



THE MARK OF ENVIRONMENTAL RESPONSIBILITY

**GS-5**

**GREEN SEAL™ STANDARD FOR  
COMPACT FLUORESCENT  
LAMPS (CFLs)**

**THIRD EDITION  
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Green Seal, Inc. • 1001 Connecticut Ave. NW, Ste 872 • Washington, DC USA 20036-5525  
(202) 872-6400 • FAX (202) 872-4324 • [www.greenseal.org](http://www.greenseal.org)

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## **GREEN SEAL™**

Green Seal is a non-profit organization whose mission is to use science-based programs to empower consumers, purchasers, and companies to create a more sustainable world. Green Seal sets leadership standards that aim to reduce, to the extent technologically and economically feasible, the environmental, health, and social impacts throughout the life-cycle of products, services, and companies. The standards may be used for conformity assessment, purchaser specifications, and public education.

Green Seal offers certification of products, services, and companies in conformance with its standards. For additional information on Green Seal or any of its programs, contact:

Green Seal  
1001 Connecticut Avenue, NW, Suite 827  
Washington, DC 20036-5525  
(202) 872-6400  
greenseal@greenseal.org  
www.greenseal.org

## FORWARD

**General.** The final issued standard was developed in an open and transparent process with stakeholder input that included producers, users, and general interests.

The requirements in the standard are based on an assessment of the environmental, health, or social impacts associated with the products, services, or organizations covered in the scope of the standard. The requirements included in the standard are subject to revision. Provisions for safety have not been included in this standard. 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 law or regulations. This standard (and any corresponding conformity assessment) presumes compliance with all applicable laws and regulations.

This standard neither modifies nor supersedes laws and regulations. Compliance with all applicable laws and regulations is a required prerequisite for the manufacturing and marketing of the products.

Products, services, or organizations that are substantially similar to those covered by this standard in terms of function and life cycle considerations may be evaluated against the intent of the requirements of this standard, accounting for relevant differences between the intended scope of the Standard and the actual product, service, or organization to be evaluated.

This standard may not anticipate features of the product that may significantly, and undesirably, increase its impact on the environment, health, or society. In such a situation, Green Seal will ordinarily amend its standards to account for the unanticipated environmental, health, and societal impacts.

Normative references (e.g., other standards) in this standard intend to refer to the most recent edition of the normative reference.

**Edition.** This version is the Third Edition and replaces the Second Edition from December 9, 1997, including substantive revisions.

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Tests may be required by the standard that involve safety considerations. Adequate safeguards for personnel and property should be employed in conducting such tests.

## GREEN SEAL™ ENVIRONMENTAL STANDARD FOR COMPACT FLUORESCENT LIGHTING (GS-5)

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## List of Acronyms

**CFL.** Compact Fluorescent Lighting/Light/Lamp

**EICC.** Electric Industry Citizenship Coalition

**ENERGY STAR.** A joint program run by the United States Department of Energy (DOE) and the Environmental Protection Agency. The DOE runs the ENERGY STAR Program for CFLs and publishes the requirements for that program.

**IES.** Illuminating Engineering Society

**NRTL.** Nationally Recognized Testing Laboratory

**OSHA.** Occupational, Safety, and Health Administration

**UL.** Underwriters Laboratories

## GREEN SEAL™ STANDARD FOR COMPACT FLUORESCENT LIGHTING (GS-5)

### 1.0 SCOPE

This Standard establishes requirements for compact fluorescent lamps and lamp systems. This includes those lamps used for general illumination purposes, and can include those for some special purposes such as germicidal and bug lamps. The product group includes those with both screw based and pin based lamps and those with integral (e.g. self-ballasted) and non-integral ballasts (e.g. ballast adapters). This standard excludes linear fluorescent lamps.

This standard assumes compliance with all applicable laws and regulations. As a result, in order to be certified to this standard, the service provider must disclose all governmental allegations or determinations of violation of federal, state, or local laws or regulations with respect to its business. Certification shall be denied any service provider in violation of laws or regulations if, in the certifier's judgment, such violations indicate that the impacts of the service significantly exceed those contemplated in the setting of the standard.

### 2.0 DEFINITIONS

**2.1 Ballast Adapter.** A unit that contains all elements that are necessary for starting and stable operation of the lamp, with an integral socket for a lamp.

**2.2 Compact Fluorescent Lamp (CFL).** A fluorescent lamp that is small and compact that may be self-ballasted or function with a ballast adapter. May be referred to as a "lamp" in this standard.

**2.3 Conversion Kit.** A set of field-installed components which converts a portable luminary (fixture) to a permanently installed ballast adapter, or remote ballast and socket adapter, with a replaceable compact fluorescent lamp.

