

# Implementation of E-Waste Rules 2011

Guidelines



**Ministry of Environment and Forests**  
GOVERNMENT OF INDIA



जहाँ है हरियाली ।  
वहाँ है खुशहाली ॥



**Central Pollution Control Board, Delhi**

## **Abbreviations**

<b>MoEF</b>	-	<b>Ministry of Environment &amp; Forests</b>
<b>CPCB</b>	-	<b>Central Pollution Control Board</b>
<b>EST</b>	-	<b>Environmentally Sound Technology</b>
<b>CRT</b>	-	<b>Cathode Ray Tube</b>
<b>CFC</b>	-	<b>ChloroFluroCarbon</b>
<b>CCC</b>	-	<b>Common Collection Centres</b>
<b>IT&amp; TE</b>	-	<b>Information Technology &amp; Telecommunication Equipments</b>
<b>HCFC</b>	-	<b>Hydro ChloroFluroCarbon</b>
<b>SPCB</b>	-	<b>State Pollution Control Board</b>
<b>PCC</b>	-	<b>Pollution Control Committees</b>
<b>PWB</b>	-	<b>Printed Wire Board</b>
<b>PCB</b>	-	<b>Printed Circuit Board</b>
<b>LED</b>	-	<b>Light Emitting Diode/Device</b>
<b>LCD</b>	-	<b>Liquid Crystal Display</b>
<b>EPR</b>	-	<b>Extended Producer Responsibility</b>
<b>BFR</b>	-	<b>Brominated Flame Retardants</b>
<b>EEE</b>	-	<b>Electrical Electronic Equipments</b>
<b>RoHS</b>	-	<b>Reduction of Hazardous Substances</b>
<b>MT</b>	-	<b>Metric Tonne</b>
<b>PCBs</b>	-	<b>Polychlorinated biphenyls</b>
<b>PCTs</b>	-	<b>Polychlorinated terphenyls</b>
<b>P &amp; C</b>	-	<b>Prevention &amp; Control</b>
<b>RWAs</b>	-	<b>Resident Welfare Associations</b>
<b>NGOs</b>	-	<b>Non-Governmental Organisation</b>
<b>TSDF</b>	-	<b>Treatment, Storage &amp; Disposal Facility</b>
<b>HW (M, H&amp;TM)</b>	-	<b>Hazardous Waste (Management, Handling &amp; Transboundary Movement) Rules, 2011</b>

## INDEX

Chapter	Content	Page No.
1.0	Introduction	2
2.0	Objectives and scope of the guidelines	3
3.0	E-Waste (Management & Handling) Rules, 2011	3
3.1	Applicability	3
3.2	Major Stakeholders	4
4.0	Implementation of EPR	5
5.0	Collection Centre	7
5.1	Criteria for setting up Collection centres	9
6.0	Environmentally Sound Dismantling and Recycling of E-waste	11
6.1	Dismantler	11
6.1.2	Space requirement for Dismantler	13
6.1.3	Regulatory Requirement for Dismantlers	14
6.2	Recyclers	14
6.2.1	Recycling of CRT Monitor and TVs	15
6.2.2	Space requirement for Recyclers	16
6.2.3	Regulatory Requirement for Recyclers:	16
7.0	Bulk Consumers	17
8.0	Role of State Pollution Control Boards	17
8.1	Interstate Transportation	19
9.0	Role of Municipal Authorities	19
10.0	Reduction in the use of Hazardous Substances (RoHS) in the manufacture of electrical and electronic equipments	19
11.0	Over-all Compliance Mechanism	20
List of Annexure		
1.	Annexure – I,(Form – I, Application for Obtaining Authorization for Generation/ Collection/ Storage/Dismantling/Recycling/ of E-Waste)	21
2.	Annexure – II,(Form – 2,Form for Maintaining Records of e-waste Handled/ Generated)	24
3.	Annexure-III ,(Form – 3, Form for Filing Annual Returns)	25
4.	Annexure – IV (Schedule – I of the E-waste Rules)	26
5.	Annexure – V, Some of the options for Awareness &Communication	27
6.	Annexure – VI (Schedule II of E-Waste Rules)	29

## **Implementation of E-waste Rules, 2011**

### **1.0 Introduction**

E-waste has been defined as “waste electrical and electronic equipment, whole or in part or rejects from their manufacturing and repair process, which are intended to be discarded”. Whereas Electrical and electronic equipment has been defined as “equipment which is dependent on electrical currents or electro-magnetic fields to be fully functional”.

In the recent years, there has been increasing use and dependence on electrical and electronic gadgets like mobile phone, personal computers, laptops, server, data storage devices, photo copying machines, TV(CRT/LED/LCD), washing machine, refrigerators and air conditioners, etc. resulting into generation of large quantities of E-waste. The high rates of obsolescence of the above mentioned items coupled with steady rise in the demand have also resulted in substantial growth in e-waste generation. There is no comprehensive and latest inventory of E-waste in the country however, as per preliminary estimates, the annual e-waste generation in India has been estimated to be 0.8 million tonne by 2012. An UN report estimates that the world wide generation of e-waste is around 30 to 50 Million tonne per annum.

The electrical and electronic equipment (EEE) have valuable materials and hazardous/toxics substances in their components. The electronic products and electrical equipment after their useful life may not cause any harm if it is stored safely in households/stores. However, if the E-waste is opened-up and attempts are made for retrieval of useful components or material in an un-scientific manner or if the material is disposed in open, then it may cause health risks and damage to environment. E-waste can be considered as a resource that contains useful material of economic benefit for recovery of plastics, iron, glass, aluminum, copper and precious metals such as silver, gold, platinum, and palladium and lead, cadmium, mercury etc. However, at the same time presence of heavy metals (As, Cd, Hg, Pb etc.) and other toxic substances such as polychlorinated bi-phenyls (PCBs), etched chemicals, etc. may pose risk to health and environment during handling and recovery operations. E-waste is a problem of increasing proportions especially when crude methods are adopted for recovery of useful components from E-waste.

There is a need to encourage recycling of all useful and valuable material from e-waste so as to conserve the ever depleting natural resources. Electronic component are increasingly made from recycled materials, for example for making new LCDs, more than 50% of indium is sourced by recycling used LCDs. The E-waste thus presents a scenario of urban mining for recovery of ferrous/non-ferrous/ rare earth metal and precious metal in addition to plastics and glass. However, presence of hazardous and toxic substances in the component of e-waste necessitates environmentally sound management of e-waste including collection and recycling/treatment in an environmentally sound manner.

The E-waste (Management & Handling) Rules, 2011 have been notified with primary objective to channelize the E-waste generated in the country for environmentally sound recycling which is largely controlled by the un-organized sector who are adopting crude practices that results into higher pollution and less recovery, thereby causing wastages of precious resources and damage to environment.

## **2.0 Objectives and scope of the guidelines:**

MoEF/CPCB after consulting various stake holders felt the need for preparing a guidance document for implementation of the provisions of the E-Waste (Management & Handling) Rules, 2011 that may help the Producers, Consumer & Bulk Consumer, Collection Center, Dismantler, Recycler and Regulatory agencies (SPCBs/PCCs) for effective compliance/implementation of these rules. This document also provides guidance on setting up collection mechanism, dismantling and recycling operations.

As the E-waste Rules place main responsibility of e-waste management on the producers of the electrical and electronic equipment by introducing the concept of “extended producer responsibility”(EPR). The scope of implementing such EPRs is also discussed in these guidelines.

## **3.0 E-Waste (Management & Handling) Rules, 2011:**

The e-waste (Management & Handling) Rules, 2011 have been notified in May 2011 and are effective from 01-05-2012. These rules were notified in advance to give the various stakeholders adequate time to prepare themselves and also to place the required infrastructure for the effective implementation of these rules.

