

Engineer's Guide: Simplifying China RoHS Compliance



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Introduction

Now that China is being viewed increasingly as a market opportunity and not just as a center of manufacturing and export trade, many producers and distributors of electronic products are actively gearing up to sell there. However, they must look before they leap, because the People's Republic of China (PRC) is developing tough new criteria to limit the use of toxic or hazardous substances in electronic information products (EIPs).

On March 1, 2007, the PRC government made into law its Administrative Measure on the Control of Pollution Caused by Electronic Information Products. The Measure commonly referred to as "China RoHS," was published on February 28, 2006 to encompass products containing any of the following hazardous substances: lead; cadmium; mercury; hexavalent chromium (Cr VI); polybrominated biphenyls (PBB); and polybrominated diphenyl ethers (PBDE) flame retardants, excluding decaBDE; and any other toxic or hazardous substances or elements to be named by the government.

Failure to comply with the stipulations of China RoHS comes with direct business consequences. The greater risks are not confined to monetary fines. They could involve the opportunity costs of lost sales, the costs of product recalls and write-downs of obsolete inventory, and the long-term damage to the company's brand that results from negative publicity.

This paper will help design engineers and product marketers learn how to work within the guidelines of China RoHS. It shows how China RoHS compares to the increasingly familiar RoHS requirements in the European Union (EU), describes the rulings that deserve particular attention, explains the significance of the environment-friendly use periods, and illustrates key provisions for marking of products in order to comply with China RoHS.

EIP Categorization

The first question that many companies may have is this: "Does China classify my product as an EIP?" According to China RoHS, the term "Electronic Information Product" refers to the following products and their accessories manufactured by using electronic information technology:

- radar equipment products,
- communication equipment products,
- broadcast television equipment products,
- computer products,
- household electronic products,
- electronic measurement instrument products,
- electronic products for professional use,
- electronic component,
- electronic application products, electronic material products, etc.

The Measure excludes export and military products. More information can be found at: http://www.mii.gov.cn/art/2006/03/16/art_1221_8441.html

Comparing China RoHS with EU RoHS

By now many engineers are familiar with the EU's RoHS Directive, which stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment". The RoHS Directive is an EU Article 95 single-market directive that came into force on July 1, 2006 with the intent of banning anywhere in the EU market the introduction of new electrical and electronic equipment (EEE) containing more than the defined maximum concentration levels of certain hazardous substances, i.e., lead, cadmium, mercury, Cr VI, PBB, and PBDE. China RoHS runs parallel to EU RoHS in many respects, but there are critical differences too:

Similarities:

- Both China RoHS and EU RoHS are legal regulatory documents
- Both are intended for the control of hazardous substances in electronic and electrical equipment by prohibiting use and/or limiting concentration values
- Both apply to trading and sales activities
- The substances prohibited or restricted are the same and have the same limit values

Key differences:

- The Administrative Measure is directly executable, while the European RoHS Directive was not enforceable until it was transposed into EU members' national laws
- The European RoHS Directive applies to a broader range of EEE designed for use with a voltage rating not exceeding 1,000 volts for alternating current and 1,500 volts for direct current, while the Administrative Measure mainly applies to EIP
- The PRC's Administrative Measure restricts toxic or hazardous substances using "Catalogue Management" whereas the EU RoHS Directive covers eight categories of products from the Waste Electrical and Electronic Equipment (WEEE) Directive and grants exemption to the products which it is technically and economically impractical to control for the time being
- Implementation of the Administrative Measure requires that standards and the Catalogue support each other, while EU RoHS defines only the standard
- The Administrative Measure controls hazardous substances with self-declaration of environmental information and marking on the EIP and by monitoring products listed in the Catalogue to ensure that hazardous substances are replaced or maintained within limits, and that the products then pass obligatory certification (3C certification) to enter the China market
- The European RoHS Directive has only one step: self-declaration that the products must be in compliance with the stated requirements when they are placed on the market.

Key Elements of China RoHS

China RoHS uses three mechanisms to control the use of specific substances in EIPs:

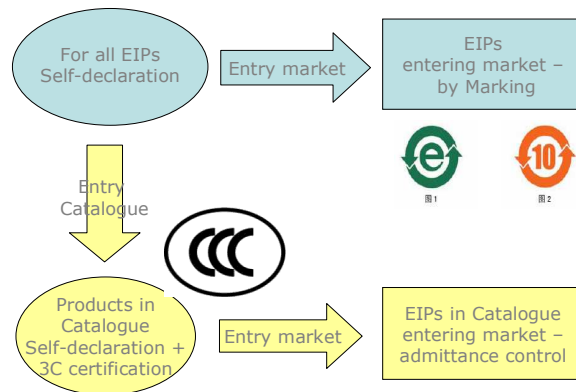
- Establishment of standards
- Catalogue management
- Substitution of hazardous substances.

