



European and
International Circular Economy
standardization initiatives for
electrical and electronic
products and systems

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IEC ACEA Chair

CEN-CLC SABE CE-TG Leader

Workshop “*Desarrollo de un concepto
para promover los servicios del SICAL
para la Economía Circular*”

Online, 12 April 2023

ACEA Advisory Committee on
Environmental Aspects



International
Electrotechnical
Commission

Circular Economy is leading to new legislations globally

Royal backing

[UPDATED] The Queen's Speech: "Environmental principles will be enshrined in law"

Circular Economy, Environment and Energy, Legislation and Regulation, Policy and Strategy
14th October 2019



Right to repair rules



EU brings in 'right to repair' rules for appliances

By Roger Handberg
BBC environment analyst
1 October 2019
Climate change



European Green Deal



ESPR - Ecodesign requirements for sustainable products regulation (proposal)



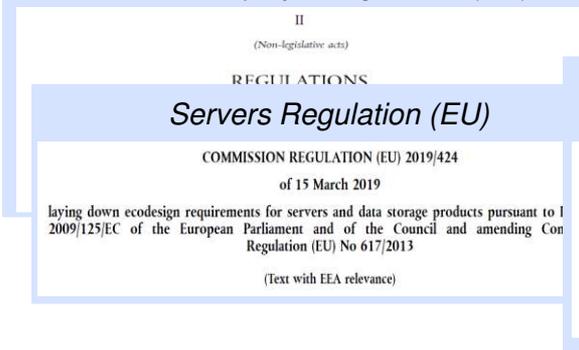
Circular Economy Promotion Law (China)



Carbon taxation



Electronic Displays Regulation (EU)



Mobile Phones Draft Regulation (EU)



ESRS



Landscape of leading Standard Development Organizations (SDOs)

Broad Scope

EEE Sector

Telecom

International SDOs

(>300 TCs)



(>100 TCs)



European SDOs



National SDOs



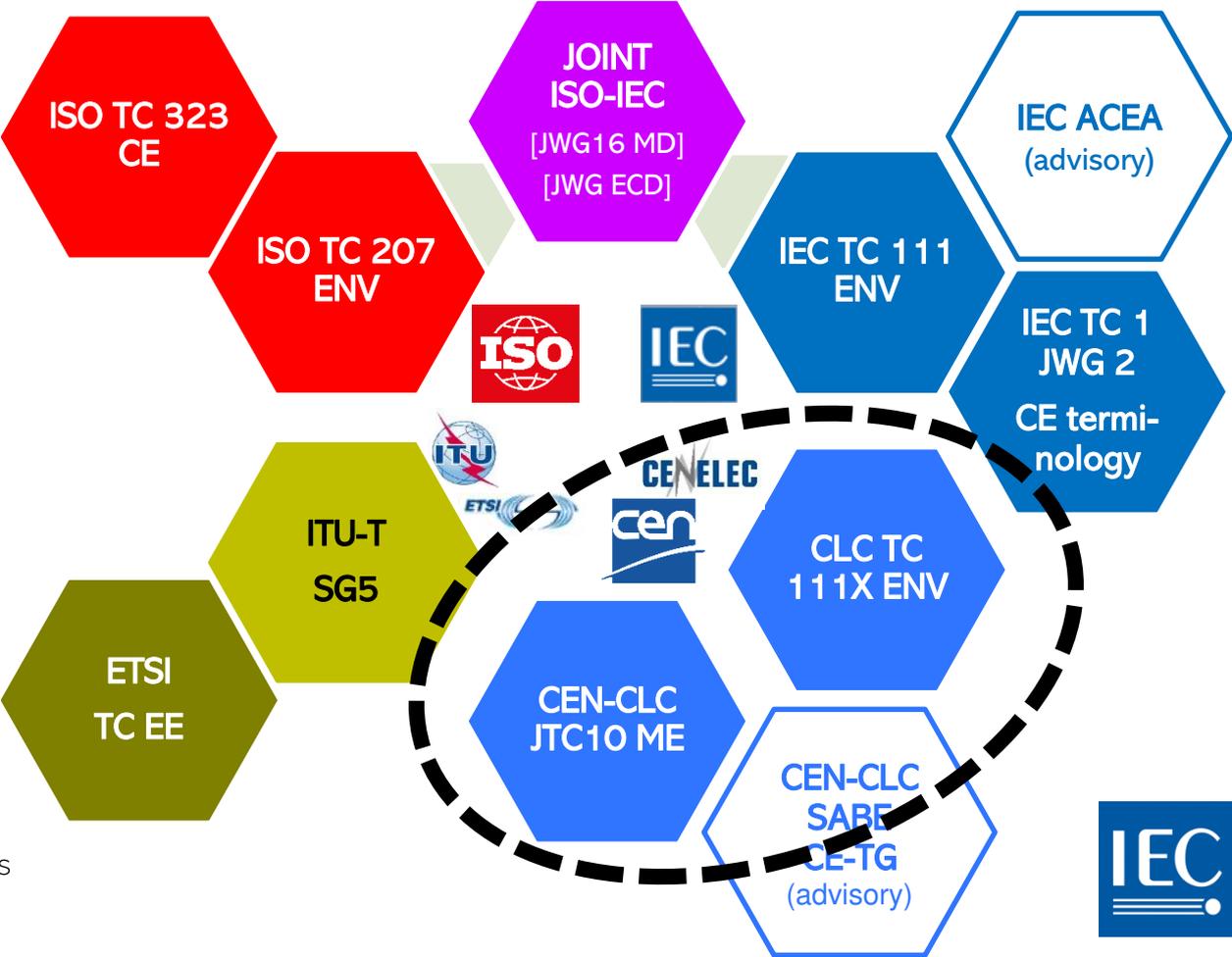
bsi.