### **3.1 Applicability**

1. These rules shall apply to every producer, consumer or bulk consumer, collection centre, dismantler and recycler of e-waste involved in the manufacture, sale, purchase and processing of electrical and electronic equipment or components as specified in schedule – I the regulatory agencies involved are SPCBs/PCCs and CPCB.
2. The rule will not apply to lead acid batteries as covered under the Batteries (Management and Handling) Rules, 2001. The rules shall not apply to, Micro and Small enterprises as defined in the Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006) and radio-active wastes as covered under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and rules made there under. The Ministry of Micro Small and Medium Enterprises has awarded a study to ‘The Energy and Resources Institute’ (TERI) to examine the quantum of e-waste generated and the management of e-waste from the products manufactured by them at the end of life. The study is likely to be completed in three months time. Based upon the finding of the study, the matter regarding the inclusion of Micro and Small Enterprises would be reviewed."
3. The e-waste Rules apply to all electrical and electronic equipment (EEE) listed in Schedule 1 (annexure-IV) and put on market in India, including their components and consumables which are part of the product at the time of discarding.
4. The rules also call for the reduction in the use of hazardous substances in electrical and electronic equipment. Every producer of equipment listed in Schedule 1 of the Rule shall ensure that the covered products do not contain lead, mercury, cadmium, hexavalent chromium, poly-brominated biphenyls or poly-brominated di-phenyl ethers above a specified threshold. The threshold for cadmium is 0.01% by weight in homogeneous material, for all other substances, the threshold is 0.1% by weight in homogeneous material.

5. In case of any doubt regarding applicability of these rules the matter would be referred to an interministerial committee comprising of technical experts and industry representatives.
6. Equipment or system that is not listed in Schedule-I but has a part or component that is listed in Schedule-I as an integral part of that equipment or system is considered to be outside the scope of the rules. However, waste generated from such components or parts may be accepted for channelization to recycling facility as long as it is recyclable.

### 3.2 Major Stakeholders

1. **Producer** is any person who, irrespective of the selling technique used, “manufactures and offers to sell electrical and electronic equipment under his own brand; or offers to sell under his own brand, assembled electrical and electronic equipment produced by other manufacturers or suppliers; or offers to sell imported electrical and electronic equipment” and has to take authorization under these Rules for implementation of EPR.
2. **Bulk Consumers** are bulk users of electrical and electronic equipment such as central government or state government departments, public sector undertakings, banks, educational institutions, multinational organizations, international agencies and private companies that are registered under the Factories Act, 1948 and Companies Act, 1956; they have to maintain records on E-waste generated and channelized to registered/authorized collection centres/recycler/dismantler.
3. **Extended Producer Responsibility** is a responsibility of any producer of electrical or electronic equipment, for their products beyond manufacturing until environmentally sound management of their end of life products.
4. **Collection Centre is a centre** established individually or jointly or a registered society or a designated agency or a company or an association to collect e-waste which has to obtain authorization under E-Waste Rules, 2011.
5. **Dismantler** is any person or registered society or a designated agency or a company or an association engaged in dismantling of used electrical and electronic equipment into their components who has to obtain authorization and registration E-Waste Rules, 2011. The association may include a consortium as well.
6. **Recycler** is any person who is engaged in recycling or reprocessing of used electrical and electronic equipment or assemblies or their component. Recycling facility may be set up by an individual or a company or a joint venture or a consortium.
7. **SPCBs/PCCs** have been given the responsibility as regulatory agencies for ensuring implementation of the E-waste Rules in their respective States
8. **CPCB** is responsible for evolving the guidelines for implementation, overseeing the progress made in implementing the Rules and ensuring RoHS compliance.

## 4.0 Implementation of EPR

Extended producer's responsibility (EPR) is the main feature of the E-waste (Management and Handling) Rules, 2011, wherein the producer of electrical and electronic equipment has the responsibility of managing such equipment after its 'end of life', thus the producer is responsible for their products once the consumer discards them. Under this EPR, producer is also entrusted with the responsibility to finance and organize a system to meet the costs involved in complying with EPR.

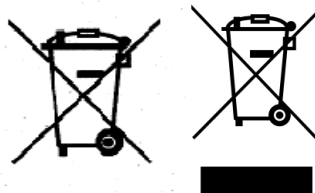
Most of the e-waste models around the world are based on these concepts which motivate the producers to reduce consumption of virgin materials, undertake product design changes to reduce waste generation and ensure closure of material loops to promote resource efficiency and sustainable development. The scope and requirements for compliance to EPR is outlined below;

1. Producers intending to sell their EEEs listed in Schedule-I are required to take authorization only in the place where their manufacturing facilities and corporate head offices are located. In case, of producers importing EEEs listed in Schedule-I, authorization may be taken from SPCB of the State where the port of landing is located.

Since these products are sold across the country, SPCB/PCC concerned granting the authorization would inform the CPCB of the details of the authorization granted. CPCB would maintain a centralized database on their website, which will be available to all stakeholders. Producers will also place this information on their website and provide details of products sold to the SPCB from whom they have obtained authorization. SPCBs will provide consolidated information to CPCB on an annual basis which CPCB will maintain on the centralized database.

2. In the application for authorization, it should be clearly mentioned, how the producer would ensure channelization of the E-waste at the end of its life; details of his own collection centres or take-back systems or the collection centres authorized by him, shall be specified.
3. As per the EPR under the Rules, the producers are required to achieve 100% collection and channelization of the end of the life equipment. However, for the purpose of monitoring, targets need to be fixed. Such targets should be based on the life of the product, type of the product, usage and consumption patterns and other relevant factors. CPCB will, therefore, set up a Committee, which will examine the issue of fixing targets, based on the aforesaid factors and also taking into consideration the level of compliance achieved during the first two years.
4. Producer who has manufacturing facility shall comply with prevailing environmental regulations under Water (P&C) Act, 1974, Air (P&C) Act, 1981, Hazardous Waste (M,H&TM) Rules, 2008 and other relevant regulations. In the case of manufacturers, who has obtained authorisation under the Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 need not take separate authorization under the e-waste rules till the validity/expiry of that authorization. Subsequent authorisation has to be taken under the e-waste rules, 2011 to ensure that electronic scraps, rejects etc. generated during the manufacturing shall be sent or channelized to registered E-waste recycling facilities. Such producer shall obtain authorization only from SPCB/PCC of the State where the manufacturing facility is located.

5. The producer is required to maintain records in form 2 (Annexure-II) along with the details of the e-waste handled/generated and has to submit the annual returns in form 3 (Annexure-III) in accordance with Rule 4(9) of these Rules.
6. Producer shall finance the EPR system either by setting up individual collection system or by joining a common collection system by authorizing them.
7. Scope of EPR for the Producer:
  1. Producer may assess their individual requirements and design a collection or product take back system as they deem appropriate as long as it facilitates channelization of E-Waste for environmentally sound management.
  2. Producer may arrange for collection from both, individual and bulk consumers and channelize the waste to collection centres or recyclers/dismantlers.
  3. The producer may opt to implement EPR on his own individually or collectively. There can be two distinct models; (i.) individual producer responsibility where producer implements EPR managed on his own by setting up his own authorized collection centres or (ii.) collective producers responsibility, where producers may authorize common collection centres (CCC) independently or by joining a consortium as a member. Producers importing EEE listed in schedule – I, may take authorisation from the State where the landing port is located
  4. In the E-waste rules, the logo has been printed without a bar below the symbol, whereas the present practice commonly followed by the producer, the Logo has a bar below the symbol. Logo without the bar below the symbol and the logo with bar below the symbol as shown below are acceptable. Symbol may be placed on the products **or** printed in the accompanying product documentation.

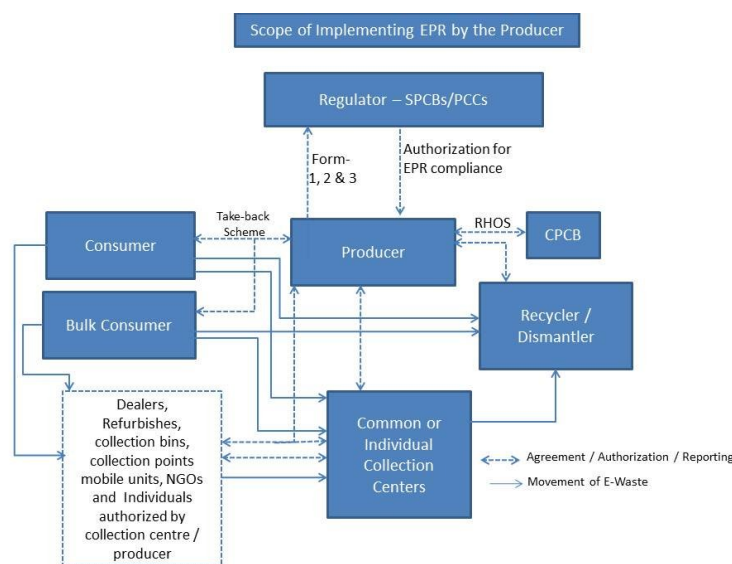


5. As per Rule 4(6) of the E-waste Rules, 2011 the producer is responsible for creating awareness for the consumer about the product that has been placed on the market. The information should essentially convey the message for the compliance under the rules and the responsibility undertaken by the producer on safe handling and disposal of the end-of-life product. Various modes for creation of awareness such as publications, advertisements, posters, information booklets, use of Television, radio, newspaper etc., could be adopted for communicating the information (some options are given at Annexure-V). The details of awareness programs under taken shall be provided to SPCBs/PCCs while submitting annual returns as per Form 3.



