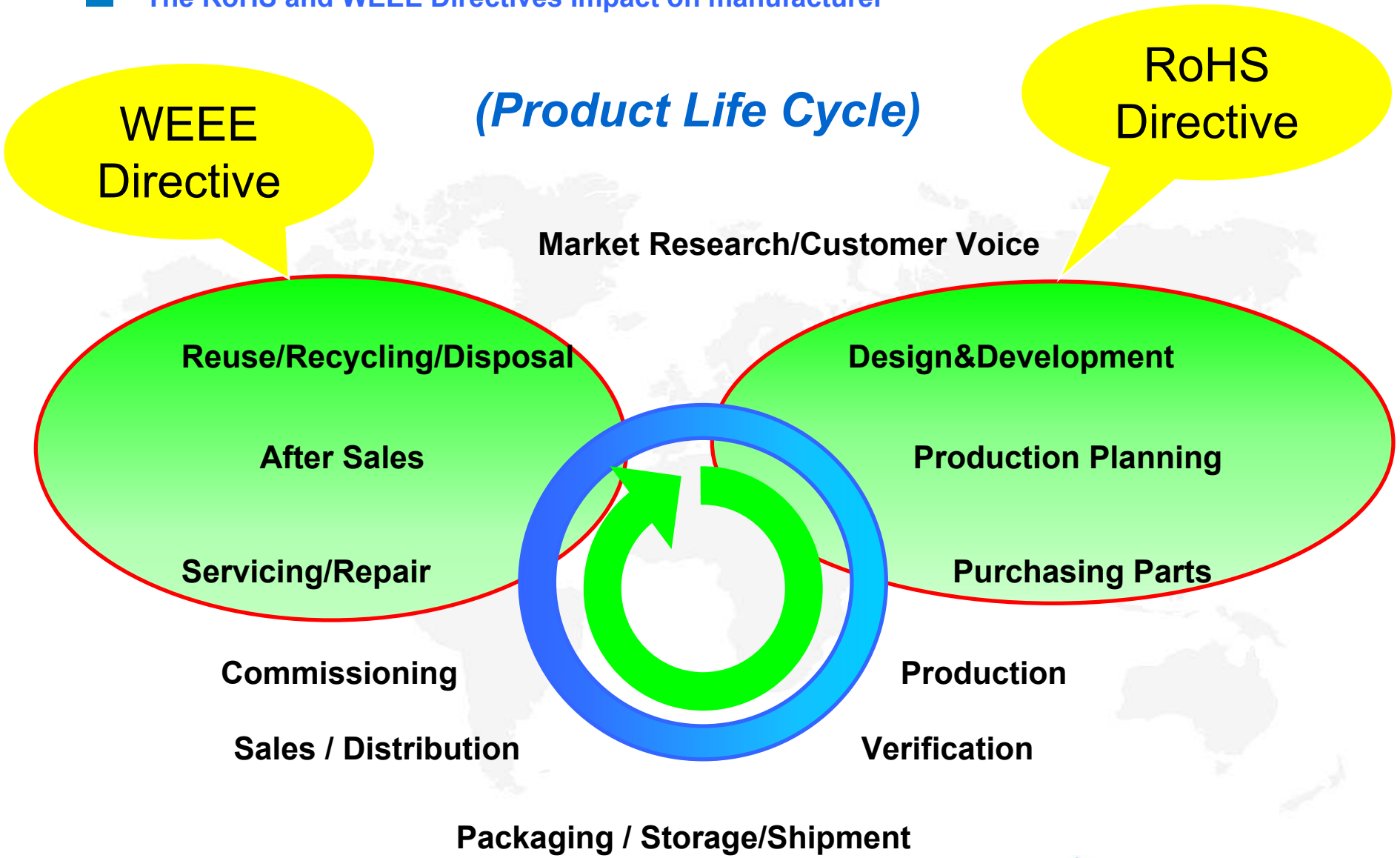
Waste Disposal Consumer do not want see/ 消费者不愿看到的现象

- ***Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE Directive)***

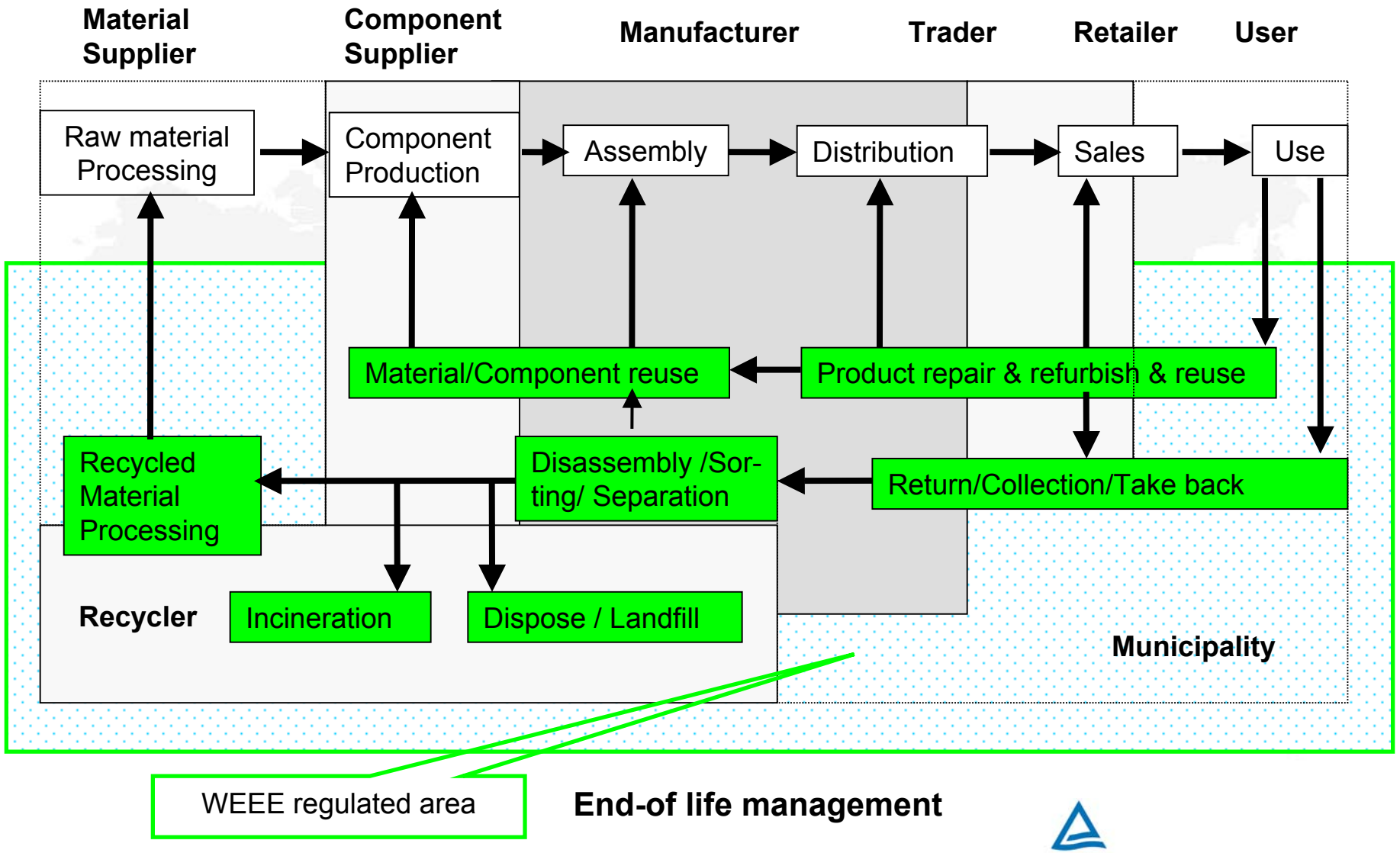
  报废电子电气产品指令

- ***Restriction of the Use of Hazardous Substances Directive 2002/95/EC (RoHS Directive)***