**2.4 Intentional Introduction.** The act of deliberately utilizing a restricted material in the formation of packaging or a packaging component where its continued presence is desired in the final package or packaging component to provide a specific characteristic, appearance, or quality.

**2.5 Post-Consumer Material.** Material that would otherwise be destined for solid waste disposal, having completed its intended end-use and product life cycle. Post-consumer material does not include materials and by-products generated from, and commonly reused within, an original manufacturing and fabrication process.

**2.6 Primary Packaging.** The material physically containing and coming into contact with the product.

**2.7 Recovered Material.** Material that has been recovered from or otherwise diverted from the waste generated after a material manufacturing process. Recovered material may include post-consumer material, cuttings, trimmings, obsolete inventories, and rejected unused stock, but does not include material capable of being re-used within the process that generated it.

**2.8 Recyclable Package.** The package can be collected in a substantial majority of communities, separated or recovered from the solid waste stream and used again, or reused in the manufacture or assembly of another package or product through an established recycling program:

**2.9 Secondary Packaging.** Any packaging or material other than primary packaging, including wrappers, but excluding shipping containers.

**2.10 Self-Ballasted Lamp.** A unit that incorporates, permanently enclosed, all elements that are necessary for starting and stable operation of the lamp, and which does not include any replaceable or interchangeable parts. The unit including all elements is discarded at the end of the lamp life.

**2.11 Source-Reduced Package.** A package that has at least 50% less material (by weight) compared to packages commonly used for that product type.

**2.12 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.

**2.13 Third-Party Certification Program.** A program without any financial interest or stake in the sales of the product or service being certified, or other conflict of interest. There must be a standard to base the certification upon and the standard must be appropriate and meaningful for its intended purpose. The standard must be publically available and developed with stakeholder input. Certification to the standard must be completed by an independent party (e.g., not the manufacturer of the product being certified), include site inspections, where applicable, and have a monitoring program to verify ongoing compliance.

### **3.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS**

**3.1 ENERGY STAR Compliance.** Lamps shall meet or exceed the ENERGY STAR Program Requirements for CFLs according to the base and type/design that applies, or most closely applies. The lamps that are not included in the scope of the ENERGY STAR program will be evaluated against all the requirements for the product they most closely resemble, with the option of using alternative test methods (see section 3.7).



**3.2 Life.** The average minimum rated lamp life shall be 10,000 hours at 3 hours per start as measured in accordance with the ENERGY STAR Program Requirements for CFLs. In units packaged with replaceable lamps, the ballast shall be tested to assure an average minimum rating of 1 lamp life cycle of 10,000 hours, with ongoing testing to confirm a life expectancy of an average minimum of 4 lamp life cycles, as measured in accordance with the ENERGY STAR Program for CFLs or IES LM 65.

**3.3 40% of Lamp Life.** The lamp lumen output, measured as specified by ENERGY STAR, at 40% of the lamp's life shall be within 15% of average initial lumens.

**3.4 Ballast.** Integral ballasts and ballast adapters shall not be magnetic.

**3.5 Ballast Adapter Power Quality.** Ballast adapters shall have a high power factor (>0.9) based on an average of 10 samples and the current harmonic distortion in triplens shall be less than or equal to 20%.

**3.6 Safety.** The products shall be tested by a third-party and listed to the applicable UL standard, or equivalent, by a NRTL accredited by OSHA.

**3.7 Alternative Test Methods.** Alternatively, a product can demonstrate adequate performance through using another scientifically validated test method under controlled and reproducible laboratory conditions if accompanied by justification for the method modification and documented in sufficient detail.

#### **4.0 PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS**

**4.1 Mercury Content.** The product shall contain less than 3 milligrams of mercury per unit.

**4.2 Radioisotopes.** The products shall not contain radioisotopes.

**4.3 Lead.** The glass and solder components shall not contain lead.

**4.4 Flame Retardants.** Plastic components weighing more than 5 grams shall not contain flame retardant substances or preparations that contain substances that carry the risk phrases R45, 46, 50, 51, 52, 53, 60, 61. In addition, the plastic components weighing more than 5 grams shall not contain any of the following flame retardants:

- Decabromodiphenyl 13654-09-6
- Monobromodiphenyl ether 101-55-3

- Dibromodiphenyl ether 2050-47-7
- Tribromodiphenyl ether 49690-94-0
- Tetrabromodiphenyl ether 40088-47-9
- Pentabromodiphenyl ether 32534-81-9
- Hexabromodiphenyl ether 36483-60-0
- Heptabromodiphenyl ether 68928-80-3
- Octabromodiphenyl ether 32536-52-0
- Nonabromodiphenyl ether 63936-56-1
- Decabromodiphenyl ether 1163-19-5
- Chloroparaffins with chain length 10-13 C atoms, Chlorine content > 50 % by weight 85535-84-8

## 5.0 MANUFACTURING REQUIREMENTS

**5.1 Compliance to Laws and Regulations.** The product shall be produced in compliance with applicable laws and regulations.