Standards have already been established and are described below, but creation of the catalogue and its management guidelines are not yet complete.

Compliance with China RoHS is currently in two steps. The first step became effective on March 1, 2007: no products can be introduced legally into China's markets unless they have been marked in accordance with strict China RoHS criteria. The second step involves inclusion of an EIP in the China RoHS catalogue. Implementation deadlines will vary according to when a product is included in the catalogue. An EIP listed there will require

“3C” certification to confirm compliance with the limits of hazardous substances before it can be introduced into the market. Once its listing appears, restrictions to certain or all six declared substances apply, and all clauses will be effective from the date of inclusion (See Figure 1). The PRC’s Ministry of Information Industry has drafted a procedure for catalogue development. The draft of the catalogue management system is expected to be complete by late 2007.

Figure 1: Paths to Entry into the China Market



Standards

The following three published standards for China RoHS were implemented on November 16, 2006:

- SJ/T11363 – Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products
- SJ/T11364 – Marking for Control of Pollution Caused by Electronic Information Products
- SJ/T11365 – Testing Methods for Hazardous Substances in Electronic Information Products

SJ/T 11363 covers the classification of materials for testing as well as the concentration limits for hazardous substances in different classes of material. There are three classes, each with specific applicable concentration limits:

- EIP-A: Each homogeneous material in electronic information products
 - The content of Pb, Hg, Cr6+, PBB, PBDE (excluding decaBDE) should not exceed 0.1% by weight. The content of Cd should not exceed 0.01% by weight.
- EIP-B: Metal coating in each part of electronic information products
 - Pb, Hg, Cd, and Cr VI should not be added intentionally and the criteria used to determine compliance is: for Pb, Hg, and Cd, it should pass the XRF test; for Cr VI, it should pass the Spot Test as outlined in SJ/T 11365.
- EIP-C: Small components or materials that cannot be separated under current conditions. (A general rule is for the component to measure less than or equal to 4mm³.)
 - The content of Pb, Hg, Cr VI, PBB, and PBDE (excluding decaBDE) should not exceed 0.1% by weight. The content of Cd should not exceed 0.01% by weight.

Marking Requirements

The standard of most relevance to most engineers will be SJ/T 11364: the standard referring to the requirements for marking of products in order to comply with China RoHS now. So for the balance of this paper, we will focus on the details of SJ/T 11364, returning in a future paper to address aspects of the catalogue procedure as it develops.

SJ/T 11364 covers the regulation of:

- Marking for toxic and hazardous substances or elements in EIPs
- The environment-friendly use period
- The recyclables
- The names of packaging materials

Let us first examine the requirements for marking logos on products. Two logos are applicable (See sample logos illustrated below):

- Green Logo: Indicates that the EIP does not contain toxic and hazardous substances or elements over the maximum concentration values defined above, and is an environment-friendly product which can be recycled and reused.

- Orange Logo: Indicates that the EIP contains toxic and hazardous substances or elements over the defined maximum concentration values defined above. The names and content of the toxic and hazardous substances or elements shall be provided in the product instruction manual. The number in the symbol refers to the environment-friendly use period (described in more detail below.) It implies that the products should enter the recycling system after the environment-friendly use period.

Specifications for Logos

Recommended Colors

- Green – C85, M31, Y83, K20
- Orange – C0, M75, Y99, K0

Dimension Ratio referencing the 3 dimensions of the Orange Logo

- 5:8:12

Minimum Size

- 5 mm x 5 mm



图 3

Locations of Logos

- Green Logo: Can be on product or on product literature.
- Orange Logo: Should be on product when surface area is more than 5,000 mm² but can be on product literature when surface area is less than 5,000 mm².

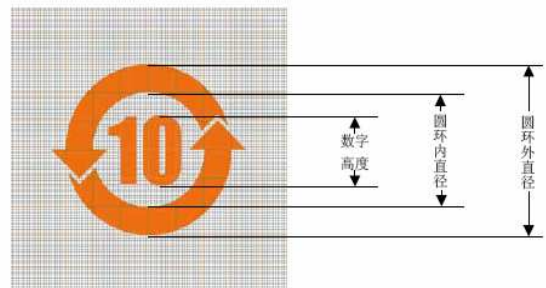


图 4

Marking for Hazardous Materials

Products containing hazardous materials must be provided with an additional label as shown below. And, this label should be included in the product literature while everything must be in Chinese!