  限制在电子电气产品中使用有害物质指令


WEEE Directive
(Product Life Cycle)
RoHS Directive
Market Research/Customer Voice
Reuse/Recycling/Disposal
After Sales
Servicing/Repair
Design&Development
Production Planning
Purchasing Parts
Commissioning
Sales / Distribution
Production
Verification
Packaging / Storage/Shipment

WEEE Resource Life-Cycle



Product Categories of EEE Waste/EEE的范围

Annex IA

1. Large Household Appliances/大型家用电器
2. Small Household Appliances/小型家用电器
3. IT and Telecommunications Equipment/IT及通讯设备
4. Consumer Equipment/消费者设备
5. Lighting Equipment/灯具
6. Electrical and Electronic Tools/电子及电动工具
7. Toys, Leisure and Sports Equipment/玩具，休闲及体育设备
8. Medical Devices (not implanted and infected devices)/医疗设备
9. Monitoring and Control Instruments/监控设备
10. Automatic Dispenser/自动售货机

Main requirements

- Product Design (Article 4)/产品设计（第四章）
- Separate Collection (Article 5)/分类回收（第五章）
- Treatment of WEEE (Article 6)/WEEE的处理（第六章）
- Recovery and recycling (Article 7) /回复及循环利用（第七章）
- Financing WEEE from private household (Article 8)/私人家庭WEEE的财务责任（第八章）
- Financing WEEE from others (Article 9)/其他WEEE的财务责任 （第九章）
- Information for user (Article 10) /用户信息（第十章）
- Information for treatment facilities (Article 11)/回收处理机构信息（第十一章）
- Information and reporting to authorities (Article 12)/需提供给授权机构的报告及信息（第十二章）

Separate collection (Article 5)

- System are to be set up allowing final holders to return waste free of charge/提供保证最终消费者抛弃WEEE的过程是免费的体系

  Responsibility of authorities and producers

Treatment of WEEE (Article 6)

- Best available treatment, recovery and recycling technique to be applied/
  最佳的技术处理，回复及再利用的工艺的应用
  Responsibility of producers or third parties acting on their behalf (e.g. recycler)

Recovery-Recycling-Reuse WEEE Directive

WEEE指令 再生-循环使用-再利用

- **Recovery means:**
  Recovery of raw material and/or production of energy from certain waste
  再生表示:
  从某些特定的废弃物中重新获得原材料或者使其产生能量
- **Recycling means:**
  The reprocessing in a production process of the waste materials for the original purpose or for other purposes,but excluding energy recovery which means the use of combustible waste as a means of generating energy through direct incineration with or without other waste with recovery of the heat
  循环使用表示:
  经特殊处理恢复原有或其他功能,除了用作能量恢复(就是指可燃废物通过废料和恢复的热力的直接焚化或单独燃烧而产生能量)
- **Reuse means:**
  Any operation by which WEEE or components thereof are used for the same purpose for which they were conceived,including the continued use of the equipment or components thereof which are returned to collection points,distributors,recyclers or manufacturers

再利用表示:
对从收集站，经销商，回收商或制造商处回收的报废电子电气设备或零部件进行某种处理，使其恢复原有功能

❑Recovery- Recycling-Reuse WEEE Directive/WEEE指令 再生-循环使用-再利用

Recovery means:

Recovery of raw material and/or production of energy from certain waste

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循环使用表示:

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Recovery and Recycling Targets (Article 7)

to be achieved by 31. December 2006

Category	Recovery	Reuse/Recycling
1, 10	80 %	75 %
3,4	75 %	65 %
2,5,6,7,9	70 %	50 % [1)]

[1)] For gas discharge lamps 80%

Example

- **Refrigerator Weight/冰箱总重: 100 kg (Category 1)**
  Recovery Target/回收率指标: 80%
  Reuse / Recycling Target/重复/再循环率指标：75%

Conclusion/结论:

Disposal as Landfill max/最大填埋量. 20 kg
Recovery as incineration: max/最大焚烧量. 5 kg
Back into resource stream: minimum/最小进入原料循环体系量 75 kg

Financing of waste private household (Article 8)

- Collection and treatment to be financed by producers

  制造商需承担回收及处理的费用

- Historical waste to be financed by producers based on current market share (basis would be the reporting according to article 12)

  历史废弃物的费用应根据当时该产品的市场占有率由制造商均摊

Information for user (Article 10)

- Producer shall provided:

  Label product with WEEE symbol/WEEE的标签
  Information about meaning WEEE label/WEEE标签所包含的相关信息
  the return and collection systems available/回收系统的建立
  information about potential impact on environment and health of WEEE/
  对环境和人类健康可能造成危害的WEEE的信息
  the requirement not to dispose of WEEE as unsorted municipal waste/
  严禁将WEEE如未经分类的地方性废物般弃置

  Responsibility: Authorities and producers

Information for Treatment Facilities (Article 11)

- Producer shall provided:

  Information about reuse and treatment of EEE, of components and hazardous substances used inside the product and their location inside the product and disassembly information./提供EEE的再利用及产品或零部件中的有害物质的含量及位置及拆卸的信息

  Responsibility: Producers

Information and Reporting (Article 12)

- Producers shall register in a National register制造商需在进口国登记
- Producers report at least on annual basis the quantities and categories of electrical and electronic equipment put on the market/制造商需于每公历年申报其投放市场的EEE的数量及种类
- Producers report at least on annual basis the quantities and categories of electrical and electronic equipment collected, reused, recovered, recycled and exported by weight or numbers/制造商需于每公历年申报其投放市场的EEE的回收，重复使用，循环使用及出口的重量及数量。

Responsibility: Producers

Essential requirements for manufacturer /对制造商的基本要求

Design Obligation

Article 4: Product Design/产品设计

Manufacturer shall design and produce electrical and electronic equipment which take into account and facilitate dismantling and recovery, in particular the reuse and recycling of WEEE, their components and materials./制造商必须在设计EEE时就重视其零部件和原材料的拆装，回收，重复使用，再循环利用