6. Under Rule 4(5) it is mandatory for the producer to publicize the contact details of the authorized collection centres and collection points or their collection mechanism to the consumers and such information should be periodically updated. The detailed information should comprise of the full address, telephone number, fax number e-mail etc for each State. The helpline number (like call centre) may also be publicized so that the consumer can reach the nearest collection centre from where he/she is located.
7. Awareness is essential regarding the hazardous constituents present in the equipment as well as the safe handling and disposal of the product after its use. In case of the products complying with the provisions of rule 13(1), the same should be indicated in the product information booklet..
8. Producer may manage a system directly or with a help of any professional agency on his behalf for collection and channelization system of E-waste by involving relevant stake holders such as consumer, bulk consumer, NGOs, informal sector, resident associations, retailers, dealers, etc.

The scope of implementing the EPR by the producers is also explained in the schematic diagram given below;



## 5.0 Collection Centre

Collection of e-waste is of prime importance for environmentally sound management of e-waste. Collection centre can be established to collect the E-waste individually or jointly or it can be a registered society or a designated agency or a company or an association, thus there is ample scope for evolving various ways in which a collection centre can be set up and functional.

A collection centre is a store / warehouse where the E-Waste collected from consumers, bulk consumers, urban local bodies and retail outlets/collection-points/collection-bins/mobile-units etc. established by producers or collection centres, can be received and stored safely for necessary channelization for dismantling/ recycling.

As per Rule 4(3), the producer is responsible for 'setting up collection centres or take-back systems either individually or collectively'. The decision about the mechanism for collection can be decided by the individual producer in accordance with their company policy. However such details shall be specified while obtaining authorization from SPCBs/PCCs. These guidelines suggest the following options and requirements for setting up Collection Centres;

1. Collection centres can be established by various ways. If a collection centre is set up for a particular producer, it may be called individual collection centre. If a collection centre caters the EPR requirements of multiple producers it may be called common collection centre. All collection centres require authorization from SPCBs/PCCs of respective States.
2. In case a producer himself sets up a collection centre, he shall take separate authorization from SPCBs/PCCs for setting up such individual collection centre.
3. Producer may organize take-back system through their retailers or through service centres and set up collection points or bins or drop-off points and link them to their authorized individual collection centres. Such collection points can also be set-up by authorized common collection centres.
4. Producer may organize take-back system through their retailers or service centres and set up collection points or bins and channelize the E-waste directly to registered dismantlers or recyclers.
5. The collection points can be designated places where e-waste can be collected through residential areas, office complexes, commercial complexes, retail outlets, customer care stores, educational and research institutions, resident welfare associations (RWAs), NGOs working with rag pickers, etc. These collection points can be financed by producers or common collection centres (on behalf of producers) to channelize the E-waste to registered dismantler or recyclers. The e-waste collected through these points should be transported to collection centres or registered dismantling or recycling plants within a stipulated time period as per rule 12. These collection points do not require to take authorization from SPCBs/PCCs.
6. Collection Bins could be installed in public places such as kerbsides, restaurants, malls, offices etc. which can be owned by the authorized collection centres or the producer. The contact details of authorized collection agencies should be printed on these bins for reference purposes of the general public. The e-waste collected in these bins should be transported to collection centres or channelized to registered dismantler or recyclers by the producers. These collection Bins do not require authorization.



A collection bin  
for public  
places

7. Mobile collection vans can also act as collection systems for door to door collection of e-waste or from institutions/ individuals/small enterprises and such vans shall be linked to collection centre or provided by producer to channelize the e-waste to collection centres or registered dismantler or recyclers. A mobile collection van does not require authorization but their detail has to be provided to SPCBs/PCCs while seeking authorization by the producers or collection centres.
8. SPCBs shall ensure that authorized collection centres comply with the provisions of the Rules and ensure that the e-waste collected by them is stored in a secured manner and no damage is caused to the environment during storage and transportation till the e-waste reaches registered dismantler (s) or recycler (s) by undertaking periodic inspections and verifications
9. The Rules specify that Collection Centres are allowed to store e-waste for a maximum period of 180 days. However, this period may be extended up to one year in the exceptional cases with genuine reasons when the Collection Centres are located in the States, which do not have any registered dismantling or recycling facility and are unable to send the e-waste for recycling within the stipulated time period.

### 5.1 Criteria for setting up Collection centres

E-waste in itself may not pose any threat to human health and environment till the point it is dismantled. However broken equipment can be a potential safety hazard for those engaged in handling and transporting e-waste. Care should be taken for proper packaging for any such equipment during the storage/ transportation. Sufficient additional measures, including training, may be taken to safeguard occupational and environmental health and safety. The criteria for setting up collection centres are given below;

1. The collection, transportation, storage and handling of E-Waste in the collection centres has to be done carefully without breaking the end of life equipments.
2. Collection centers, established under these Rules, need not seek Consent to Establish and Consent to Operate under the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981.

3. Producers who has pan India presence having large number of distributors/dealers in each of the State and has large warehouses already in place can use the space if available in these ware house for establishing collection centre. However, the space used for collection centre has to be clearly demarcated (by enclosure or partition) from the space meant for new goods.
4. The storage capacity of any collection centre should be commensurate with available area, volume of operations (in weight) and type of E-waste.
5. The collection centre where Refrigerator and Air conditioners are also stored should have adequate facilities for handling / arresting leakage of compressor oils, CFCs/HCFCs if any.
6. Covered shed/spaces may be used for storage of E-Waste generated from IT and Telecommunication equipments while open spaces can be used for storage of refrigerators / washing machines /air conditioners. In case of storage of e-waste, generated from IT and Telecommunication equipment, in open spaces, containers with lids/covers may be used. E-waste comprising of IT & TE waste preferably be segregated and stored at collection centre in suitable racks/containers/bins.
7. Containers of appropriate size and shape may be used for segregation of e-waste items generated from IT and Telecommunication equipments to facilitate effective collection and handling operations. Containers can be made either of wood or plastic or mild steel or any appropriate material with sufficient strength and shapes (top open containers, caged boxes, rakes etc.) for holding the e-waste. These containers/racks may be placed in such a way that there should be adequate space for movement of workers and material.



Different Types of Bins for open storage

8. Producer can assess their individual requirements and design a collection or product take back systems as they deem appropriate as long as it facilitates channelization of WEEE for environmentally sound management.
9. The collection centre has to comply with following legal requirements:
  - i. To obtain an authorization from the concerned SPCBs/PCCs
  - ii. To ensure that the e-waste collected by them is sent to registered dismantlers or recyclers in a secured manner.
  - iii. To maintain records of the e-waste handled in Form 2
  - iv. To file annual returns in Form 3
  - v. To make the records available for scrutiny by the SPCBs/PCCs

## **6.0 Environmentally Sound Dismantling and Recycling of E-waste**

The E-Waste comprising of IT &TE listed in Schedule-I(Annexure IV) including TVs can contain up to 60 different elements of which some are valuable, some are hazardous/toxic and some are both. Printed Circuit Board (PCB) commonly called as motherboard or printed wire board (PWB) contains a complex mix of elements and needs a very careful handling for recovery of precious metals and for minimizing impact on the environment during recovery process. The electrical and electronic equipments require very large amounts of non-ferrous/precious/semi-precious metals and are among the major contributors to the demand for non-ferrous/precious/semi-precious metals in the world. The substances within the components of electrical and electronic equipment which have adverse impact on the environment are lead, mercury, cadmium, chromium (VI), halogenated substances (CFCs), polychlorinated biphenyls and poly-brominated di-phenyl ethers. Plastics and printed circuit board contains brominated flame retardants (BFRs). BFRs can give rise to dioxins and furans during incineration. Recoveries of these non-ferrous/precious/semi-precious metals from e-waste, if not done in a scientific and environmental friendly manner, will result in large emissions of hazardous substances into the environment. In view of this, environmentally sound recycling of e-waste is a must. Environmentally sound recycling with best available technology will lead to efficient recovery of non-ferrous/precious/semi-precious metals and will have low greenhouse gas emissions compared to extraction of these metals from ores. Urban mining of e-waste and recoveries of non-ferrous/precious/semi-precious metals needs significantly low energy compared to recoveries from ore.