and many more...



SDOs developing Circular Economy, Material Efficiency, and Environment Horizontal standards



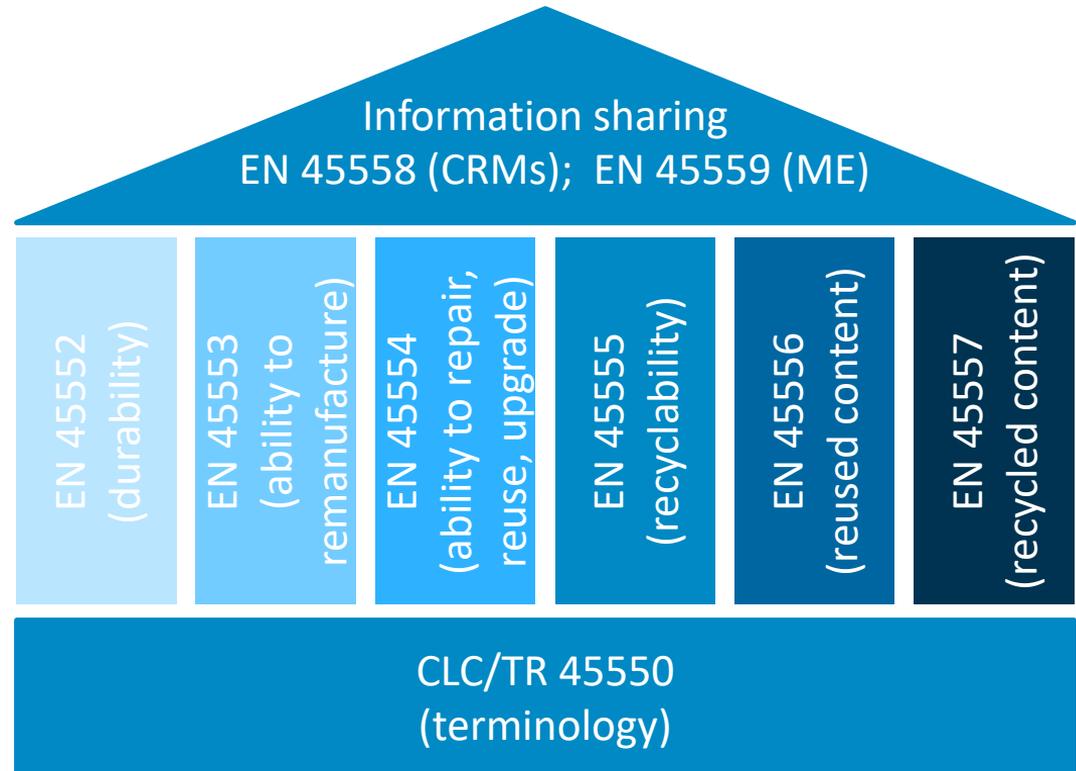
CE: Circular Economy
 ME: Material Efficiency
 ENV: Environment
 MD: Material Declaration
 ECD: Environmentally Conscious Design
 ACEA: Advisory Committee on Environm. Aspects
 SABE: Strategic Advisory Board on Environment