Obligation for Manufacturer

Article 10: Information for User/用户信息

- **The products must be labeled with/产品上必须标注：**

Marking the product according to EN 50419:2005

Marking must include:

- A unique identification of producer (e.g. brand name, trade mark or other means/唯一的制造商信息

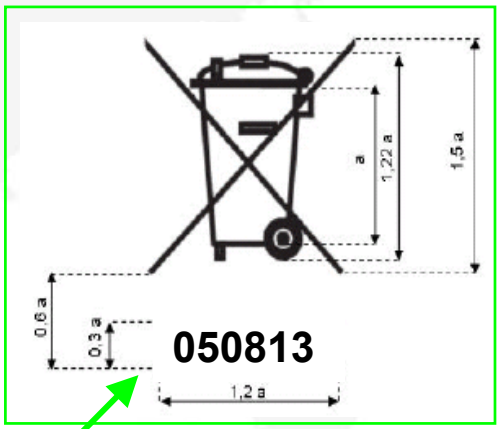
-Date or year of manufacture/placed on the market in coded or un-coded text or投放市场的日期

-或于带轮垃圾筒的下面加一道黑色的标记

marking as above with the crossed-outwheeled bin and additional bar

WEEE Marking

Registered trademark



Date placed on the market

Obligation for Manufacturer

Article 10: Information for User/用户信息

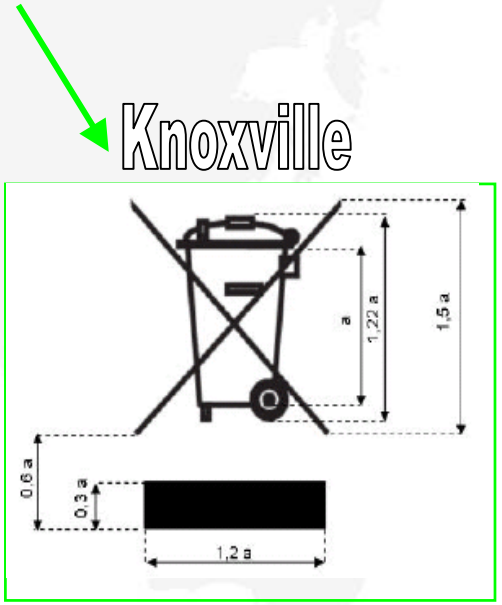
WEEE Marking/WEEE标记

Shall indicate that product is placed on the market after August 13. 2005需显示其产品是2005年8月13日之后投放市场的

- Shall facilitate separate collection (minimizing disposal of WEEE as unsorted municipal waste) information to user about meaning must be provided in user manual
  用户手册上需显示分类回收的信息
- **Does not indicate that waste collection and treatment is financed/无需显示此产品是否已付回收及处理的费用**

- **Does not indicate compliance with WEEE directive** /无需显示此产品符合WEEE指令

WEEE Marking



Obligation for Manufacturer

Article 11: Information for Treatment Facilities

- ***Information about reuse and treatment of EEE, of components and hazardous substances used inside the product and their location inside the product and disassembly information.***
  足够的再利用及回收处理信息,包括在产品中使用的零部件及有害物质,它们的位置及拆卸.
- ***Plastic parts must be marked according ISO 11469塑料部分必须根据ISO 11469标准标注:***

e.g. >PA66+ABS-(GF25+MD15)FR(52)>

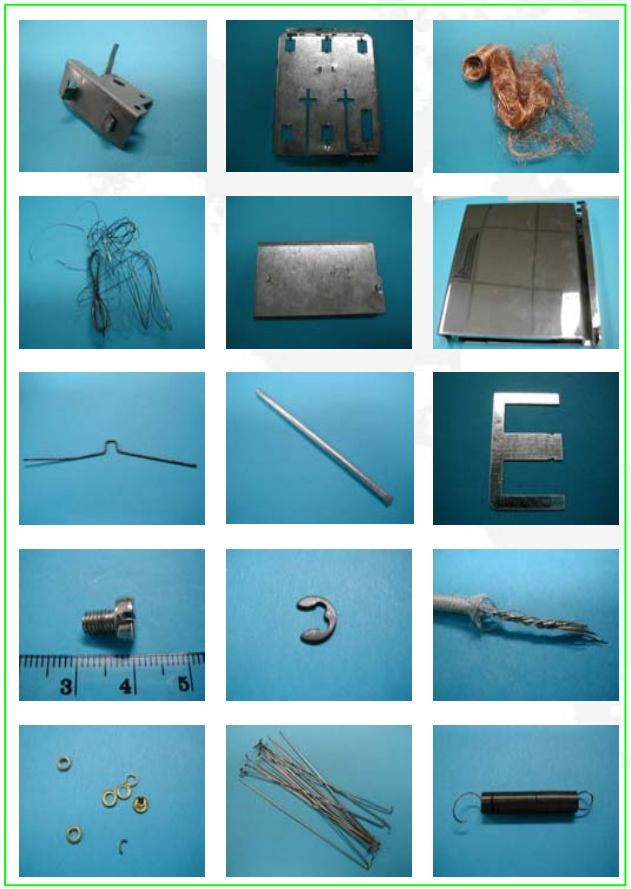
Obligation for Manufacturer

Article 11: Information for Treatment Facilities

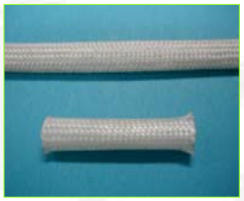
This information must be made available to all interested parties especially to reuse centers, treatment and recycling facilities in the form of manuals, by electronic means or on-line on Internet. The information must be available within one year after placing the product on the market. ***制造商必须有明确的信息提供给任何相关组织,尤其是再利用,回收机构.这些信息可以显示于用户手册上,亦可通过任何电子传媒包括互联网传达,同时指令要求这些信息必须于产品投向市场一年内提供..***

