

Australian/New Zealand Standard™

**Collection, storage, transport and
treatment of end-of-life electrical and
electronic equipment**



AS/NZS 5377:2013

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Association of Accredited Certification Bodies
Australian Council of Recyclers
Australian Industry Group
Australian Information Industry Association
Australian Local Government Association
Australian Mobile Telecommunications Association
Community Recycling Network
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Australian/New Zealand Standard™

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EV-019, E-waste.

The objective of this Standard is to provide guidance and specify requirements for the safe and environmentally sound collection, storage, transport and treatment of end-of-life electrical and electronic equipment in order to maximize re-use and material recovery; reduce or eliminate the amount of waste from this equipment going to final disposal operations such as landfill; safeguard worker health; and minimize harm to the environment.

This Standard is designed with the principles of ecological sustainable development in mind, including lifecycle assessment, the precautionary principle and the principle of due diligence. Operations involved in the collection, storage, transport and treatment of electrical and electronic products, whether it be for re-use of parts or recycling purposes, are encouraged to understand all obligations and take all reasonable and practicable steps to ensure that these products are managed in a manner that will protect human health and the environment against the adverse effects that may result from such wastes. Lack of full scientific certainty should not be used as a reason for postponing feasible measures to prevent environmental degradation or adverse health and safety effects.

This Standard recognizes that there are general laws in place regulating how to comply with occupational health and safety requirements and environmental performance. This Standard also recognizes that Australia and New Zealand are signatories to international agreements regarding the environmentally sound management of hazardous and other wastes, and elimination of pollutants. The intention is not to cut across the law, but enhance the legislation and international obligations. If there is any doubt as to a potential conflict between the law and this Standard, professional advice should be sought.

The terms 'normative' has been used in this Standard to define the application of the appendix to which it applies. A 'normative' appendix is an integral part of a Standard.

Statements expressed in mandatory terms in footnotes to tables are deemed to be requirements of this Standard.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard**Collection, storage, transport and treatment of end-of-life electrical and electronic equipment****SECTION 1 SCOPE, OBJECTIVE,
APPLICATION AND GENERAL
REQUIREMENTS****1.1 SCOPE**

This Standard sets out principles and minimum requirements for the safe and environmentally sound collection, storage, transport and treatment of end-of-life electrical and electronic equipment in order to maximize re-use and material recovery, reduce or eliminate the amount of waste from this equipment going to final point of disposal operations such as landfill, safeguard worker health, and minimize harm to the environment. This Standard covers electrical and electronic equipment, as outlined in Appendix A, designed for a supply voltage not exceeding 1000 volts for alternating current and 1500 volts for direct current.

1.2 OBJECTIVE

The purpose of this Standard is to—

- (a) provide collection, storage, transport and recycling facilities with guidance and minimum requirements for handling, transporting, resource recovery and disposal of end-of-life electrical and electronic equipment, diverting it from landfill;
- (b) assist collection, storage, transport and recycling facilities to develop, implement and maintain management processes; and
- (c) give confidence to parties and stakeholders of the benchmarks against which to gauge performance of collection, storage, transport and recycling facilities.

1.3 APPLICATION

This Standard is intended to be used by parties involved in the collection, storage, transport, and treatment of end-of-life electrical and electronic equipment.

This Standard is intended to be read in conjunction with the relevant legal and other requirements for occupational health and safety and environmental performance.

1.4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.4.1 Assembly

A number of electronic components (i.e., ‘circuit elements’, ‘discrete components’, ‘integrated circuits’, etc.) connected together to perform specific functions, replaceable as an entity and normally capable of being disassembled.

1.4.2 Batch

Manual or mechanical processing of a definite and well-defined amount of e-waste or fractions thereof to determine the yields and compositions of the resulting output fractions and treatment performance in material recovery and removal of hazardous waste.

1.4.3 Collection location or collection facility

A place temporarily or permanently designated for receiving end-of-life electrical and electronic equipment in order to sort, store, and transport that equipment to storage or processing facilities. The collection location or facility may be co-located with the storage or processing facilities.

1.4.4 Competent person

A person who has acquired through training, qualifications or commensurate experience, or a combination of these, knowledge and skills enabling that person to safely perform a specific task.

1.4.5 Component

Element of an appliance with a distinct function, which has been removed from the device as a unit.