Environmentally sound recycling/re-processing of e-waste starts with decontamination/ dismantling where the concentration of hazardous material/chemical is reduced followed by recycling and recovery of the material of economic value and then disposal of the residue in TSDF (Treatment, storage & Disposal facility).

The second category equipment like refrigerators, air conditioners and washing machines primarily contain steel plastics and copper wiring. It also contains potentially harmful substance such as CFCs/HCFs gases which have high ozone depletion potential. The compressor oils are hazardous waste that need proper disposal at TSDFs or can be processed in cement kilns. Environmentally sound recycling is required to ensure safe collection and disposal of these substances.

### **6.1 Dismantler**

As per these rules any person or registered society or a designated agency or a company or an association can engage in dismantling of end of life electrical and electronic equipments into their components by obtaining registration and authorization from the respective SPCB/PCC.

Dismantling operation can be manual, semi manual and automatic involving physical segregation operations for plastics, glass, steel, non-ferrous material, wires, gases, liquids and printed circuit boards. Dismantlers may perform the following operations

1. Decontamination
2. Manual dismantling using appropriate tools, PPEs and dust control equipment.
3. Hammering
4. Shredding
5. Segregation and

6. Specialized separation processes

- a) CRT cutting into funnel and panel including removal of phosphor coating from the panel as well as lead paste binding the panel with the funnel.

The major objective of hammering and shredding operations is size reduction and separation of steel, plastics, PCBs, non-ferrous metals, glass etc. Fractions such as plastic, ferrous and nonferrous material, glass are sent to secondary recycling industry while other remaining fractions are sent to registered E-Waste Recyclers for treatment and recovery.

Dismantling operations are a dry process that may cover the following operations;

1. The first step is to decontaminate E-waste and render it non-hazardous by separating hazardous components and materials. Hazardous electronic components such as Hg switches, Poly Chlorinated Biphenyl (PCBs) etc. can be recovered and sent to TSDFs for treatment and disposal. In case of refrigerators and air conditioners, the refrigerant gases such as chlorofluorocarbon (CFCs), hydrochlorofluorocarbons (HCFCs) etc. can be collected by using gas recovery equipment for their recovery and storage. The refrigerant gases may be re-used or may be disposed by thermal destruction adopting any of the following options;
  - i. By incineration in existing common HW incinerators
  - ii. By co-processing in cement kiln
  - iii. By plasma destruction
2. Manual dismantling can be carried out over the dismantling table with space de-dusting hoods connected with bag dust collectors venting out through a chimney of 3 meter above roof levels so as to maintain desirable work zone air quality as per the Factories Act 1948. Collection boxes with adequate capacity in sufficient number should be placed near dismantling table for keeping the dismantled components. The workers involved in dismantling operation should have proper equipment for dismantling the e-waste.
3. Mechanized dismantling shall comprise of physical separation after opening the material by manual or semi-mechanical operations or directly feeding into a crusher (attached with bag dust collectors) to crush the wastes into fragments that will be segregated on a moving belt by manual collection. Fine grinding, Wet grinding, gravity separation / magnetic/density/eddy current/electromagnetic separators shall not be employed by dismantlers.
4. Dismantling operations shall not include Fine grinding / wet shredding / wet grinding operations. Dismantling operations shall not be permitted for chemical leaching or heating process or melting the material. Dismantlers shall not shred segregated LCDs.
5. Dismantler shall have adequate facilities for disposal of bag filter residue and floor cleaning dust in secure manner or shall obtain membership with TSDF for safe disposal.
6. Dismantlers can be permitted shredding or cutting of printed circuit boards not below the size of 20mm which have to be handled by employing minimal manual handling and with adequate air pollution control systems.
7. In case of dismantling refrigerators and air conditioners, only skilled manpower having adequate tools and personal protective equipments (PPEs) must be deployed to manually separate compressors. Prior to dismantling the compressors, adequate facilities should be provided for recovery of safe collection of refrigerant gases and compressor oils.

8. Dismantled circuit boards, CRTs, capacitors, batteries, capacitors containing PCBs (Polychlorinated biphenyls) or PCTs (Polychlorinated ter phenyls) etc shall not be stored in open.
9. The dismantling operation shall not discharge any process wastewater except workers utilities and re-circulated machine cooling water.
10. The premise for dismantling operation should fulfill the following requirements:
  - a) Weather proof roofing and Impermeable surfaces for appropriate areas with appropriate spillage collection facilities, decanters, degasser, and degreasers.
  - b) Appropriate storage for disassembled spare parts.
  - c) Appropriate containers for storage of batteries, capacitors containing PCBs (Polychlorinated biphenyls) or PCTs (Polychlorinated ter phenyls)
11. Impermeable working surface or pavement should be constructed and maintained to prevent the transmission of liquids beyond the pavement surface. The impermeable surface should be associated with a sealed drainage system connected to a collection sump.
12. The type of impermeable surface required is likely to depend on a number of factors, including:
  - a) The type and quantity of E-waste being stored or processed including whether the E-waste contain hazardous substances and fluids
  - b) The type and volume of other materials dealt with
  - c) The type and level of activity undertaken on the surface
  - d) The level of maintenance
13. Spillage collection facilities include the impermeable pavement and sealed drainage system as the primary means of containment. However, spill kits to deal with spillages of oils, fuel and acids should be provided and used as appropriate.
14. The dismantler must provide appropriate storage for dismantled parts from E-waste. Some parts (e.g. motors and compressors) will contain oil and/or other fluids. Such parts must be appropriately segregated and stored in containers that are secured such that oil and other fluids cannot escape from them. These containers must be stored on an area with an impermeable surface and a sealed drainage system.
15. Other components and residues arising from the dismantling of E-waste will need to be contained following their removal for disposal or recovery. Where they contain hazardous substances they should be stored on impermeable surfaces and appropriate containers or bays with weatherproof covering. Containers should be clearly labelled to identify their contents and must be secure so that liquids, including rain water cannot enter them. Components should be segregated having regard to their eventual destinations and the compatibility of the component types. All batteries should be handled and stored having regard to the potential fire risk associated with them.

#### **6.1.2 Space requirement for Dismantler**

Adequate and separate space is required for storage of raw material, segregated material and dismantling operations, office or administration and other utilities.

### **6.1.3 Regulatory Requirement for Dismantlers:**

The dismantler has to comply with following legal requirement:

1. To obtain authorization and registration from the State Pollution Control Board
2. To ensure that no damage is caused to the environment during storage and transportation of e-waste
3. To ensure that the facilities and dismantling & recycling processes are in accordance with the standards or guidelines published by the Central Pollution Control Board from time to time
4. Dismantler to ensure that dismantled e-waste are segregated and sent to the registered recycling facilities for recovery of materials
5. To ensure that non-recyclable/non-recoverable components are sent to authorized Treatment Storage and Disposal Facilities (TSDF)
6. To file return in form 3 to the SPCB/PCC on or before 30<sup>th</sup> June following the financial year to which that returns relates.
7. Should not process any E-waste for recovery or refining of materials, unless he is registered with SPCB/PCC as a recycler for refining and recovery of materials.

### **6.2 Recyclers**

As per these rules any person who is engaged in recycling or reprocessing of used electrical and electronic equipment or assemblies or their component is a recycler. Recyclers may also set up their own authorized collection centres and may establish linkages with producers/bulk generators/other collection agencies. They may also establish a scheme for household collection of e-waste or may establish tie-ups with other agencies involved in collection of e-waste from individual consumers.