Parts and Materials of Toaster

Metal

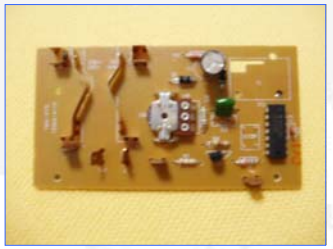


Textile



Plastics

PCB

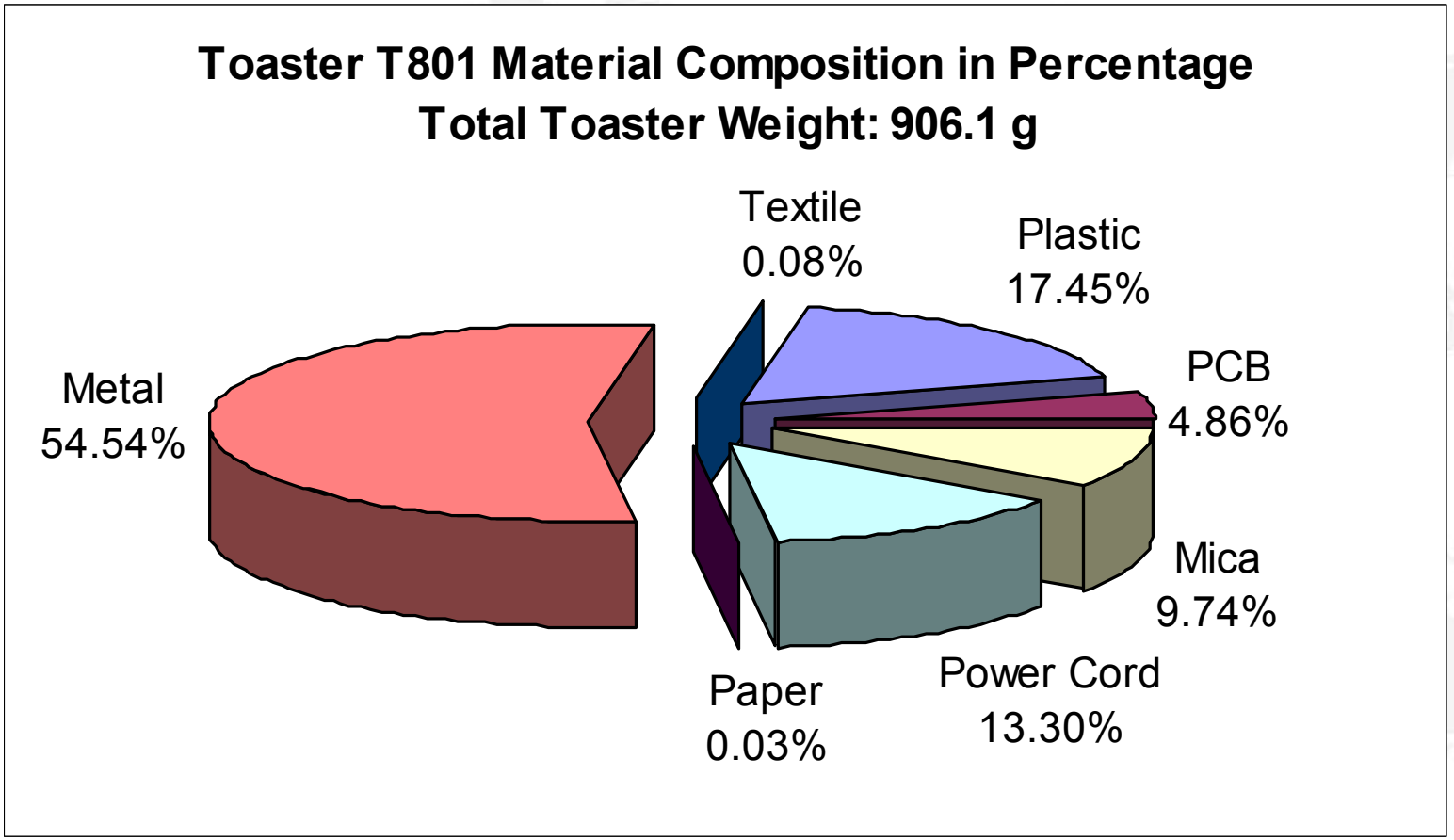


Mica

Paper

Power Cord

Typical Material Composition Toaster



Hazardous Materials to be removed from the equipment before further treatment according to Annex II

定义，在未来的废弃物处理前,应该从设备中拆除据附录的有害物质

Hazardous Materials 有害物质

- **The following materials, substances, components must be removed from the product by the treatment facilities: (information is to be provided by manufacturer)**

以下原材料、物质与零部件必须由废弃物处理机构从产品中去除:
(由生产者提供相关信息)

- **PCB (**polychlorinated biphenyls) **containing capacitors/**
含聚氯化二联苯PCB的电容器
- **Mercury containing components/含汞零部件**
- **Plastic containing brominated flame retardants/**
塑料原材料中所含溴化物阻燃剂
- **Components which contain asbestos and asbestos waste/零部件所含石棉或石棉废弃物**

Hazardous Materials 有害物质

- Printed circuit boards of mobile phones/移动电话中的印刷电路板
- Printed circuit board of devices where the surface is greater than 10 square centimeter
  设备中表面积大于10平方厘米的印刷电路板
- Toner cartridges, liquid and pasty as well as colour toner
  墨盒，液态或胶体态打印机专用墨水，包括彩色墨盒与墨水
- batteries/各类电池
- Cathode ray tubes (CRT)/阴极射线管
- Gas discharge lamps/气体放电灯
- External electric cables/设备外部使用的电源线

Hazardous Materials 有害物质

- Chlorofluorocarbons (CFC), hydrochlorofluoro-carbons (HCFC) or hydrofluorocarbons (HFC), hydrocarbons (HC)
  各类含氯氟烃(CFC)/(HCFC)/(HFC)和烃类(HC)
- liquid crystal displays (together with their casing where appropriate) of a surface greater than 100 square centimetres and all those back-lighted with gas discharge lamps
  表面积大于100平方厘米的液晶显示器 (连同其外壳材料)，以及所有采用气体放电管的背光显示器
- Electrolyte capacitors containing substances of concern (height > 25 mm, diameter > 25 mm or proportionately similar volume)
  电解电容器 (高度 > 25 mm, 直径 > 25 mm 或相似体积)

Cost saving Opportunities/成本节约

Contents:

- Estimated Recycling Cost/循环利用费用预估
- Typical Material Content of Electrical and Electronic products/典型EEE物料成分
- Design for Recycling/循环设计
- Design for Disassembly/拆装设计
- Life Cycle Design ? /

European Countries with Working Product Take Back Schemes

- Belgium
- Sweden
- Netherlands
- Austria
- Switzerland

Belgium Take Back Scheme

- Manufacturer have to declare monthly or three monthly about imported good in addition an annual declaration must be submitted

- Recycling contribution is to be paid 30 days after the products has been declared (usually at the the time VAT becomes payable)

What recycling cost can manufacturer and importer expect from WEEE?

Example: Recupel Belgium WEEE Compliance Scheme

Category : Large Household Appliances

Recycling Contribution Cost: 20 €

Recycling Contribution Cost: 10 €

What recycling cost can manufacturer and importer expect from WEEE?

Example: Recupel Belgium WEEE Compliance Scheme

Category : IT equipment

Recycling Contribution Cost: 8 €

Recycling Contribution Cost: 6 €

What recycling cost can manufacturer and importer expect from WEEE?