表 1 有毒有害物质或元素名称及含量标识格式

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr ⁶⁺)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
.....
O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/Txxxxx-xxxxx 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/Txxxxx-xxxxx 标准规定的限量要求。 (企业可在此处, 根据实际情况对上表中打“X”的技术原因进行进一步说明。)						

- The first row is the heading.
- The first column is the names of *parts*.
- All other columns are the content of toxic and hazardous substances or elements of the part.
- “O” - If a part does not contain certain type of toxic and hazardous substances or elements, it indicates that the content of toxic and hazardous substances within the homogeneous material is below the limits.
- “X” - If a part contains certain type of toxic and hazardous substances or elements, it indicates that the content of toxic and hazardous substances within the homogeneous material exceeds the limits.
- Organization can further elaborate the item marked “X”.
- Character size: min 1.8 mm in Chinese

Marking of Packaging Materials

Packaging materials must also carry designated markings (see illustrations below). The manufacturer or importer of EIP shall mark on the outer package the symbol and the number codes of packaging materials of EIP per GB18455-2001.

- If the maximum surface area of packaging materials is less than 5x1000 mm², the indication doesn't need to be labeled on the packaging materials. It must then be indicated in the product's instruction manual.



Environment-friendly Use Period (EPUP)

Article 11 of the China RoHS Administrative Measure provides rules that govern the time period during which the toxic and hazardous substances or elements contained in an EIP do not leak or mutate under normal use. It is the period during which normal use of the EIP does not cause serious pollution or damage to human life or property. The period is called the Environment-friendly Use Period or Environment Protection Use Period (EPUP). Manufacturers should determine the EPUP by themselves.

Article 11 also stipulates that if the EIP contains toxic and hazardous substances or elements, it shall be labeled with the “Orange” color mark indicating the EPUP. Detailed instructions on the usage condition and special marking of accessories during the EPUP shall be included in the product instruction manual.

The manufacture date of a product should be marked on the product to comply with the Chinese ruling that requires products with a service life limit to be marked with their date of manufacture and service period. The manufacture date represents the EPUP’s start date.

Methods for Determining EPUP

The PRC’s Ministry of Information Industry has set up a committee to develop the General Guidelines of Environment-friendly Use Period of electronic information products. The committee is expected to publish its findings soon. For now, though, some guidelines are clear. For a period of less than or equal to 10 years, the EPUP should be an integer between 1 and 10. For a period of more than 10 years, the EPUP should be an integer that is a multiple of 5. If the period is not an integer multiple of 5, then the next lowest multiple of 5 below the actual value shall be selected as the EPUP.

There are several different methods of determining the EPUP:

- **Practical method** Under conditions of normal use, if five units are involved in a leakage incident of an EIP's hazardous substances or elements, then the technical EPUP for the product shall be determined by rounding off the minimum intervals between the time the product first used and the occurrence of the incident.
- **Experimental method** The EPUP determination is made after an accelerated aging test
- **Safe Use Period method** If the products have a safe use period, that period shall be taken to be the products' EPUP
- **Techno-life method** If the techno-life of a product is determined at the design stage and the environment factors are considered, the EPUP for the product shall be calculated as the sum of the techno-life plus the difference, with the difference including market-life factors such as shipment and pre-sale storage of products and the overhaul life of a repairable product
- **Analogy method** For new EIPs whose techno-life and safe use periods have not been determined, the EPUP for the products should be the same as those EIPs whose production technology and raw materials are the same or similar.
- **Table Look-up method** The EPUP for common EIPs shall be recommended by the China RoHS related committee.

Best Practices

Every company that plans to sell its electronic products in China must find out which specific standards apply to its offerings, and what it must do to ensure that its products are fully compliant with China RoHS. There is no shortcut: the specifications of each product must be matched carefully to the China RoHS requirements. That said, though, there are some general-purpose preparations that companies can make:

- Create a compliance plan
 - What information do you have and what is missing?
 - Education, training, preparation (company and supply chain)
- Set up compliance management (information) systems for:
 - Tracking and tracing, registration and test data



- Suppliers: Information, auditing, etc.
- Include materials (disclosure) in your criteria
- Communicate: Internally, externally, up and down the supply chain

Conclusion

This paper has provided a quick overview of what is required to comply with the emerging China RoHS measure.

If your company intends to sell electronic products in China, and your product specifications staff are struggling to make sense of the China RoHS rulings in time to meet a critical window of opportunity, you may find it helpful to partner with Intertek-ETL Semko, a worldwide leader in compliance, for electrical safety and for restricted substances. By working with a partner such as Intertek-ETL Semko, it is often easier and faster to gain China RoHS certification, to obtain a technical compliance file (TCF) or to complete compliance and verification testing and evaluation. Alternatively, Intertek-ETL Semko's consultants and trainers can help get your staff up to speed quickly and cost-effectively.

For more information, go to www.intertek-rohs.com. You can also call 1-800-WORLDFAB or email icenter@intertek.com. Intertek gets you the answers you need—within 24 hours. We look forward to helping you.

For more information, go to www.intertek-etlsemko.com. Call 1-800-967-5352 or email icenter@intertek.com. Intertek gets you the answers you need—within 24 hours. We look forward to helping you.