The output material after dismantling and segregation of mild steel, aluminium, Hg Switches, batteries, capacitors, plastic components, CRT, printed circuit board (plain or shredded), cables etc. can be further re-processed or recycled for refinement or enrichment or recovery of useful components that can be used as supplementary raw material for production of new materials including electronic components.

The functions of the recycling facilities are similar to the dismantlers but implements high degree technologies for recycling or recovery operations. There shall be no restriction on degree of operations that can be permitted for recyclers. The following processes can be employed by recyclers ;

1. Manual / semi-manual / automatic dismantling operations
2. Shredding / crushing / grinding / enrichment operations
3. Pyro-metallurgical operations - Smelting furnace
4. Hydro metallurgical operations
5. Electro-winning
6. CRT cutting
7. Toner cartridge recycling
8. Melting, casting, molding operations (for metals and plastics)



1. A recycling facility can be permitted to receive any kind of E-waste covered under E-waste Rules.
2. The recycling facilities shall comply with the requirements as specified for dismantlers in the above section for the operations specified therein.
3. A recycling facility shall install adequate wastewater treatment facilities for process wastewater and air pollution control equipment depending on type of operations undertaken.
4. Suitable space de dusting equipment shall be installed where manual dismantling, shredding operations are carried out.
5. Suitable fume hoods connected with bag dust collectors followed by wet (chemical) scrubbers shall be installed for control of fugitive emissions from furnaces or chemical reactor fumes.
6. The discharges from the facility shall comply with general standards under E(P) Act, 1986 for discharge of wastewater.
7. In case of air emissions, the unit shall comply with emission values prescribed under Air (Prevention and Control of Pollution) Act, 1981. In case of furnace, a minimum stack height of 30mt shall be installed depending on emission rate of SO<sub>2</sub>.
8. The workers involved in recycling operations shall wear proper PPEs (Personal Protective Equipment).
9. In additions to dismantling operations, recyclers may adopt suitable technologies for shredding, wet grinding, gravity / magnetic/density/eddy current/electromagnetic separators with adequate air pollution control equipment. It shall be ensured that dust control equipment comprises of mechanical dust collectors followed by fabric filters or two stage fabric filters or fabric filter followed by wet (chemical) scrubbers.
10. Adequate facilities for onsite collection and storage of bag filter residues, floor cleaning dust and other hazardous material shall be provided and sent to secure land fill facility by obtaining membership with TSDF operator .
11. The degree of refining and % recovery of resource or precious material present in the E-waste shall be given due importance.

#### **6.2.1 Recycling of CRT Monitor and TVs**

Large volumes of CRTs are expected to be generated in coming years. Care should be taken for recycling of CRTs as it contains harmful substances.

CRT monitors and TVs can be manually removed from plastic/ wooden casing. The CRT is split into leaded funnel and unleaded panel glass using different splitting technology in a closed chamber under low vacuum environment and the funnel section is then lifted off from the panel glass section and the internal metal gasket is removed for facilitating the removal of internal phosphor coating.

The CRT can be split manually adopting Ni-Chrome hot wire cutting, Diamond wire method or Diamond saw separation

Manual shredding, cutting, and segregation operations for CRTs should be carried out in vacuum chambers where the dust is extracted through cyclones, bag filters, ID fan and a suitable chimney. The operators should use gloves fixed to the walls of the vacuum chamber while handling CRTs as shown in the figure below



The internal phosphor coating from the inner side of panel glass is removed by using an abrasive wire brush and collected separately. The extracted air is cleaned through high efficiency bag-filter system to collect the phosphor dust. The phosphor dust so collected in the filter bags should be sent to TSDF.

Segregated CRTs can also be shredded in automatic shredding machines connected with dust control systems. The mixed shredded glass is separated into leaded glass and glass cullet using electro-magnetic field or by density separation.

### **6.2.2 Space requirement for Recyclers**

Adequate and separate space is required for storage of raw material, segregated material and dismantling and recycling operations, office or administration and other utilities.

### **6.2.3 Regulatory Requirement for Recyclers:**

The recycler has to comply with following legal requirement:

1. To obtain authorization and registration from the State Pollution Control Board
2. To ensure that no damage is caused to the environment during storage and transportation of e-waste
3. To ensure that the recycling process are in accordance with the standards or guidelines published by the Central Pollution Control Board from time to time
4. Recyclers to ensure that dismantled materials are sent to the registered or bonafied industries for use of recycled material as their raw materials
5. To ensure that non-recyclable/non-recoverable components are sent to authorized Treatment Storage and Disposal Facilities (TSDF)
6. To file return in form 3 to the SPCB/PCC on or before 30<sup>th</sup> June following the financial year to which that returns relates.

7. Should not process any E-waste for recovery or refining of materials, unless he is registered with SPCB/PCC as a recycler for refining and recovery of materials.

### **7.0 Bulk Consumers:**

Departments of Central/State Government, public sector undertaking, banks, educational institution, multinational organizations, international agencies and private companies that are registered under the Factories Act, 1948 and Companies Act, 1956 are called as Bulk Consumers.

As per these rules a bulk consumer has to ensure that the e-waste generated by them have to be channelized to authorized collection centres or registered dismantler or recycler or is returned to the producer through its pick up or take back services or through its collection points.

The bulk consumer has to maintain records of e-waste generated by them in Form 2 and make such records available for scrutiny to SPCBs/PCCs whenever demanded.

### **8.0 Role of State Pollution Control Boards**

SPCB/PCC shall ensure that Producer having their manufacturing facility in their State obtain authorization.

1. SPCB/PCC shall also ensure that Producer having manufacturing facility or corporate head office in their State shall obtain authorization. SPCB/PCC shall also ensure that a Producer having their port of landing of imported equipments in their State obtains authorization.
2. Shall ensure that manufacturer has set-up adequate collection mechanism to cater the collection needs from entire State.
3. The number of collection centres or take-back systems may depend on quantum of sales, number of urban centres in that State
4. The authorization granted to each producer shall be evaluated on case to case basis depending on their proposed EPR implementation scheme. The details of EPR with respect to authorized collection centres, collection points, take-back systems, authorized recyclers, authorized dismantlers and details of agreement between producers, authorized collection centre, dismantler and recycler are required for evaluation.
5. Shall ensure that the collection centres, who have applied for authorization, should have adequate space for storing the quantity of e-waste for which application has been made.
6. Shall ensure that adequate numbers of containers proportionate to the applied capacity are available for storing e-waste.
7. Shall ensure that collection centre should not store e-waste for a period exceeding one hundred and eighty days. The storage period may be extended to one year in those States which do not have any registered dismantling and recycling facility or in such cases where the e-waste needs to be stored for development of a process for its recycling or reuse.

8. Shall ensure that collection centre should have arrangement in place for transferring the e-waste to the registered dismantler or recycler.
9. Shall ensure that dismantlers and recyclers who have applied for authorization and registration, possess appropriate facilities, technical capabilities and equipment to handle e-waste safely. The land may be owned by the dismantlers/recyclers or could be on lease.
10. SPCBs/PCCs shall ensure that no one starts dismantling or recycling of e-waste without having prior permission (registration and authorization) to do so from SPCBs/PCCs.
11. Shall ensure that dismantler and recyclers should have appropriate equipments for dismantling and recycling of e-waste.
12. Grant of registration for dismantling and or recycling has to be evaluated on case to case basis depending on their capacity and level of operation. The SPCBs/PCCs should ensure that dismantler should not exceed their mandate for processing any e-waste for recovery or refining of materials.
13. SPCBs/PCCs shall ensure that dismantlers have well set mechanism for providing dismantled material to recyclers. Action Plan for channelizing the disposal of dismantled component in an environmentally sound manner has to be provided by dismantler.
14. SPCBs/PCCs shall ensure that dismantlers/recyclers should be members of TSDF.
15. SPCBs/PCCs shall ensure that dismantlers/recyclers should file their annual returns within the stipulated time period.
16. SPCBs/PCCs shall place on their web site the conditions imposed on the collection centre, dismantler and recycler while granting authorization and registration and ensure that these conditions are strictly met with by the facility concerned.
17. SPCBs/PCCs should regularly monitor the compliance of authorization and registration.