Example: Recupel Belgium WEEE Compliance Scheme

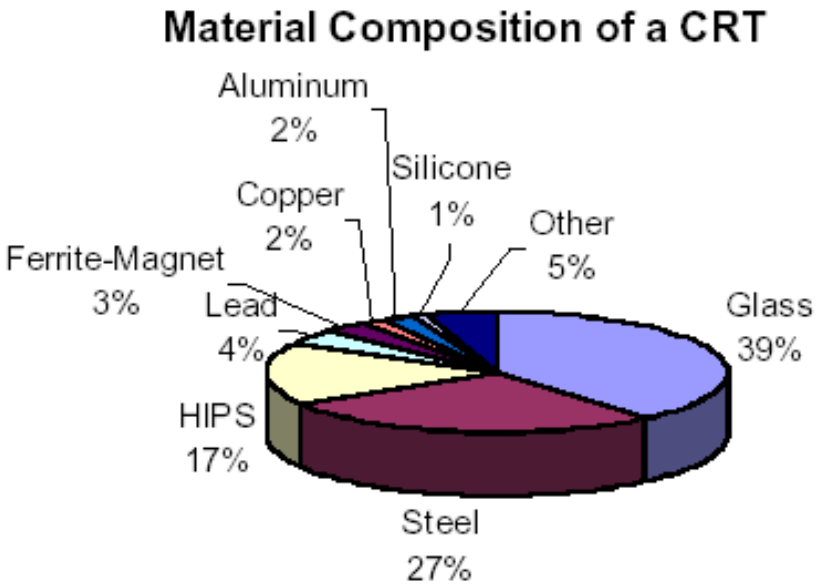
Category : Small Appliances

Recycling Contribution Cost: 1 €

Recycling Contribution Cost: 4 €

Typical Material content of WEEE/典型WEEE物料成分

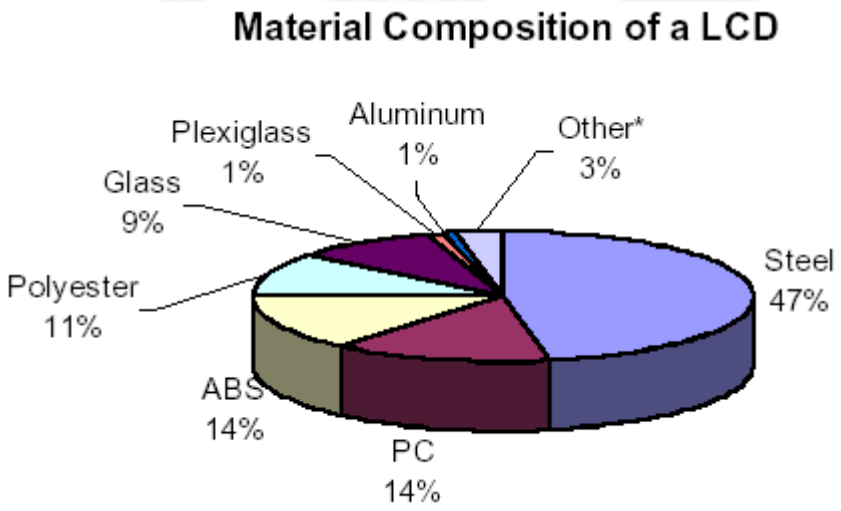
Example: CRT Monitor total weight 12.8 kg /CRT显示器总重



Material	Percent %	Material in kg
Glass/玻璃	39	5
Steel/钢	27	3.45
Plastic HIPS/聚苯乙烯	17	2.17
Lead/铅	4	0.512
Ferrite/含铁化合物	3	0.384
Rest	10	1.284

Typical Material content of WEEE

Example: LCD Monitor total weight 5.1 kg/LCD显示器总重



Material	Percent %	Material in kg
Steel/钢	47	2.4
Plastic ABS/ 丙烯晴	14	0.71
Plastic PC/ 聚氯丁烯	14	0.71
Plastic Polyester/ 聚酯	11	0.561
Glass/玻璃	9	0.45
Rest	5	0.26

Typical Material content of WEEE

Example: Refrigerator total weight 63 kg

Material content	
Metals	
• Steel	69%
• Copper	1.4%
• Aluminum	1.9%
Plastics	
• Insulation (Pur)	7.5%
• Other plastics	14%
Glass	3.6%
Blowing agent	0.3%
Refrigerant	0.2%
Electronic components	0.5%
Others	1.6%

Material	Percent %	Material in kg
Steel/钢	69	43.47
Copper/铜	1.4	0.88
Aluminum/铝	1.9	1.19
Plastic Polyester/ 涤纶	14	8.82
Plastic Insulation/ 塑料绝缘	7.5	4.72
Rest	6.2	3.92

Average Market Prices for Recycled Materials

Material	Unit	Price Virgin Material	Price Recycled Material
Tin/锡	Pound (lb)	3.67	2.54 – 3.38
Steel (hot rolled)/钢	tonne	630	153 – 193 *)
Copper, primary/铜	Pound (lb)	1.5218	1.2
Aluminum/铝	Pound (lb)	0.84	0.47 – 0.71
Plastic ABS/丙烯碃	Pound (lb)	1.33 – 1.72	0.24 – 0.41
Plastic PC/聚氯丁烯	Pound (lb)	1.76 – 2.34	0.65 – 0.75 clear 0.30 – 0.35 mixed

Prices in US$ as of 19.4.2005

*) Mixed scrap iron/steel

Price LME for virgin material

Price recycled material: www.metalworld.com

Plastic: www.plasticnews.com

Strategy for higher end-of-life value

1. **Reduce disassembly time/缩短拆卸时间**
   (e.g. reduces cost for disassembly and assembly)
2. **Eliminate toxic substances/限制有毒物质的使用**
   (e.g. hazardous chemicals are removed e.g. brominated flame retardants)
3. **Reduce material variety/减少物料种类**
   (e.g. no mixed plastic materials)

DISASSEMBLY

- **Reduce the number of joints/减少产品的连接结构**
- **Use snap fit fasteners – screws – glue – solder/使用滑动式-旋入式-粘贴式-焊接式结构设计**
- **Use only one type of screw head/使用一种镙釘**
- **Minimize the number of screws/使用最少量的镙釘**
- **Make the screws easily accessible/使镙钉易于拆卸**
- **Eliminate the need to access the product from different sides/尽量消除从多个面拆卸产品的可能**

Standard Disassembly times

Method	Time (s)
Click (snap fit)	3.5
Screws easy to reach	6.5
Screws difficult to reach	10.5
Screws very difficult to reach	18
Glue	12
Solder joint	7.5
Rivets	13

TOXIC SUBSTANCES

- Eliminated brominated flame retardants/限制溴化阻燃剂的使用
- Antimony as FR/含锑的阻燃剂
- Arsenic in semiconductors and FR/半导体及阻燃剂中的砷
- Bismuth in solder/焊锡中的铋
- Beryllium in Cu Be alloys up to 2%/铍含量达到2%的铜铍合金

Hazardous substances

Substances	Limit ppm
BFR other than PBB, PBDE	1000
Antimony and compounds	1000
Arsenic and compounds	1000
Bismuth and compounds	1000
Beryllium and compounds	1000
PCV	1000

MATERIAL VARIETY

- Avoid Composite Material (e.g. Plastic glass fiber reinforced, or plastic blends)/避免成分复杂的原料
- Avoid Painting and coating/尽量 避免喷漆及电镀
- Avoid stickers and adhesive on plastic/ 避免塑料上使用粘贴物
- Avoid material with toxic substances/ 避免使用含有毒元素的原料
- Use plastic screws for plastic and metal screws for metal/尽量在塑料部件上使用塑料镙钉，金属件上使用金属镙钉