NOTE: Typical components of electrical and electronic equipment are batteries, capacitors, printed circuit boards, cathode ray tubes (CRTs), hard disk drives, transformers, power supplies, and subassemblies.

1.4.6 Disposal

Any operation which is not recovery, even where the operation has as a secondary consequence the reclamation of substances or energy.

1.4.7 Downstream processor

An entity that receives material from the first operator or other downstream processor for the purposes of additional processing and refining for maximum resource recovery.

1.4.8 Electrical and electronic equipment

Includes any equipment, device or thing, the operation of which is in some way dependent on, or designed for the generation, transfer or measurement of, an electric current and/or an electromagnetic field and designed for a supply voltage not exceeding 1000 volts for alternating current and 1500 volts for direct current.

1.4.9 Environmental management system

Part of the overall management system, that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, risk assessment and resources for developing, implementing, achieving and maintaining the environmental policy.

1.4.10 End-of-life electrical and electronic equipment

Life-cycle stage of a product starting when it is removed from its intended use-stage.

1.4.11 Energy recovery

Production of useful energy through direct and controlled combustion or other processing of waste.

1.4.12 Fractions

Components which have been dismantled or treated mechanically.

1.4.13 Hazardous material

A substance with potential to cause harm to persons, property or the environment because of one or more of the following:

- (a) The chemical properties of the substance.
- (b) The physical properties of the substance.
- (c) The biological properties of the substance.

Without limitation to any of the above, all dangerous goods and combustible liquids are hazardous materials.

1.4.14 Material processing

Operations including mechanical treatment, recycling, feedstock (chemical) recycling and organic recycling, but excluding energy recovery.

1.4.15 Material recovery

Any recovery operation excluding energy recovery and reprocessing into materials which are to be used as fuel.

1.4.16 Operator

An entity or person that engages in any of a number of activities including collection, sorting, storage, transportation, disassembly or processing of electrical and electronic equipment for the purpose of recovery, re-use, recycling or disposal.

1.4.17 Point of final disposal

A point in the downstream flow of materials where the separated materials generated from the processing of end-of-life electrical and electronic equipment are physically altered from their original state and become commodities used to produce new products or become by-product waste for disposal.

A point of final disposal occurs when commodities are—

- (a) used as a raw material in the production process of new products;
- (b) used in the recovery of metal, energy and/or other resources;
- (c) used in pelletisation of plastics;
- (d) disposed of to landfill or incinerated;
- (e) processed in preparation for use as a raw material.

1.4.18 Recovery

Separation or extraction of materials from used electrical and electronic equipment for processing into useable materials.

1.4.19 Recycling

Any recovery operation by which used electrical and electronic equipment materials are reprocessed into useable materials, commodities or substances, whether for the original or other purposes. It does not include energy recovery or reprocessing into materials that are to be used as fuels or for backfilling operations.

1.4.20 Re-market

Any action, including marketing activities, necessary to sell previously end-of-life electrical and electronic components assemblies or parts directly or indirectly to customers.

1.4.21 Re-use

Operation by which a product, or a part thereof, having reached the end of one use-stage is used again for the same purpose for which it was conceived.

1.4.22 Substances of concern

Materials or components making up end-of-life products that when handled or processed at a recycling facility may pose a risk to human health or the environment and therefore merit special environmental and safety controls.

1.4.23 Waste

Any material or object which the holder discards or intends or is required to discard.

1.5 GENERAL REQUIREMENTS

Legal and other requirements, including regulatory and international requirements that are directly applicable to end-of-life electrical and electronic equipment, need to be identified and adhered to. These include, but are not limited to the following:

- (a) Environmental legislation.
- (b) Operation requirements including site licensing and licences for the handling, storage, transport and treatment of end-of-life electrical and electronic equipment.
- (c) Laws relating to the handling, storage, treatment and transport of dangerous goods, controlled wastes and hazardous wastes.
- (d) Occupational health and safety legislation.
- (e) Export licensing laws and regulations.
- (f) International treaty obligations which bind Australia or New Zealand.

Information on legal and other obligations, including international requirements, needs to be kept up-to-date and be communicated to the relevant stakeholders including its employees and contractors.

1.6 ORGANIZATIONAL REQUIREMENTS

1.6.1 General

This Clause identifies collection, storage, transport and treatment requirements that are specific to the management of end-of-life electrical and electronic equipment that should be integrated into an organization's existing environmental management system or similar management system to encourage effective implementation.