**E-Waste (M&H) Rules - 2011 applicability:**

Sr. No.	Type of Applicant	To Maintain Records	To Maintain Record in Form -2	Filling Annual Return in Form - 3	Authorization Form-I	Registration Form-IV	RoHS Compliance
1.	Consumer	X	X	X	X	X	X
2.	Bulk Consumer	✓	✓	X	X	X	X
3.	Urban Local Bodies	✓	X	X	X	X	X
4.	Collection Centre	✓	✓	✓	✓	X	X
5.	Producer –offer to sell	✓	✓	✓	✓	X	✓
6.	Producer - importer	✓	✓	✓	✓	X	✓
7.	Producer -	✓	✓	✓	✓	X	✓

Sr. No.	Type of Applicant	To Maintain Records	To Maintain Record in Form -2	Filling Annual Return in Form - 3	Authorization Form-I	Registration Form-IV	RoHS Compliance
	Manufacturing EEE						
8.	Dismantler	✓	✓	✓	✓	✓	X
9.	Recycler	✓	✓	✓	✓	✓	X

X = Not applicable

✓ = Applicable

### 8.1 Interstate Transportation

Transportation of e-waste, being sent for dismantling or recycling to a facility in a State other than the State, where it is generated or collected, does not require 'No objection certificate' from the SPCBs/PCCs concerned.

However, Transporter of the e-waste is required to give prior intimation to the SPCBs/PCCs concerned i.e. the States in which the e-waste is generated, transited and being sent for the purpose of recycling or dismantling.

### 9.0 Role of Municipal Authorities:-

As per the rules, consumers and bulk consumers of electrical and electronic equipment listed in Schedule – I are required to ensure e-waste generated by them is channelized to authorized collection centers or dismantlers or recyclers. However, there is possibility of mixing of e-waste with municipal solid waste. In such cases, the Urban Local bodies (Municipal Committees/ Councils/ Corporations) are required to ensure that e-waste if found to be mixed with MSW is properly segregated, collected and is channelized to either authorized collection centre or dismantler or recycler.

The Urban Local bodies (Municipal Committees/ Councils/ Corporations) are also required to ensure that e-waste generated from non branded or assembled electrical and electronic equipment as specified in Schedule – I is collected and channelized to either authorized collection centre or dismantler or recycler. The ULBs are also required to collect e-waste generated from those EEEs which are covered under the rules and produced by a company, which has closed its operation or has stopped product support.

ULBs may also set up their own collection points at MSW disposal site, public places, residential locality etc to collect the e-waste and such collection points shall be connected to authorized collection centres/dismantlers/recyclers

### 10.0 Reduction in the use of Hazardous Substances (RoHS) in the manufacture of electrical and electronic equipments:

The e-waste rules specifies limit for hazardous substance in the components of electrical and electronic equipments. The limits are detailed below

- Every producer of electrical and electronic equipments as per Schedule I shall ensure that new electrical and electronic equipments should not have concentration value more than 0.1% by weight in homogenous materials for Lead, Mercury, Cadmium, Hexavalent Chromium, Polybrominated biphenyls or polybrominated diphenyl ethers and for

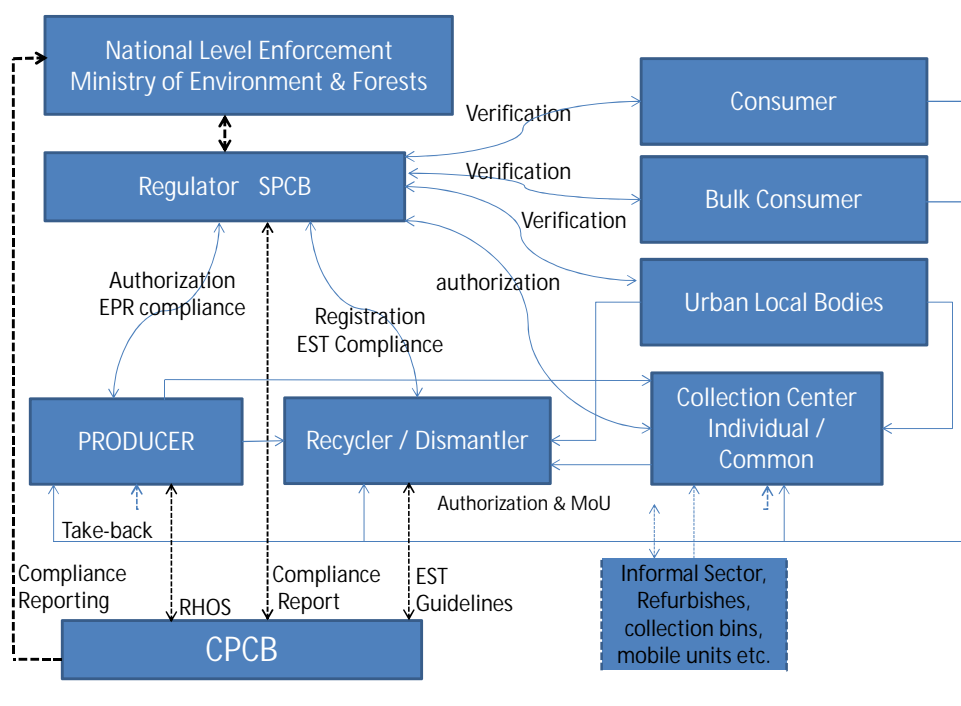
Cadmium more than 0.01% by weight in homogenous materials. The above maximum concentration limit should be achieved before 01-05-2014. The above limits will not apply to components of electrical and electronic equipment manufactured or placed in the market six years before the date of commencement of these rules. The above limits will also not apply to applications listed in Schedule II (Annexure-VII) of the e-waste rules and electrical and electronic equipments used for defense purpose.

- ii. Import or placement in the market for new electrical and electronic equipment shall be permitted only for those equipment which are RoHS compliant.
- iii. Components of electrical and electronic equipment manufactured or placed in the market before the date of 01-05-2014 are exempted from above provisions.
- iv. The reductions have to be achieved before 1 May 2014 i.e. within two years from the dates of commencement of these rules. Certain applications listed in Schedule II are exempted from the above requirement and there is also an exemption for components of electrical and electronic equipment manufactured or placed in the market six years before the date of commencement of the reduction.

## 11.0 Over-all Compliance Mechanism

A compliance mechanism has been set out in e-Waste Rules for producers, collection centers, consumer, bulk consumers, dismantler, recyclers and the regulatory authorities (SPCB's, PCCs, CPCB and MoEF). It also sets out the responsibilities for producers to finance and organize the take back and recycling system. However, while ensuring that the given compliance mechanism is followed the same can be visualized in the following schematic flow sheet;

Implementation of E-Waste Rules 2011



## FORM -1

[See rule 9(2)]

APPLICATION FOR OBTAINING AUTHORIZATION FOR GENERATION/ COLLECTION/  
STORAGE/DISMANTLING/RECYCLING/ OF E-WASTE\*

From: .....

.....

To

The Member Secretary,

.....Pollution Control Board or..... Pollution Control Committee

.....

.....

Sir,

I / We hereby apply for authorization/ renewal of authorization under rule 11 (2) and 11 (6) of the E-waste (Management and Handling) Rules, 2011 for collection/ storage/ transport/treatment/ disposal of e-wastes.