Incompatible Materials

Material	Incompatible Material
Cu	As, Sb, Ni, Bi, AL
Al	Cu, Fe, polymers
Fe	Cu, Sn, Zn
Plastic PE	Plastic PA
Plastic PA	Plastic PC

ESSENTIAL REQUIREMENTS

- WEEE Labelling /WEEE 标签
- Documentation/文件
- Component and parts labelling e.g. plastic/零部件及塑料标签
- Design for Dismantling/拆装图
- Design for Recycling/循环利用之设计
- Life Cycle Design ?/生命周期设计

ESSENTIAL Documentation

- **Information about reuse and treatment of EEE components and dangerous substances and preparations [1] used (including those to be treated separately according to annex II) and their location inside the product, or components and disassembly information's. This information must be made available to all interested parties via manuals, electronic means or on-line on Internet within one year**

  生产商必须提供废弃电子电气产品的再利用和处理及有害物质使用和位置的相关信息（包括指令附页II里规定的必须分类回收的物质）。这些信息必须在产品投放市场一年内通过如用户手册，互联网等电子媒介手段提供给所有相关机构。

[1] Dangerous substance or preparation' means any substance o preparation which has to be considered dangerous under Council Directive 67/548/EEC or Directive 1999/45/EC of the European Parliament and of the Council

ESSENTIAL Documentation Content

- General Overview (Explosion Drawing)/爆炸图
- List of components indicating the parts to be removed (Annex II, WEEE directive)/根据WEEE指令附页II规定的需事先拆除的部分清单
- List of components which may have impact on recycling or contain valuable materials/可能影响产品的再循环及含有有价值物质的愿器件清单
- General Material Information including material code e.g. plastic, amount or weight/包含塑料成分，数量及重量的原材料信息

Use colors to identify materials and parts

Red Color: Parts, materials which are dangerous and have to be removed and treated separately according to WEEE e.g. Batteries, Br containing plastic
根据WEEE指令需事先拆卸的原材料或部件，如电池，含溴塑料等

Yellow color: Parts, materials which may disturb the recycling process e.g. beryllium containing parts, bismuth containing parts etc.
扰乱再利用处理的原材料或部件，如含铍，铋的部件等

Green Color: Parts, materials which have a economic value at end of life e.g. steel, copper, plastic materials, etc.产品寿命终结时有经济价值的原材料或部件，如钢，铜，塑料等

ESSENTIAL Documentation Content

Example

Material	Approx weight (kg)	Information
Lithium battery	0.01	Battery with harmful substances
Plastic PA with FR	0.5	Plastic material with Brominated Flame Retardant
Lamp	0.2	Contains mercury
Printed Circuit Board	0.3	Contains BFR (TBBPA)
Power Cord	0.3	PVC cord
Mixed metal Cu Be Alloys	0.3	Contains 2% beryllium
Mixed plastic	0.4	Plastic >PA+PC< Recycled inside protection
Plastic PA, glass fibre reinforced	0.4	Plastic >PA66-GF30< Protection inside
Plastic ABS	0.4	>ABS< Front and back panel
Aluminum	0.4	Bottom and top enclosure
Copper	0.4	Transformer

What Buyers may ask from their Supplier?

Buyers Guide

- **WEEE Compliance Declaration (incl. assessment report)**
  WEEE符合性声明（包括评估报告）
- **Material Disclosure Information**
  原材料信息
- **RoHS Compliance Declaration (incl. assessment report)**
  RoHS符合性声明（包括评估报告）
- **Provide Environmental Purchasing Specification/环保采购说明书**
  - **Require for Design for Disassembly/拆装设计**
  - **Require for Design for Recycling/循环利用设计**
  - **Require for elimination of toxic, hazardous substances**
    有毒，有害物质说明

Scope of RoHS Directive

From 1. July 2006 new electrical and electronic equipment put on the European market shall not contain: (Article 4)

- Lead (Pb)/铅
- Mercury (Hg)/汞
- Cadmium (Cd)/镉
- Hexavalent chromium (CrVI)/六价铬
- Polyprominated biphenyls (PBB)/ 多溴联苯
- Polybrominated diphenyl ether (PBDE)/ 多溴联苯醚

❑ TUV主要客户ROHS环保要求举例

单位：ppm

禁用物质	Sony	Philip	Motorola	Panasonic	Dell
镉 (Cd)	5	5	75	5	50
铅(Pb)	100	100	100	100	100
汞(Hg)	5	2	禁用	1000	5
六价铬(Cr+6)	禁用	10	3	1000	100
多溴联苯/多溴联苯醚 (PBB/PBDE)	禁用	10	10	1000	5
聚氯化二联苯(PCB)	禁用	10	禁用	禁用	5

❑Exemptions/豁免

- ***ANNEX to RoHS Directive*** **(I)**

Applications of lead, mercury, cadmium and hexavalent chromium, which are exempted from the requirements of Article 4

1. Mercury in compact fluorescent lamps not exceeding 5 mg per lamp.
2. Mercury in straight fluorescent lamps for general purposes not exceeding:
— halophosphate 10 mg
— triphosphate with normal lifetime 5 mg
— triphosphate with long lifetime 8 mg.

❑ Exemptions

- ***ANNEX to RoHS Directive*** **(II)**

3. Mercury in straight fluorescent lamps for special purposes.
4. Mercury in other lamps not specifically mentioned in this Annex.
5. Lead in glass of cathode ray tubes, electronic components and fluorescent tubes./阴级射线管，电子零部件和荧光电子管里的铅
6. Lead as an alloying element in steel containing up to 0.35 % lead by weight, aluminium containing up to 0.4 % lead by weight and as a copper alloy containing up to 4 % lead by weight. (Copper wire)/合金钢中的铅可以达到3,500ppm,
   铝材中的铅可以达到4,000ppm
   铜合金（包括铜导线）中的铅可以达到40,000ppm

Exemptions

- ***ANNEX to RoHS Directive* (III)**

7. — Lead in high melting temperature type solders (i.e. tin-lead solder alloys containing more than 85 % lead),高温焊料（铅含量大于85%的）

— lead in solders for servers, storage and storage array systems (exemption granted until 2010),服务器，存储器中的铅（至2010年）

— lead in solders for network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunication,电信及网络设备的焊料中的铅

— lead in electronic ceramic parts (e.g. piezoelectronic devices).应用于电子部件的陶瓷中的铅

Exemptions

- ***ANNEX to RoHS Directive* (IV)**

8. Cadmium plating except for applications banned under Directive 91/338/EEC (1) amending Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations./电触点中的镉及其化合物以及91/338/EC指令限制范围以外的镉镀层中的镉
9. Hexavalent chromium as an anti-corrosion of the carbon steel cooling system in absorption refrigerators.制冷设备中制冷系统使用的碳钢中用于防腐的六价铬

10. Within the procedure referred to in Article 7(2), the Commission shall evaluate the applications for:
根据第7章条款（2）的规定，需对以下申请尽快审议：
— Deca BDE/台卡二苯醚
— mercury in straight fluorescent lamps for special purposes/特殊用途直管荧光灯的汞

Exemptions

- *ANNEX to RoHS Directive (VI)*

— lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunications (with a view to setting a specific time limit for this exemption),
— light bulbs/灯炮

as a matter of priority in order to establish as soon as possible whether these items are to be amended accordingly.

