

WEEE AND ROHS DIRECTIVES – FROM BEGINNING TO PRESENCE

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Abstract

WEEE and ROHS are European Community directives adopted from 2002., became European Law in 2003. These directives are refer to e-waste generally, and certain hazardous substances in electronic equipment.

Key words: WEEE, ROHS, hazardous substances

Introduction

The WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment [1] was adopted by European Community in order to solve the problem of toxic e-waste. On the other way is ROHS Directive 2002/95/EC (Restriction of Hazardous Substances) [1], which restricts certain hazardous substances and which is in close relation with WEEE.

The WEEE sets into 11 categories of EEE [2]:

1. Large household appliances
2. Small household appliances
3. IT and telecommunications equipment
4. Consumer equipment
5. Lighting equipment
6. Electrical and electronic tools
7. Toys, leisure and sports equipment
8. Medical devices
9. Monitoring and control instruments including industrial monitoring and control instruments
10. Automatic dispensers
11. Other EEE not covered by any of the categories above

The ROHS restricts the use of six substances, although this is so-called lead-free directive. The maximum permitted concentrations are 0,1% by weight of homogenous material. The exception is cadmium with limit 0,01%. This limit refers to any single component that could be separated mechanically, not to the weight of finished product or component in it. So, considering this, everything that can be identified as homogenous substance must match the limit. The maximum concentration values for restricted substances are given in Table 1.

Table 1. Restricted substances by ROHS and tolerated values by weight of homogenous materials [3]

Substance	Limit
Lead (Pb)	0,1%
Mercury (Hg)	0,1%
Cadmium (Cd)	0,01%
Hexavalent chromium (Cr ⁶⁺)	0,1%
Polybrominated byphenils (PBB)	0,1%
Polybrominated dyphenil ethers (PBDE)	0,1%

These hazardous substances given in Table 1 are widely used in various electronic products. For example: lead and cadmium are used in printed circuit boards, batteries, paints, solders, lamps and various metal parts; mercury in lighting devices like fluorescent lamps; hexavalent chromium in metal finishes; PBB and PBDE as flame retardants.

WEEE and ROHS directive

The purpose of WEEE Directive 2002/96/EC is prevention of e-waste, generally, but also reuse, recycling and improvement of environmental performances of all subjects involved in life cycle of electrical and electronic equipment (EEE). The directive itself has definition of all terms which are related to e-waste such as prevention, treatment, disposal, producer, etc.

In Annexes in this Directive there is categorization of EEE and list of products which are included in. Some of these products with their categories are listed in Table 2.

Table 2. Some of EEE categories and products in 2002/96/EC directive [2]

Large household appliances	Small household appliances	IT and telecommunications equipment	Consumer equipment	Lighting equipment
Refrigerators	Vacuum cleaners	Computers	Radio sets	Straight fluorescent lamps
Freezers	Carpet sweepers	Printers	TV sets	Compact fluorescent lamps
Washing machines	Irons	Faxes	Cameras	High intensity discharge lamps
Microwaves	Toasters	Calculators	HI FI recorders	Low pressure sodium lamps
Electric radiators	Fryers	Copying equipment	Musical instruments	Other lighting or equipment

Also, there is a symbol for marking EEE, given at figure 1. This symbol is point out that EEE should collect separately.

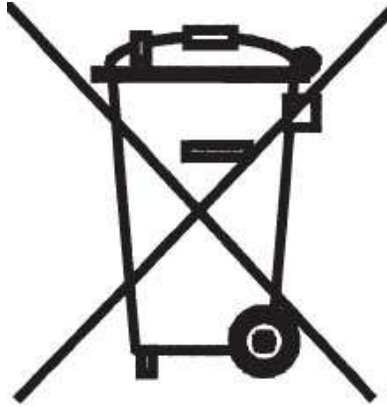


Figure 1. The marking symbol for ELV [2]

These basic facts given above are global, and there is not huge difference in directive from 2002 and in present day.

There are number of exemptions from the ROHS which are listed in annexes of the Directive. These exemptions are not given at once yet this list is modifying during last 10 years. Some of these exemptions are listed in Table 3, and they are given for specific technical applications in order to achieve a gradual removal of hazardous substances in EEE.

Table 3. List of some exemptions from the restriction in ROHS [3]

Exemption	Scope and date of applicability
Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC or higher	Expires on January 2013 and after that may be used in spare parts for EEE placed on the market before January 2013
Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80% and less than 85% by weight	Expired on January 2011 and after that may be used in spare parts for EEE placed on the market before January 2011
Lead used in other than C-press compliant pin connector systems	Expires on January 2013 and after that may be used in spare parts for EEE placed on the market before January 2013
Lead in linear incandescent lamps with silicate coated tubes	Expires on 1 September 2013
Cadmium and its compounds in one shot pellet type thermal cut-offs	Expires on January 2012 and after that may be used in spare parts for EEE placed on the market before January 2012
Cadmium in colour converting II-VI LEDs ($< 10\mu\text{g Cd per mm}^2$ of light-emitting area) for use in solid state illumination or display systems	Expires on 1 July 2014
Mercury in High Pressure Mercury (vapour) Lamps (HPMV)	Expires on 13 April 2015

The most recent document which is preceding new Directive is Opinion of the EU Commission on the Proposal. Based on that, the actual Directive recast to a new one. The least WEEE Directive 2012/19/EU has been published in issue L197 of the Official Journal on 24 July 2012. Some of Declarations adopted by the Commission included in Directive 2012/19/EU [4] are declarations on: product design, specific derogations from the collection targets, nanomaterials and the use of implementing acts.

Conclusion

In order to solve the e-waste problem and the restriction of hazardous substances, WEEE and ROHS directives are adopted by EU. Considering the situation on the market, research work and the possibility of implementing new materials, removal of the hazardous substances is not an easy job. Because of that, the WEEE and ROHS are continually recast to a new form, and these directions are important to follow in Member State countries as well as in states which are not members.

References

[1] <http://ec.europa.eu/environment/waste>

[2] <http://eur-lex.europa.eu>

[3] EU Parliament and Council, Directive 2011/65/EU, Official Journal of the European Union, L174 (2011) 88

[4] EU Parliament and Council, WEEE Directive 2012/19/EU, Official Journal of the European Union, L197 (2012) 38