

# SAFEGUARDS

SGS CONSUMER TESTING SERVICES

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## NEW IEC TEST STANDARD FOR MERCURY LIMITS IN ENERGY SAVING LAMPS

The market of energy saving lamps grows constantly. Irregular disposal of mercury containing fluorescence lamps may become an environmental risk even if lamps contain only small amounts of mercury and directive 2002/95/EC sets a threshold for this hazardous substance. In order to monitor regulatory product compliance a new test standard is currently under development by the International Electrotechnical Commission (IEC). Test standard IEC 62554, in close connection with IEC 62321:2008, is designed to determine the amount of mercury which is currently allowed for this application.

Energy saving lamps, also known as fluorescence lamps or luminescence lamps, getting a growing market share since some traditional incandescent lamps are already or will be banned in certain areas of the world. For important markets like the European Union Member States bans of certain application of incandescent lamps are already in place since September 2009<sup>1</sup> or regulations are under preparation and will be enforced in the future for other markets e.g. for the United States of America between 2012 and 2014<sup>2</sup>.

Even if fluorescence lamps feature reduced energy consumption they are not completely environmental friendly. A typical fluorescent lamp is in principal made from a coated glass tube with electrodes connected to it. Additionally to the coating the tube contains mercury (Hg) of which a small fraction is in vapor form. This small amount of Hg vapor in the discharge tube is necessary in order to make these lamps work properly. After application of a voltage the electrodes energize the Hg vapor which subsequently emits ultraviolet light (UV). The tube coating absorbs the UV light and reacts by emitting visible light through a fluorescence process<sup>3</sup>. An Hg vapor source in the lamp may exist in liquid elemental form or as amalgam; or even both<sup>4</sup>. Figure 1 on following page shows a cross-section of a compact fluorescence lamp.

Breaking a lamp under uncontrolled conditions during regular use or irregular disposal will set this Hg free and is considered a hazard for consumers and the environment due to the poisonous features of Hg. Being aware of the technical necessity of Hg in this lamp type as well as its environmental threats the

European Commission found a compromise.

Whereas directive 2002/95/EC<sup>5</sup>, also known as RoHS, sets strict limits for hazardous substances in homogeneous materials for electrical and electronic equipment the use of Hg in fluorescence lamps is exempt. Table 1 shows the allowable amounts of Hg.

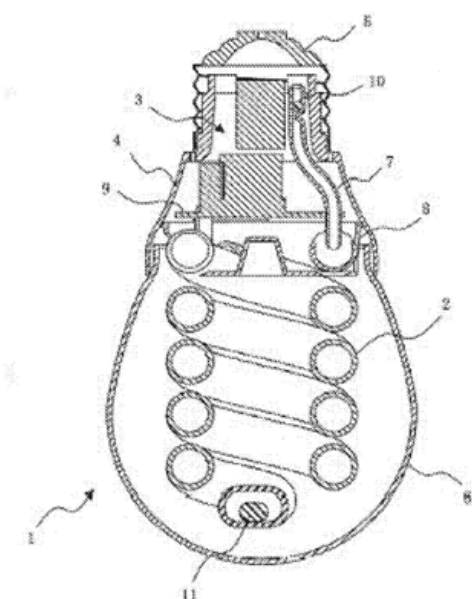
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<sup>1</sup> [COMMISSION REGULATION \(EC\) No 244/2009 of 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps](#)

<sup>2</sup> [Energy Independence and Security Act of 2007](#)

<sup>3</sup> [FLUORESCENT LIGHTS AND MERCURY](#)  
<sup>4</sup> [www.patent-de.com](#)

<sup>5</sup> [DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment](#)



1. Bulb type fluorescence lamp
2. Spiral type tube
3. Stabilizer
4. Plastic housing
5. Screw base
6. Bulb
7. Ventilation tube
8. Plate
9. Electronics
10. First Hg source
11. Second Hg source

Figure 1

Lamp type	Mercury limit [mg Hg/lamp]
Compact fluorescence lamp	≤ 5
Straight fluorescence lamp for general purpose; halophosphate	≤ 10
Straight fluorescence lamp for general purpose; triphosphate with normal lifetime	≤ 5
Straight fluorescence lamp for general purpose; triphosphate with long lifetime	≤ 8
Straight fluorescence lamp for special purpose	Not limited

Table 1

Standard IEC 62554 (read [IEC Document: 34A/1389/CDV](#)) is currently at the stage of a Committee Draft for Voting. The standard was developed to allow product specific sample preparation and in connection with [IEC 62321:2008](#) determine even the small amounts of Hg used in current technology fluorescence lamps. The standard's draft specifies sample preparation methods for determining Hg levels in new tubular fluorescent lamps (including single capped, double capped, self ballasted and Cold Cathode Fluorescent Lamps (CCFL) for backlighting) containing 0.1 mg Hg or more.

A large variety of Hg vapour sources exists. Although some of the lamps are dosed with amalgam or solid Hg alloy, there are also many fluorescent lamps dosed with liquid Hg. Amalgam dosed lamps often have sources that act as an auxiliary amalgam. Form and location of these sources may also vary widely. The introduction of a specific sample preparation technique minimizes the loss of Hg in the vapor state when the discharge tube is opened. With this sample preparation technique all Hg will condense in the discharge allowing good control for Hg recovery. The procedure in the standard draft includes a method to collect liquid Hg, Hg compounds and alloys and amalgams.

SGS will follow up and inform about exemption surveillance analysis in consumer products as a complementary service. We can help you to control the risks.

Through our global network of laboratories, we enable to provide a range of services, including analytical testing and consultancy work for technical and non-technical parameters in a comprehensive range of consumer products in chemical field for the worldwide. Please do not hesitate to contact us for further information.

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