Exemptions

- *Amendment to ANNEX to RoHS Directive (VII)*

— Lead used in compliant-pin VHDM (Very High Density Medium) connector system
— Lead as a coating material for a thermal conduction module c-ring
— Lead and cadmium in optical and filter glass
— Lead in optical transceivers for industrial applications
— 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 85% in proportion to the tin-lead content (exemption until 2010)
— Lead in high melting temperature type solders (i.e. tin-lead solder alloys containing more than 85% lead) and any lower melting temperature solder required to be used with high melting temperature solder to complete a viable electrical connection

Exemptions

- *Amendment to ANNEX to RoHS Directive (VIII)*

— Lead in high melting temperature type solders (i.e. tin-lead solder alloys containing more than 85% lead) and any lower melting temperature solder required to be used with high melting temperature solder to complete a viable electrical connection

— Lead in solders to complete a viable electrical connection internal to certain Integrated Circuit Packages (Flip Chips) (exemption until 2010)

— Article 4(1) substances in safety equipment for fire and rescue services.

— Lead in lead-bronze bearing-shells and bushes

❑ Exemptions

RoHS – More Exemptions Approved

- The following exemption under the RoHS Directive have been approved and are expected to confirmed in the
- Official Journal in March 2005:

Lead exemptions:

-Lead-based alloys containing more than 85% lead e.g. Sn/Pb solders etc.铅含量大于85%的合金中的铅笔

-Time limit (until 2010) deleted for lead solders in servers, storage & storage array systems.(All exemptions will be re-assessed in 2010, as part of their review every 4 years after implementation.)/服务器，存储器和存储阵列焊料中的铅，信号发生及传输，电信网络管理的基础设备中焊料中的铅。

-Compliant-pin VHDM (Very High Density Medium)connector systems/顺应针联接系统中的铅

-Use as a coating material for a thermal conduction module c-ring./热导项枪钉模组涂层中的铅

-Optical and filter glass./光学及滤光玻璃中的铅

-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.微处理器针脚及封装联接所使用的含有80-85%铅的复合焊料中的铅

-Solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages.倒装芯片封装中半导体芯片及载体之间形成可靠联接所用焊料中的铅

❑ Exemptions

Cadmium exemptions:

-Cadmium and its compounds in electrical contacts./联接器中的镉及化合物
e.g. cadmium oxide in silver/cadmium oxide contacts (AgCdO).
-Optical and filter glass./光学及滤光片玻璃中的镉

❑ RoHS – Other Exemptions Under Consultation

- **Lead in lead-bronze bearing shells and bushes.**
- **Lead crystal in glass chandeliers.**
- **Use of non-RoHS compliant parts in new EEE.**

A further 22 proposed exemptions are under a Commission consultation, which closes on 11 February 2005:

1. Lead in tin whisker resistant coatings for fine pitch (<0.65 mm) applications (e.g. connectors).

2. Lead bound in glass, crystal glass, lead crystal or full lead crystal in general.

3. Chromium (VI) and cadmium as colouring agents (up to 2 % content) in glass, crystal glass, lead crystal or full lead crystal for decorative and/or functional use.

4. Solders containing lead and/or cadmium for specific applications.

5. Hexavalent chromium anti-corrosion coatings.

❑ RoHS – Other Exemptions Under Consultation

6. Lead oxide glass in plasma display panels.
7. Lead in connectors, flexible printed circuits, flexible flat cables.
8. Lead glass used for magnetic heads (e.g. VCRs).
9. Cadmium as a doping material in avalanche photodiodes (APDs) for optical fibre communications.
10. Lead in optical isolators.
11. Lead glass seals in the sheath heater of microwaves.
12. Cadmium pigments (except for those banned by the Cadmium Directive 91/338/EEC.
13. Lead halide (iodide) as a radiant agent in high intensity discharge (HID) lamps for professional UV applications (e.g. lamps used for curing, reprography and label printing).
14. Lead activators in the phosphors used for specialised straight and compact fluorescent lamps (e.g. lamps for sun tanning, diazo-printing, reprography, lithography, insect traps).

❑ RoHS – Other Exemptions Under Consultation

15. Lead as an amalgam in discharge lamps (e.g. small compact energy-saving fluorescent lamps).
16. Lead in glass solder used for mercury-free flat panel lamps.
17. Lead in the glass envelope of Black Light Blue (BLB) UV lamps (BLB lamps are used for money checking, leak detection, disco lighting etc).
18. Lead in low melting point alloys (e.g. second soldering operations on a printed circuit board (PCB) and safety and other temperature dependant switching devices.
19. Lead in galvanised steel (up to 0.35% lead) and aluminium (up to 0.4 % unintended lead).
20. Lead in solder and hexavalent chromium in surface treatments in parts recovered from non-household printers & copying equipment which were originally placed on the market before 1 July 2006, and are reused as part of the original equipment manufacturer's closed loop system until 1 July 2011.
21. Cadmium sulphide photocells.Light sensors which mimic the human eye, such as daylight-responsive dimming systems for lighting.
22. Aeronautic and aerospace sector applications that require high safety standards for any of the RoHS restricted substances. (Clarifying that EEE in these sectors is exempt from the RoHS Directive. Such EEE is excluded from the WEEE by falling outside the 10 WEEE categories.)

Challenge to Manfacturer on how manage hazardous substances and materials

- Manufacturer faces multiple questions and challenges

  - What other substances beside lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium (CrVI), PBB and PBDE?
  - How to evaluate compliance of parts and components
  - Always testing needed?
  - When is testing needed?
  - How to get information about substances?
  - How to trace materials and substances inside the product?
  - What kind of information needed from suppliers?
  - How to judge/evaluate information/report provided by suppliers?
  - How to control cost for compliance with RoHS&WEEE?

Hazardous Materials and Substances – Global Regulation and Standards

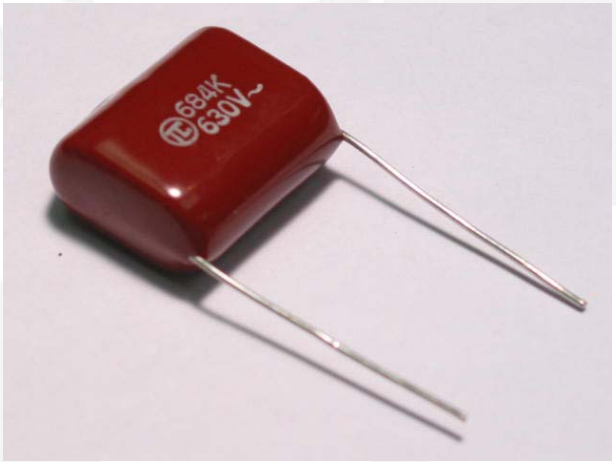
- European Directive on restriction of hazardous substances in electrical and electronic Equipment (2002/95/EC) effective 1. July 2006
- Joint Industry Guide (EIA, EICTA, JGPSSI) Material Declaration Guide with restricted and banned substances
- Guidance Document on the Appliance of Substances under Special Attention in Electric & Electronic – Products (CEFIC - EECA - EICTA – EUROMETAUX)
- California proposition 65
- California Electronic Waste Recycling Act of 2003 (SB 20) effective 1. January 2007
- Japan Chemical Control Act
- Japan Green Procurement Survey Standardization Initiative (JGPSSI)
- Draft - Management Methods for the Prevention and Control of Pollutants from Production of Electronic Information Products 2003 (China)

How to manage suppliers and parts?