**5.2 Code of Conduct.** Manufacturers shall have and implement, documented with annual audit records, a code of conduct program that includes the criteria established by the Electronic Industry Code of Conduct (from EICC) covering labor, health and safety, environment, management systems, and ethics.

**5.3 Mercury in Manufacturing.** If mercury is in the product, the manufacturer shall use encapsulated dosing methods to minimize mercury exposure to workers during product manufacturing. Other methods of closed, accurate, and precise dosing would be acceptable if proven, with documentation, to have similar or better dose efficiency and protection to worker exposure.

## 6.0 END OF LIFE REQUIREMENTS

**6.1 Lamp Recycling.** Manufacturers shall have a recycling program in place to encourage and facilitate recycling of lamps in all markets where their CFLs are sold, including at least:

- Providing convenient CFL collection options free of cost to the user. This shall include options beyond municipal programs, such as but not limited to a third-party provider or retailer partnership.
- Information on the company website on the recycling program that links consumers/customers to the CFL collection options, through a link on the main CFL or lighting page for the company.

## 7.0 PACKAGING REQUIREMENTS

**7.1 Polyvinyl Chloride Package.** The package shall not be made from polyvinyl chloride.

**7.2 Recyclable Package.** The product's package shall be recyclable or source-reduced, or a combination of the two.

**7.3 Recycled Content Package.** Plastic, or similar, packaging shall contain at least 25% post-consumer material and paperboard, or similar, packaging shall contain at least 50% post-consumer material.

**7.4 Secondary Packaging.** Secondary packaging shall not be used. An exception may be made for packaging of multiple units when the total packaging (primary plus secondary) is a reduction in packaging material use.

**7.5 Heavy Metal Restrictions.** Heavy metals, including lead, mercury, cadmium, and hexavalent chromium, shall not be intentionally introduced. Further, the sum of the concentration levels of these metals present shall not exceed 100 parts per million by weight (0.01%); an exception is allowed for refillable packages or packages that would not exceed this maximum level but for the addition of recovered materials. Further, intentional introduction does not include the use of one of the metals as a processing aid or intermediate to impart certain chemical or physical changes during manufacturing, where the incidental retention of a residual of that metal in the final packaging or packaging component is not desired or deliberate, if the final packaging or packaging component complies with the incidental concentration restrictions of 100 ppm.

## 8.0 LABELING REQUIREMENTS

### 8.1 Primary Packaging Information for CFLs, Self-Ballasted Lamps, Ballast/Lamp Systems, and Conversion Kits.

**8.1.1 ENERGY STAR Compliance.** Lamps shall meet or exceed all of the ENERGY STAR Program Requirements for CFLs. The lamps that are not included in the scope of the ENERGY STAR program will be evaluated against all the requirements for the product they most closely resemble. If the lamp does not contain mercury, it does not need to include the mercury labeling requirements in the ENERGY STAR Program Requirements for CFLs.

**8.1.2 Extra Long Life.** If the lamp has an average minimum rated lamp life of greater than 15,000 hours it can make a claim about the extended life of the product, such as "extra long life."

**8.2 Primary Packaging Information for Ballast Adapters.** The total input watt rating and average rated life shall be displayed on the front face (the package side intended to face forward in merchandising) or adjacent side panels (not top, bottom, back or flaps) of the primary package.

**8.3 Right-To-Know.** The following information, if it is not on the product label, shall be readily available to consumers and purchasers on the product web site and product information sheets:

- Color-Rendering Index
- Mercury content
- Lamp recycling collection options (see section 6.1)
- Broken lamp clean up instructions; unless otherwise approved in writing by Green Seal, the description shall read as follows::

“If lamp breaks, do not inhale. Open window, leave room, and close door behind you. Shut off air system. Stay away for 20 minutes. With gloves or plastic bags to protect hands, scoop up broken material with stiff paper or cardboard and seal in plastic bag or container with lid. Clean area with damp paper towels and seal in a separate plastic bag or container, include gloves. Dispose of properly. Wash hands thoroughly. Do not allow children or pregnant/nursing women to help with cleanup. Do not vacuum or sweep.”

**8.4 Certification.** Whenever a claim on the product or package is made that it has been certified to this standard, it shall be based on a third-party certification program with an on-site audit and a description of the basis of certification shall be in a location, style, and typeface that are easily readable by the consumer. Unless otherwise approved in writing by Green Seal, the description shall read as follows:

“This product meets the Green Seal™ Standard for Compact Fluorescent Lighting (GS-5) for energy efficiency, long-life, low mercury content, lead-free glass, and in a package with post-consumer content.”