



**GS-5**

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

EDITION 3.1  
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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.

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COMPACT FLUORESCENT LAMPS (CFLs), GS-5**

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## FOREWORD

**Edition.** This version is Edition 3.1 from July 12, 2013 and replaces the Third Edition from November 12, 2009, (with editorial changes made on October 1, 2011). This revision includes substantive changes.

**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. These requirements are subject to revision, and generally cover aspects above and beyond regulatory compliance. This standard neither modifies nor supersedes laws and regulations. Any conformity assessment to this standard requires compliance with all applicable laws and regulations for the manufacturing and marketing of the products.

Provisions for safety have not been included in this standard, since they are supervised by regulatory agencies. Adequate safeguards for personnel and property should be employed for all stages of production, and for all tests that involve safety considerations.

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 a feature 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 a standard to account for the unanticipated environmental, health, or societal impacts.

Normative references (e.g., other standards) in this standard intend to refer to the most recent edition of the normative reference. Test methods may be required for product evaluation. Unless explicitly stated that a specified method is the only acceptable one, the intent of the standard is that an equivalent test method may be accepted at Green Seal's sole discretion.

Certification to this standard shall be awarded only by Green Seal, or, with Green Seal's explicit written permission, by a third-party certification program conducting on-site audits.

**Disclaimer of Liability.** Green Seal, as the developer of this standard, shall not incur any obligations or liability for any loss or damages, including, without limitation, indirect, consequential, special, or incidental damages, arising out of or in connection with the interpretation or adoption of, reliance upon, or any other use of this Standard by any party. Green Seal makes no express or implied warranty of merchantability or fitness for a particular purpose, nor any other express or implied warranty with respect to this Standard.

## ACRONYMS AND ABBREVIATIONS

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

**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

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## GREEN SEAL STANDARD FOR COMPACT FLUORESCENT LAMPS (CFLs), GS-5

### 1.0 SCOPE

This Standard establishes requirements for *compact fluorescent lamps (CFLs)* 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. See Appendix 1 for an example list of products included in this standard.

Words and phrases described in the standard that appear in *italics* have a corresponding definition located in the definition section of the standard, Annex A.

### 2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS

**2.1 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 2.7).

**2.2 Lamp 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 Illuminating Engineering Society (IES) LM 65.

**2.3 Lumen Output at 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.

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

**2.5 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%.

**2.6 Safety.** The products shall be tested by a *third-party* and listed to the applicable Underwriters Laboratories standard, or equivalent, by a Nationally Recognized Testing Laboratory accredited by the Occupational, Safety, and Health Administration.

**2.7 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.

### 3.0 PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS

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

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

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

**3.4 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 ether 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

### 4.0 MANUFACTURING REQUIREMENTS

**4.1 Code of Conduct.** Manufacturers shall have and implement a code of conduct program that includes the criteria established by the Electronic Industry Code of Conduct (covering labor, health and safety, environment, management systems, and ethics). Annual audits of this program will be documented.



**4.2 Exposure to Mercury.** If the product contains mercury, the manufacturer shall use encapsulated dosing methods to minimize the exposure of workers to mercury 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.

## 5.0 END OF LIFE REQUIREMENTS

**5.1 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.

## 6.0 PACKAGING REQUIREMENTS

**6.1 Polyvinyl Chloride Restrictions.** The package shall not be made from polyvinyl chloride.

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

**6.3 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*.

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

**6.5 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.

## 7.0 CERTIFICATION AND LABELING REQUIREMENTS

**7.1 Certification Mark.** The Green Seal® Certification Mark may appear on the product, packaging, secondary documents, and promotional materials, only in conjunction with the certified product. Use of the Mark must be in accordance with *Rules Governing the Use of the Green Seal Certification Mark*<sup>1</sup>.

The Green Seal Certification Mark shall not be used in conjunction with any modifying terms, phrases, or graphic images that might mislead consumers as to the extent or nature of the certification.

Green Seal must review all uses of the Certification Mark prior to printing or publishing.

**7.2 Use With Other Claims.** The Green Seal Certification Mark shall not appear in conjunction with any human health or environmental claims, unless verified and approved in writing by Green Seal.

**7.3 Statement of Basis for Certification.** Wherever the Green Seal Certification Mark appears, it shall be accompanied by a description of the basis for certification. The description shall be in a location, style, and typeface that are easily readable.

The description shall read as follows, unless an alternate version is approved in writing by Green Seal:

This product meets Green Seal™ Standard GS-5 based on energy efficiency, durability, lead-free glass, minimized/recycled packaging, and protective limits on mercury content. GreenSeal.org.

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<sup>1</sup> [www.greenseal.org/TrademarkGuidelines](http://www.greenseal.org/TrademarkGuidelines)

## ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

**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.

**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.

**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*.

**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.

**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.

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

**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.

**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:

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

**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.

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

**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.

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**APPENDIX 1 – SCOPE (Informative)**

Examples of products included in or excluded from the scope of GS-5:

**Products Included in GS-5**

- *CFLs*
- *CFL systems*
- *CFLs with integral ballasts*
- *CFLs with non-integral ballasts*
- *Colored CFLs*
- *Dimmable CFLs*
- *Flood light CFLs*
- *Germicidal CFLs*
- *Pin based CFLs*
- *Screw based CFLs*

**Products Excluded from GS-5**

- Halogen light bulbs
- High Intensity Discharge light bulbs
- Incandescent light bulbs
- Light emitting diodes
- Linear fluorescent lamps

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