---

**For Office Use Only**


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Code No. :

Whether the unit is situated in a critically polluted area as identified by Ministry of Environment and Forests (Yes/no);

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**To be filled in by Applicant**


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**Part -A: General**

1. (a) Name and full address, telephone nos. e-mail and other contact details of the unit :  
(b) Authorization required for (Please tick mark appropriate activity/ies\*)
 

(i) Generation*	<input type="checkbox"/>
(ii) Collection *	<input type="checkbox"/>
(iii) Dismantling*	<input type="checkbox"/>
(iv) Recycling*	<input type="checkbox"/>

 (c) In case of renewal of authorization previous authorization no. and date
2. (a) Whether the unit is generating or processing e-waste as defined in the E- waste (Management and Handling) Rules, 2011

- (i) Generation\* ☐
- (ii) Processing\* ☐

3. (a) Total capital invested on the project:  
 (b) Year of commencement of production:  
 (c) Date of grant of the Consent to Establish:  
 (d) Date of grant of the Consent to Operate:

#### **Part -B: e-waste**

4. E-waste details:

	Type of e-wastes generated as defined under the e-wastes (Management and Handling) Rules, 2011:	
(a)		
(b)	Total Quantity e-waste handled generated/collected/dismantled/recycled :	
(c)	Mode of storage within the plant:	
(d)	Method of treatment and disposal:	
(e)	Installed capacity of the plant :	

#### **Part - C: Dismantling and Recycling Facility**

5. Detailed proposal of the facility (to be attached) to include:
- (i) Location of site (provide map).
  - (ii) Details of processing technology
  - (iii) Type and Quantity of waste to be processed per day
  - (iv) Site clearance (from local authority, if any)
  - (v) Utilization of the e-waste processed
  - (vi) Method of disposal of residues (details to be given)
  - (vii) Quantity of wastes to be processed or disposed per day
  - (viii) Details of categories of e-waste to be dismantled/processed
  - (ix) Methodology and operational details
  - (x) Measures to be taken for prevention and control of environmental pollution including treatment of leachates
  - (xi) Measure to be taken for safety of workers working in the plant

**Place:** \_\_\_\_\_

**Signature**\_\_\_\_\_

**(Name**\_\_\_\_\_ **)**

**Date:** \_\_\_\_\_

**Designation:** \_\_\_\_\_



**FORM 1(a)**  
[See rule 9(3)]  
FORM FOR GRANTING AUTHORIZATION FOR GENERATION/COLLECTION/  
STORAGE/ DISMANTLING/RECYCLING/ OF E-WASTE\*

1. (a) Authorization and (b) date of issue .....
2. .... of ..... Is hereby granted an authorization for generation, collection, storage, dismantling and recycling of e-waste on the premises situated at .....
3. The authorization granted for generation, collection, storage, dismantling, and recycling of e-waste.
4. The authorization shall be in force for a period from..... to .....
5. The authorization is subject to the conditions stated below and such conditions as may be specified in the rules for the time being in force under the Environment (Protection) Act, 1986.

Signature -----

Designation -----

Date: -----

**Terms and conditions of authorization**

1. The authorization shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under.
2. The authorization its renewal shall be produced for inspection at the transport of an officer authorized by the State Pollution Control Board or Committee of Union territories.
3. The person authorized shall not rent, lend, sell, transfer or otherwise transport the e-wastes without obtaining prior permission of the state Pollution Control Board or Committee of Union territories.
4. Any unauthorized change in personnel, equipment as working conditions as mentioned in the application by the person authorized shall constitute a breach of his authorization.
5. It is the duty of the authorized person to take prior permission of the State Pollution Control Board or Committee of Union territories to close down the operations.
6. An application for the renewal of an authorization shall be made as laid down in sub-rule (6) of rule 9.

**FORM -2***[See rules 4 (8), 5 (5) and 9 (5)]***FORM FOR MAINTAINING RECORDS OF E-WASTE HANDLED/ GENERATED  
Quantity in Metric Tonnes (MT) or Kilograms (Kg) per year**

1.	Name & Address: Producer /Collection Centre/Dismantler? Recycler/ Bulk consumer *		
2.	Date of Issue of Authorization* Registration*		
3.	Validity of Authorization* /Registration*		
4.	Types & Quantity of e- waste handled/generated	Category	Quantity
		Item Description	
5.	Types & Quantity of e- waste stored	Category	Quantity
		Item Description	
6.	Types & Quantity of e- waste sent to authorized collection centre/registered dismantler or recycler	Category	Quantity
		Item Description	
7.	Types & Quantity of e- waste transported*	Category	Quantity
		Quantity	
	Name, address and contact details of the destination		
8.	Types & Quantity of e- waste refurbished*	Category	Quantity
		Item Description	
	Name, address and contact details of the destination of refurbished materials		
9.	Types & Quantity of e- waste dismantled*	Category	Quantity
		Item Description	
	Name, address and contact details of the destination		
10.	Types & Quantity of e- waste recycled*	Category	Quantity
	Types & Quantity of materials recovered	Item Description	
		Quantity	
	Name, address and contact details of the destination		
11.	Types & Quantity of waste treated & disposed	Category	Quantity
		Item Description	

**FORM - 3**

[See rules 4(9), 5(4), 6(2), 7(7), 8(5) and 9(5)]

**FORM FOR FILING ANNUAL RETURNS**

[To be submitted by producer/collection centre/dismantler/recycler by 30<sup>th</sup> June following to the financial year to which that return relates].

**Quantity in Metric Tonnes (MT) or Kilograms (Kg) per year**

1.	Name and address of the producer/collection centre/dismantler/recycler		
2.	Name of the authorized person and complete address with telephone and fax numbers and e-mail address		
3.	Total quantity e-waste sold/purchased/ sent for processing during the year of electrical and electronic equipment listed in the Schedule I (Attach list)		
	Details of the above	TYPE	QUANTITY
3(A)*	<b>DISMANTLERS:</b> Quantity of e-waste in MT purchased & sent to (category wise):		
3(B)*	<b>RECYCLERS:</b> Quantity of e-waste in MT purchased/processed (category wise):		
4.	Name and full address of the destination with respect to 3 (A-B) above		
5.	Type and quantity of materials segregated/recovered from e-waste of different categories as applicable to 3(A) & 3(B)	Type	Quantity

Note: The applicant shall provide details of funds received (if any) from producers and its utility with an audited certificate

✓enclose the list of recyclers to whom e-waste have been sent for recycling.

\* Strike off whichever is not applicable

Place\_\_\_\_\_

Date\_\_\_\_\_

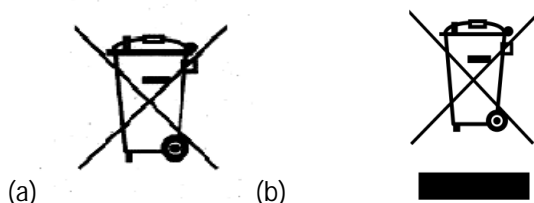
Signature of the authorized person

SCHEDULE I  
Categories of Electrical and Electronic Equipments Covered under the Rules

Sr. No.	Categories of Electrical and Electronic Equipments
i	<b>Information Technology and Telecommunication Equipment:</b> Centralized data processing, Mainframes, Minicomputers, Personal computing, Personal computers (Central processing unit with input and output devices), Laptop computers (Central processing unit with input and output devices), Notebook computers, Notepad computers, Printers including cartridges, Copying equipment, Electrical and electronic typewriters, User terminals and systems, Facsimile, Telex, Telephones, Pay telephones, Cordless telephones, Cellular telephones, Answering systems
ii	<b>Consumer electrical and electronics</b> Television sets (including sets based on (Liquid Crystal Display and Light Emitting Diode technology), Refrigerator, Washing Machine, Air-Conditioners excluding centralized air conditioning plants.

## Some of the options for Awareness &amp; communication

1. Producers must comply with the logo requirements in Rule 4. Logo can be placed either on the products within scope or the accompanying product documentation. The presence of other graphics (e.g., borders or bars) in connection with the logo prescribed in Rule 4 will not make such a logo invalid provided that the basic image of the crossed-out wheellie bin is present on the product or in the product documentation.



