Color rendering index, lumen maintenance and initial luminous efficiency of reflective self-ballasted LED lamp environmental labeling and environmental labeling low carbon products shall meet the requirements in Table 5.
Table 5 Requirements for reflective self-ballasted LED lamp products

<table>
<thead>
<tr>
<th>Rated color temperature</th>
<th>Model</th>
<th>CRI</th>
<th>3000h Lumen maintenance</th>
<th>The minimum initial luminous efficiency /(1m/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤4000K</td>
<td>PAR16</td>
<td>PAR20 PAR30 PAR38</td>
<td>≥85</td>
<td>96%</td>
</tr>
<tr>
<td>&gt;4000K; ≤6500K</td>
<td>PAR16</td>
<td>PAR20 PAR30 PAR38</td>
<td>≥80</td>
<td></td>
</tr>
</tbody>
</table>

5.4 Product packaging requirements
5.4.1 Labeling shall be done according to the requirements of GB/T 18455.
5.4.2 HCFCs shall not be used as foaming agent.

5.5 Requirements for product recovery stage
The management system of waste product recovery and recycling should be established, and relevant information of product recovery and recycling should be provided.

5.6 Requirements for Product Instruction Manual
Product Instruction Manual shall be sold together with the product and shall include the followings:

1) Information on correct recycling method to be adopted after product abandoning such as separation from ordinary wastes without random discarding, warning signs for prevention of breakage and post-broken emergency treatment method.
2) Label on the content of hazardous substances in accordance with the Measures for Management and Control of the Pollution of Electronic Information Products.
3) Information related to luminous efficiency, color rendering index and lumen maintenance of the product.

6 Test Methods
6.1 The test of mercury content in Technical Contents 5.3 shall be conducted according to the methods specified in QB/T2940 and GB/T 23113.
6.2 The test of initial luminous efficiency and lumen maintenance of single-capped fluorescent lamps in Technical Content 5.4.1 shall be conducted based on the methods specified in GB/T 17262.
6.3 The test of initial luminous efficiency and lumen maintenance of self-ballasted fluorescent lamps in Technical Content 5.4.2 shall be conducted based on the methods specified in GB/T 17263.
6.4 The test of initial luminous efficiency and lumen maintenance of double-capped fluorescent lamps in Technical Content 5.4.3 shall be conducted based on the methods specified in GB/T 10682.
6.5 The test of initial luminous efficiency and lumen maintenance of high-pressure sodium lamps in Technical Content 5.4.4 shall be conducted based on the methods specified in GB/T13259.
6.6 The test of initial luminous efficiency and lumen maintenance of metal halide lamps in Technical Content 5.4.5 shall be conducted based on the methods specified in GB/T 24458 and GB/T 18661.

6.7 The test of color rendering index, initial luminous efficiency and lumen maintenance of non-directional self-ballasted LED lamps in Technical Content 5.4.6 shall be conducted based on the methods specified in GB/T 24824.

6.8 The test of color rendering index, initial luminous efficiency and lumen maintenance of reflective self-ballasted LED lamps in Technical Content 5.4.7 shall be conducted based on the methods specified in GB/T 24824.

6.9 Other requirements in Technical Contents shall be verified by document review combined with site inspection.