1.6.2 Licensing

Facilities and operators shall be authorized in accordance with the relevant legal and other requirements pertaining to the location in which the facility is situated.

1.6.3 Risk assessment and management

A documented risk assessment process to identify and control any potential environmental, health or safety hazards associated with the operator shall be maintained. The risk assessment process shall include the following steps:

- (a) Define the responsibilities for individuals conducting the risk assessment.
- (b) Identify, record and monitor any potential environmental, health or safety risks associated with the materials handled and tasks undertaken, as well as the overall operations, during both normal operating conditions and potential emergency situations.
- (c) Evaluate any potential environmental, health or safety risks identified through the assessment and develop a risk mitigation plan.
- (d) Implement controls suitable to the identified risks to eliminate and minimize the risks where practicable and to protect the environment and human health and safety.
- (e) Monitor the effectiveness of any implemented controls and adjust as required based on the acceptable residual risks.
- (f) Maintain a schedule to review risk assessments at least on an annual basis, or more frequently if required as a result of any significant operational, environmental or regulatory changes.

- (g) Maintain a list of products and waste materials that the organization is capable of collecting, processing, storing or otherwise handling in a safe and environmentally sound manner.

NOTE: Suitable risk assessment processes can be found in AS/NZS ISO 31000.

1.6.4 Emergency response

An emergency response plan to prepare for and respond to emergencies including exceptional pollution releases, fires, spills, natural disasters such as storms, floods and earthquakes and medical incidents shall be implemented and maintained at the facility. The plan should have a provision to inform anyone who may be affected by an incident on the site and consider the potential response to an emergency arising offsite which may impact the site.

The response plan shall include the following:

- (a) Action to be taken, including—
 - (i) notifications required by law; and
 - (ii) notifications to be made to regulatory authorities and those required by contractual arrangements.
- (b) Alternative collection or notice of suspension.
- (c) Alternative storage.
- (d) Alternative transport.
- (e) Recovery timeline.
- (f) Clean up or remediation methodology and validation process.
- (g) Requirements for training all responsible people.
- (h) Documentation to be made available during and after the emergency.
- (i) Review of relevant documentation to prevent reoccurrence.
- (j) Testing of the effectiveness of the emergency procedure through appropriate drills or reviews at least annually and within three months of a change of persons, procedures or actions identified in the plan.

1.6.5 Training

Any person(s) performing tasks that have the potential to cause an environmental or health and safety impact(s) shall be competent and documentation to verify this shall be retained.

1.6.6 Training material

Training materials and information shall be readily available at the facility, or be easily accessible at all times. They should include the following:

- (a) Technical guidance documents.
- (b) Risk assessments.
- (c) Safety statements.
- (d) Information charts.
- (e) Information tables.
- (f) Photos or examples of components of electrical and electronic equipment.
- (g) Material safety data sheets for hazardous substances.

Risks inherent but not limited to substances of concern identified in Appendix B shall be specified in this information.

1.7 RECORDS MANAGEMENT

Records to allow the traceability of electrical and electronic equipment, assemblies, parts, commodities and waste, including but are not limited to manifests, bills of loading, chain of custody documents, transport records and any other record keeping requirement outlined in this Standard, shall be accessible, identified, legible and maintained for at least five years.

1.8 DATA SECURITY

Collection locations should prominently display advice on the process for removing private or confidential data.

NOTE: Privacy data from any electronic storage device provided for disposal at end of life should be removed. This should be performed by the person who manages the data held on the equipment prior to disposal.

Information should be made available to persons disposing of end-of-life electronic equipment with data storage media to make sure they are aware that file deletion does not mean privacy data has been fully removed.

1.9 DISPOSAL TO LANDFILL

Waste that is disposed of to landfill shall be disposed of at a waste facility that is licensed to accept the waste.

1.10 RE-USE AND REFURBISHMENT OF EQUIPMENT

Electrical and electronic equipment identified and collected for re-use and refurbishment shall be collected, stored, transported and treated separately to electrical and electronic equipment identified and collected as end of life and covered in accordance with this Standard. General information on the preparation for re-use and refurbishment of electrical and electronic equipment disposed of at end of life is provided in Appendix C.