2. An important aspect in the process of compliance of any rules is the creation of awareness among the stakeholders on the various aspects of the products, including the requirements for the environmentally sound management of the product at the end of life. According to the section 4(6) of the e-waste (Management and Handling) Rules 2011 the producer is responsible to create awareness for the consumer about the product that has been placed on the market. The information should essentially convey the message for the compliance under the rules and the responsibility undertaken by the producer on safe handling and disposal of the product. Under these rules suggestions have been made for the various modes for creation of awareness such as publications, advertisements, posters, information booklets etc. These are the minimal requirement however, any other additional or more effective methods such as the use of Television, radio, news paper etc., could also be adopted for communicating the information. The awareness creation can also be done through road shows and camps in education institutions, especially schools colleges and other institutions.
3. Producer will create awareness among consumers using any means of communication about proper handling of equipment after use, including information on the collection points/ collection centers. Awareness through website is an acceptable means. In addition, use of advertisements, publications, information booklet and posters could be few other means.
4. Awareness is essential regarding the hazardous constituents present in the equipment as well as the safe handling and disposal of the product after its use. The rules suggest only the minimum information required to be provided on the product however, the producer may provide additional information if deemed necessary. The information on the presence of hazardous constituents such as lead, mercury, hexavalent chromium, polybrominated biphenyls and polybrominated di phenyl ethers specified under Rule 13 on the reduction in the use of hazardous substances (RoHS) in the electrical and electronic equipment needs to be indicated in the product information booklets. In

case of the RoHS compliant product the same should be indicated in the product information booklet

5. The producers currently provide information on safe handling of the product to ensure its safe delivery and installation for use. In the same manner the producers should also provide information for safe handling of the end-of-life product. The information on the consequences of improper handling, accidental breakage damage and improper recycling of the end of life product needs to be provided along with the product information booklet or in the website. The intent of the product information booklet should be to facilitate safe handling of the product before, during and after the use of the product. In order to prevent the improper recycling activities the consumer should be made aware of product disposal, after its use. Essentially the information on the collection mechanisms and the contact with the producer would help in the proper channelization of the end of use product. It would not be feasible to provide the entire information in the product booklet therefore only the selected information could be provided and the links to the website and other information sources should be provided. The most effective means for providing information are newspaper and television advertisements. The producer may also use the media for communicating with larger sections of the society.
6. The instructions to be provided with the products include the do's and don'ts in the use of the products which needs to be extended to the do's and don'ts on disposal of the equipment. One of the important things to be kept in mind is to provide information by directing the consumers on the steps to follow once the product reaches end of life. This shall include the information on where to channelize the e-waste generated after use of the product and prevent from dumping in municipal solid waste stream. One of the important features and mandatory requirement envisaged is to convey a message through a visible and legible label with the product to prevent the end of use product from being dropped in the garbage bins. This channelization of e-waste is important so that e-waste recycling efficiency is enhanced through proper collection and disposal.

SCHEDULE II  
[See rule 13(2)]

**Applications, which are exempted from the requirements of sub-rule (1) of rule 13 (applicable to categories of electrical and electronic equipment as listed in Schedule I)**

	Exemption
1	Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):
1 (a)	For general lighting purposes < 30 W: 5 mg
1 (b)	For general lighting purposes $\geq 30$ W and < 50 W: 5 mg
1 (c)	For general lighting purposes $\geq 50$ W and < 150 W: 5 mg
1 (d)	For general lighting purposes $\geq 150$ W : 15 mg
1 (e)	For general lighting purposes with circular or square structural shape and tube diameter $\leq 17$ mm: 7 mg
1 (f)	For special purposes: 5 mg
2 (a)	Mercury in double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp):
2 (a)(1)	Tri-band phosphor with normal lifetime and a tube diameter > 9 mm (e.g. T2): 4 mg
2 (a)(2)	Tri-band phosphor with normal lifetime and a tube diameter $\geq 9$ mm and $\geq 17$ mm (e.g. T5) : 3 mg
2 (a)(3)	Tri-band phosphor with normal lifetime and tube diameter > 17 mm and $\leq 28$ mm (e.g. T8): 3.5 mg
2 (a)(4)	Tri-band phosphor with normal lifetime and a tube diameter > 28 mm (e. g. T12): 5 mg
2 (a)(5)	Tri-band phosphor with long lifetime ( $\geq 25000$ h): 8 mg
2 (b)	Mercury in other fluorescent lamps not exceeding (per lamp):
2 (b)(1)	Linear halophosphalte lamps with tube > 28 mm (e.g. T 10 and T12): 10 mg
2 (b)(2)	Non-linear halophosphalte lamps (all diameters): 15 mg
2 (b)(3)	Non-linear tri-band phosphor lamps with tube diameter > 17 mm (e. g. T9): 15 mg
2 (b)(4)	Lamps for other general lighting and special purpose (e. g. induction lamps): 15 mg
3	Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp):
3 (a)	Short length ( $\leq 500$ mm): 3.5 mg
3 (b)	Medium length (> 500 mm and $\leq 1500$ mm): 5 mg
3 (c)	Long length (> 1500 mm): 13 mg
4 (a)	Mercury in other low pressure discharge lamps (per lamp)
4 (b)	Mercury in High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index $R_a > 60$ :
4 (b)-I	$P \leq 155$ W: 30 mg
4 (b)-II	$155 \text{ W} < P \leq 405 \text{ W}$ : 40 mg
4 (b)-III	$P > 405$ W: 40 mg
4 (c)	Mercury in other High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner):
4 (c)-I	$P \leq 155$ W: 25 mg
4 (c)-II	$155 \text{ W} < P \leq 405 \text{ W}$ : 30 mg
4 (c)-III	$P > 405$ W: 40 mg
4 (d)	Mercury in High Pressure Mercury (vapour) lamps (HPMV)

4 (e)	Mercury in metal halide lamps (MH)
4 (f)	Mercury in other discharge lamps for special purposes not specifically mentioned in this Schedule
5 (a)	Lead in glass of cathode ray tubes
5 (b)	Lead in glass of fluorescent tubes not exceeding 0.2% by weight
6 (a)	Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0.35% lead by weight
6 (b)	Lead as an alloying element in aluminum containing up to 0.4% lead by weight
6 (c)	Copper alloy containing up to 4% lead by weight
7 (a)	Lead in high melting temperature type solders (I. e. lead-based alloys containing 85% by weight or more lead)
7 (b)	Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission, and network management for telecommunications
7 (c)-I	Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e. g. piezoelectric devices, or in a glass or ceramic matrix compound.
7 (c) - II	Lead in dielectric ceramic in capacitors for rated voltage of 125 V AC or 250 V DC or higher
7 (c) - III	Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC
8 (a)	Cadmium and its compounds in one shot pellet type thermal cut-offs.
8 (b)	Cadmium and its compounds in electrical contacts
9	Hexavalent chromium as an anticorrosion agent of the carbon steel cooling system in absorption refrigerators up to 0,75% by weight in the cooling solution
9 (b)	Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) application.
11 (a)	Lead used in C-press complaining pin connector systems
11 (b)	Lead used in other than C-press complaint pin connector systems
12	Lead as a coating material for the thermal conduction module C-ring
13 (a)	Lead in while glasses used for optical applications
13 (b)	Cadmium and lead in filter glasses and glasses used for reflectance standards.
14	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
15	Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages.
16	Lead in linear incandescent lamps with silicate coated tubes
17	Lead halide as radiant agent in high intensity discharge (HID) lamps used for professional reprography applications.
18 (a)	Lead as activator in the fluorescent powder (1 % lead by weight or less ) of discharge lamps when used as specialty lamps for diazoprinting reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS ((Sr, Ba) 2MgSi2O7: Pb)
18 (b)	Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphor such as BSP (BaSi2O5: Pb)
19	Lead with PbBiSn-Hg and PbInSn-Hg in specific compositions as main amalgam and with PbSn-Hg as auxiliary amalgam in very compact energy saving lamps (ESL)
20	Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCDs)
21	Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses



23	Lead in finishes of fine pitch components other than connectors with a pitch of 0.65 mm and less
24	Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors
25	Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring.
26	Lead oxide in the envelope of black light blue lamps
27	Lead alloys as solder for transducers used in high - powered (designated to operate for several hours at acoustic power levels of 125 dB SPL and above) loudspeakers
29	Lead bound in crystal glass
30	Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100 dB (A) and more
31	Lead in soldering materials in mercury free flat fluorescent lamps (which e. g. are used for liquid crystal displays, design or industrial lighting)
32	Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes
33	Lead in solders for the soldering of thin copper wires 100 µm diameter and less in power transformers
34	Lead in cermet-based trimmer potentiometer elements
36	Mercury used as a cathode sputtering inhibitor in DC plasma displays with a content up to 30 mg per display
37	Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body
38	Cadmium and cadmium oxide in thick film pastes used on aluminum bonded beryllium oxide
39	Cadmium in colour converting II-VI LEDs (< µg Cd per mm <sup>2</sup> of light-emitting area) for use in solid State illumination or display systems.