- Incoming Inspection of parts Chemical Analysis or ?

Graphite Furnace AAS
石墨炉原子吸收光谱仪

EDX
能量分散型X光射线衍射光谱仪



Flame Furnace AAS
火焰原子吸收光谱仪

ICP-AES
电感耦合等离子发射光谱仪

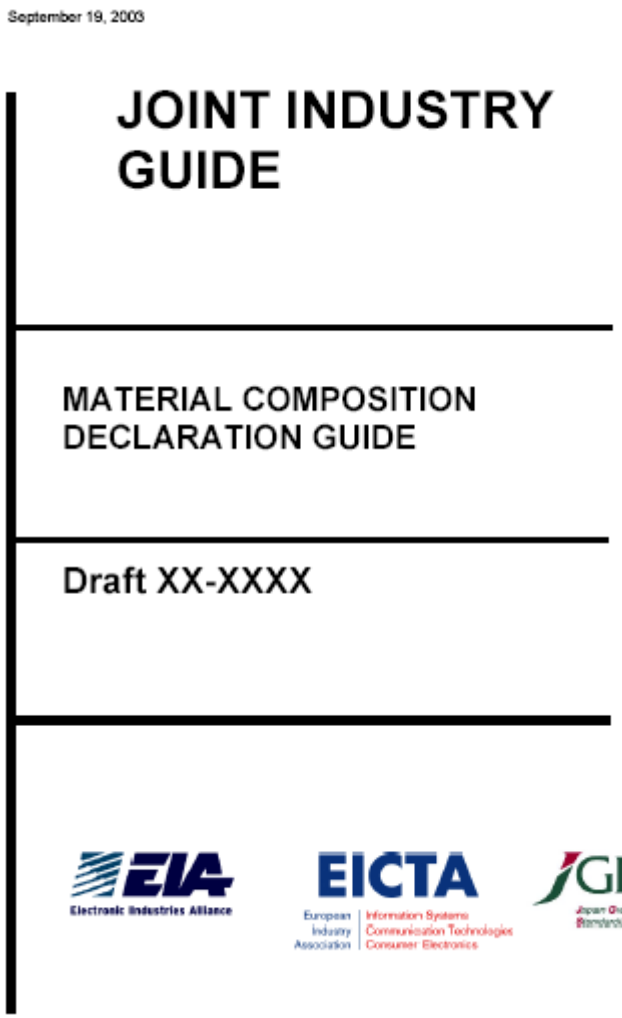
ICP-MS
电感耦合等离子质谱仪

Are there standardization approaches or guidelines for hazardous materials and substances?

Standards for hazardous materials and substances declaration

- Joint Industry Guide (EIA, EICTA, JGPSSI) Material Composition Declaration Guide with restricted, banned and reportable substances

Reference:
http://www.eia.org



Joint Industry Guide (EIA, EICTA, JGPSSI) Material Composition Declaration Guide with restricted, banned and reportable substances

- Distinguishes between Level A and Level B materials and substances
  A类与B类物质的区分
- Provides guidance on what to and how to declare
  提供如何作物料声明的指引
- Provides a form for declaration
  提供声明的标准格式
- Provides a list of Chemical Abstract Numbers (CAS) of all concerned substances and materials
  提供重要工业用物料及元素的CAS编码

Joint Industry Guide (EIA, EICTA, JGPSSI) Material Composition Declaration Guide with restricted, banned and reportable substances

Level A substances – materials are subjected to current legislation that:

a) Prohibit their use and or marketing/禁止使用及投放市场

b) Restricts their use and or marketing/限制使用及投放市场

c) Requires reporting or results in other regulatory effects/其他情况下需出示相关证明

Joint Industry Guide (EIA, EICTA, JGPSSI) Material Composition Declaration Guide with restricted, banned and reportable substances

Level B substances – materials that the industry has determined relevant for disclosure because they meet one or more of the following criteria:

a) Precious materials/substances that provide economic value for end-of-life management purposes/对产品寿命终结管理有经济价值的贵重物质

b) Materials/substances that are of significant environmental, health, or safety interest/对环境，健康及安全有重大影响的物质

c) Materials/substances that would trigger hazardous waste management requirements/会引发有害废弃物管理需求的物质

d) Materials/substances that could have a negative impact on end-of-life management./在产品寿命终结管理中有负面影响的物质

Joint Industry Guide (EIA, EICTA, JGPSSI) Material Composition Declaration Guide with restricted, banned and reportable substances

Level A materials and substances

- Lead (Pb)
- Cadmium (Cd)
- Mercury (Hg)
- Hexavalent Chromium (Cr VI)
- Polybrominated biphenyl (PBB)
- Polybrominated biphenyl ether (PBDE)
- Asbestos
- Azo colorants
- Ozone depleting substances (CFC, HCFC, HBFC)
- Polychlorinated Biphenyls (PCB)
- Polychlorinated Naphthalene's
- Short chain Chlorinated Paraffins
- Tributyl Tin (TBT) and Triphenyl Tin (TPT)
- Tributyl Tin Oxide (TBTO)

Joint Industry Guide (EIA, EICTA, JGPSSI) Material Composition Declaration Guide with restricted, banned and reportable substances

Level B materials and substances

- Antimony
- Arsenic
- Beryllium
- Bismuth
- Copper
- Gold
- Magnesium
- Nickel
- Palladium
- Selenium
- Silver
- Phthalates
- Vinyl Chloride Polymer (PVC)
- Brominated flame retardants

Annex D: Example of Material Declaration Form

Below you will find one example of a material declaration that is based on this guide.
This represents the most basic form containing only mandatory data fields.

SAMPLE MATERIAL DECLARATION DATA SHEET

Date: 03/09/11

Company Name: Any Company

Product Name: Integrated Circuit

Product Number: 001

Product Total Mass (g): 0.717 g

Material/Substance Name	Material/Substance Mass (g)	Material/Substance Information
Antimony	0.01166	
Silver	0.05636	
Copper	0.21834	
Lead	0.001715	Solder Plating
Gold	0.0047	

For other examples of material declarations solutions, see:

http://home.jeita.or.jp/eps/
http://www.rosettanet.org

RoHS Assessment and Certification of Products