SECTION 2 REQUIREMENTS FOR COLLECTION AND STORAGE FACILITIES

2.1 GENERAL

This Section specifies requirements and provides guidance for a facility at which end-of-life electrical and electronic equipment is collected and/or stored for the purpose of transporting to a facility for material recovery or processing, whether or not it provides public access.

Where a location has been advertised or promoted as being a place where end-of-life electrical and electronic equipment can be left or will be received at, that place shall be designated as a collection location or collection facility.

Facilities must be authorized in accordance with the relevant legal and other requirements pertaining to the location in which the facility is situated.

2.2 ACCESS

Areas of collection at facilities designated for public access shall be easily accessible and kept clean and free of hazards.

2.3 SIGNAGE AND INFORMATION

Signage should be provided to communicate relevant information, including the following:

- (a) Safety warnings.
- (b) Instructions to the public.
- (c) Site access times for the public.
- (d) Details of equipment that is or is not accepted at the facility.

Similar details should be included in advertising and/or display material used by the collection facility or promoting the collection service.

NOTE: Information should be made available to persons disposing of end-of-life electronic equipment with data storage media to make sure they are aware that file deletion does not mean privacy data has been fully removed.

2.4 STORAGE AND HANDLING

2.4.1 General

The physical integrity of end-of-life electrical and electronic equipment, assemblies, components and parts shall be maintained during receiving, handling and storage on site at the collection facility, in order to avoid release of hazardous substances into air, water or soil, as a result of damage and/or leakage. End-of-life electrical and electronic equipment shall be handled and stored in a manner that—

- (a) prevents theft and vandalism;
- (b) provides protection from exposure to the elements where hazardous substances may be released;
- (c) prevents exposure of people on site to unsafe storage and handling conditions or hazardous substances; and
- (d) prevents damage or breakage of cathode ray tubes (CRTs), flat panel displays, equipment with mercury containing lamps and globes, gas discharge lamps, equipment containing asbestos, ceramic fibres, petroleum fluids, polychlorinated biphenyls, batteries, or refrigerant gases.

Breakable end-of-life electronic and electrical equipment, assemblies, components and parts shall be packaged and loaded to ensure they are not damaged during loading and transportation.

NOTE: Methods of handling and storage should be undertaken with appropriate tools, receptacles and fixings to ensure effective recovery and recycling.

Collection facilities undertaking disassembly or processing on-site before transportation shall do so in accordance with Section 5 of this Standard.

2.4.2 Storage facilities

Storage for end-of-life electrical and electronic equipment that contains substances of concern shall have—

- (a) impermeable surfaces;
- (b) weatherproof coverings; and
- (c) measures to prevent potentially hazardous material entering stormwater drainage.

2.4.3 Consolidation and sorting facilities

During collection, storage and transport, end-of-life electrical and electronic equipment shall not be mixed with other types of waste within the same container or receptacle.

2.4.4 Requirements for handling and storing end-of-life electrical and electronic equipment

During the handling and storage of end-of-life electrical and electronic equipment, processes shall be in place to:

- (a) Prevent the combustion, explosion or leaking of batteries and short circuits or flows of current by insulating the electrical contacts with electrical tape or other safe means of assuring electrical safety. Special consideration should be given to wet cell batteries and exposed lithium type batteries.
- (b) Store items in receptacles, clearly identifying the contents on the outside of the receptacles holding cooling and freezing appliances to avoid damage to the refrigerant system.
NOTE: Receptacles must meet dangerous goods and United Nations Environment Programme (UNEP) guidelines.
- (c) Prevent CRT displays from imploding and/or loss of phosphorescent coatings.
- (d) Protect against damage to equipment with mercury containing lamps and globes, gas discharge lamps and smoke detectors containing hazardous components or materials to avoid breakage and discharge into the environment.
- (e) Protect against rough handling and damage to appliances containing petroleum fluids, polychlorinated biphenyls and other liquids and gases to avoid spillages and other emissions.
- (f) Protect against damage to appliances containing asbestos to avoid the release or inappropriate disposal of asbestos fibres.

NOTES:

- 1 Appliances that contain gas discharge lamps include sun beds and flat panel displays.
- 2 Appliances that contain asbestos include heaters, and stoves.
- 3 Printed circuit boards that contain capacitors/transformers.

2.5 BROKEN OR DUMPED MATERIAL

Collection facilities shall handle, store and dispose of end-of-life electrical and electronic equipment that is broken on-site or dumped in the immediate vicinity of the facility in accordance with this Standard.