4 CE-TG: Circular Economy Topic Group



CEN-CLC JTC10 – Energy-related products - Material Efficiency Aspects for Ecodesign (2015)

- JTC10 created to address European standardization request M/543
- Scope: Energy related Products (ErP)
- Nine Deliverables:
 - 6x **generic assessment standards** ('ability to'...)
 - 2x Information sharing
 - 1x Terminology



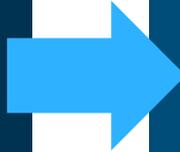
European
EcoDesign
Directive's
Material
Efficiency
requirements
addressed in
the recent
years

Requirement Product	Durability	Repairability/ Refurbishment	Recyclability	Reusability of components	Consumables & information
Commercial refrigerators		spare parts minimum availability + spare parts replaceable with the use of commonly available tools + <i>access to repair and maintenance information</i> + Maximum delivery time for spare parts	Removability of components + product specific provisions		
Dishwashers					
Domestic refrigerators					
Electronic displays					
Washing machines					
Welding equipment					
Light sources	<i>L70B50 lifetime for LED and OLED light sources</i>		Removability of components		
Servers and data storage products		- firmware - disassemblability of key components	<i>Weight range of cobalt in the batteries and Neodymium in the hard disks</i>	availability of a functionality for secure data deletion	
Smart phones & Tablets	physical and SW/FW reliability	Repairability and disassemblability	<i>Weight range of cobalt in batteries neodymium /HHD Tantalum/capacit. gold / all parts</i>	Preparation for reuse	Info on environmental impact
PV panels	yes	yes	yes		Ecological profile

*under
preparation*



- JTC 10 scope
 - on Energy related products (linked to EcoDesign Directive)
 - Topics listed in M/543 with focus on assessment
- Assessment standards (EN 45552-45557)
 - Inform on the ability (provide an ‘easy or difficult’) feedback
 - Toolbox to develop product standards
 - Do not offer help to improve the products



1. Proposal to start developing a standard on Circular product design
2. Ecodesign directive review started (broader product scope)



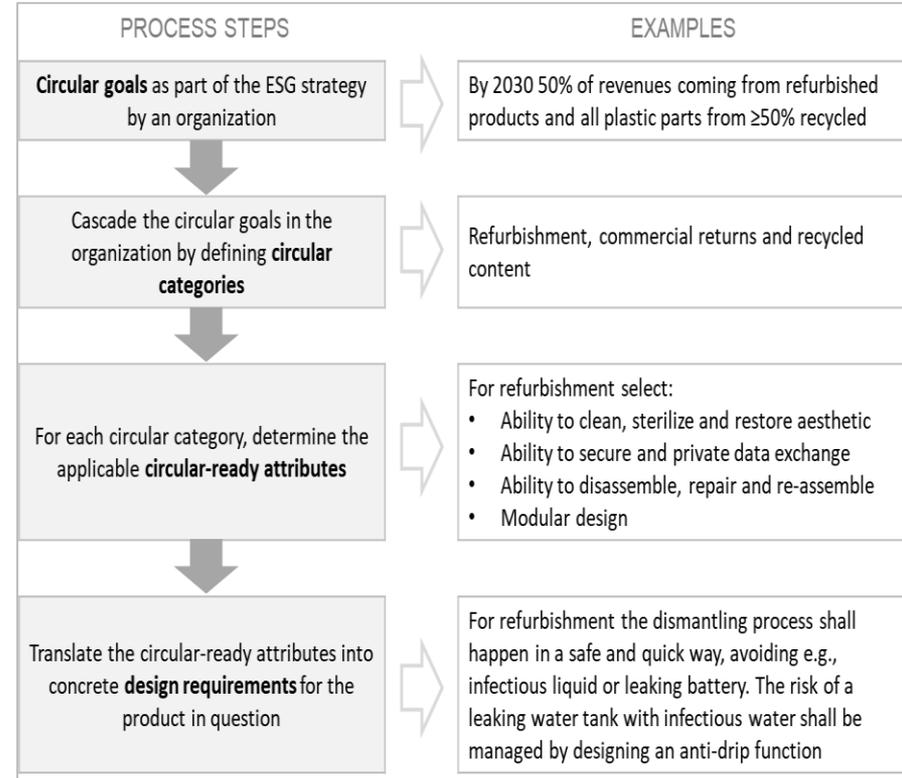
JTC 10's scope was broadened:

- New scope: Material efficiency aspects for products in scope of the Ecodesign Directive and its future revisions.
- Includes now aspects such as design rules, digitalization, transfer of information, etc.

CEN-CLC JTC10 – Material efficiency aspects for products in scope of Ecodesign legislation (2020)

EN 45560 (under dev.) – *Method to achieve circular designs of products*

- method to define circular products design rules
- requirements and guidance for integrating circularity into the design and development process of products
- focusses on material efficiency
- Makes a link with ECD addressing also environmental aspects during circular product design

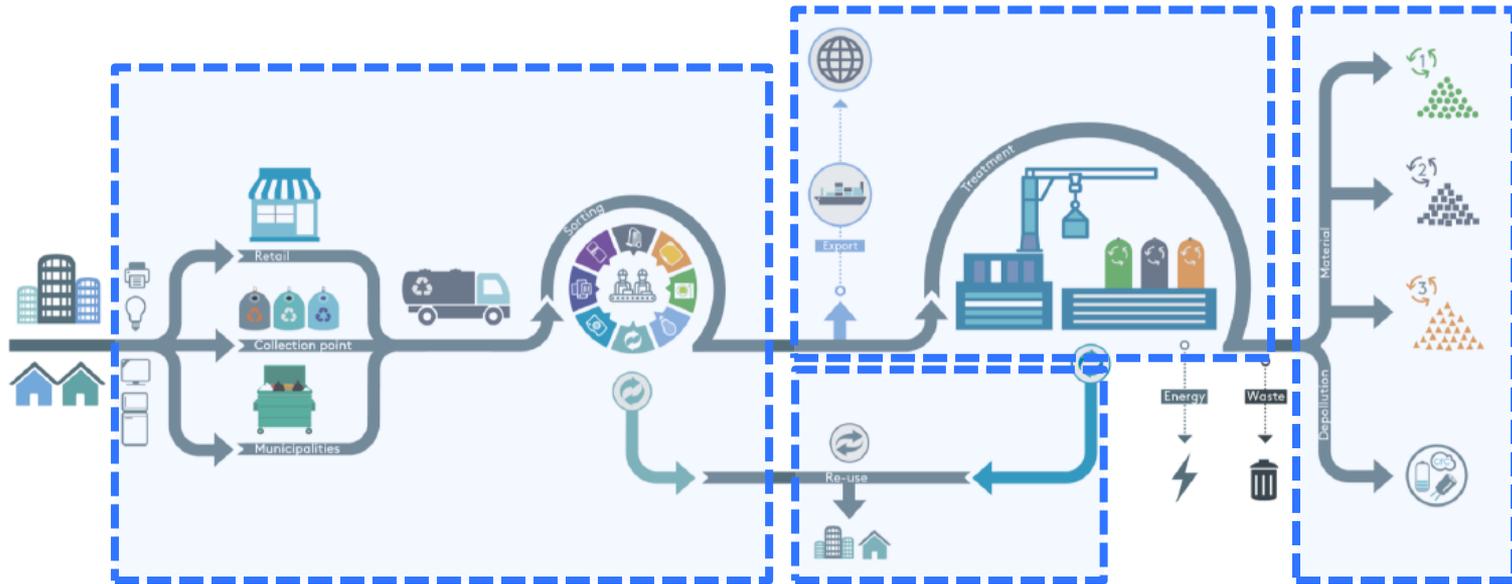


CEN-CLC JTC10 list of published and under development standards

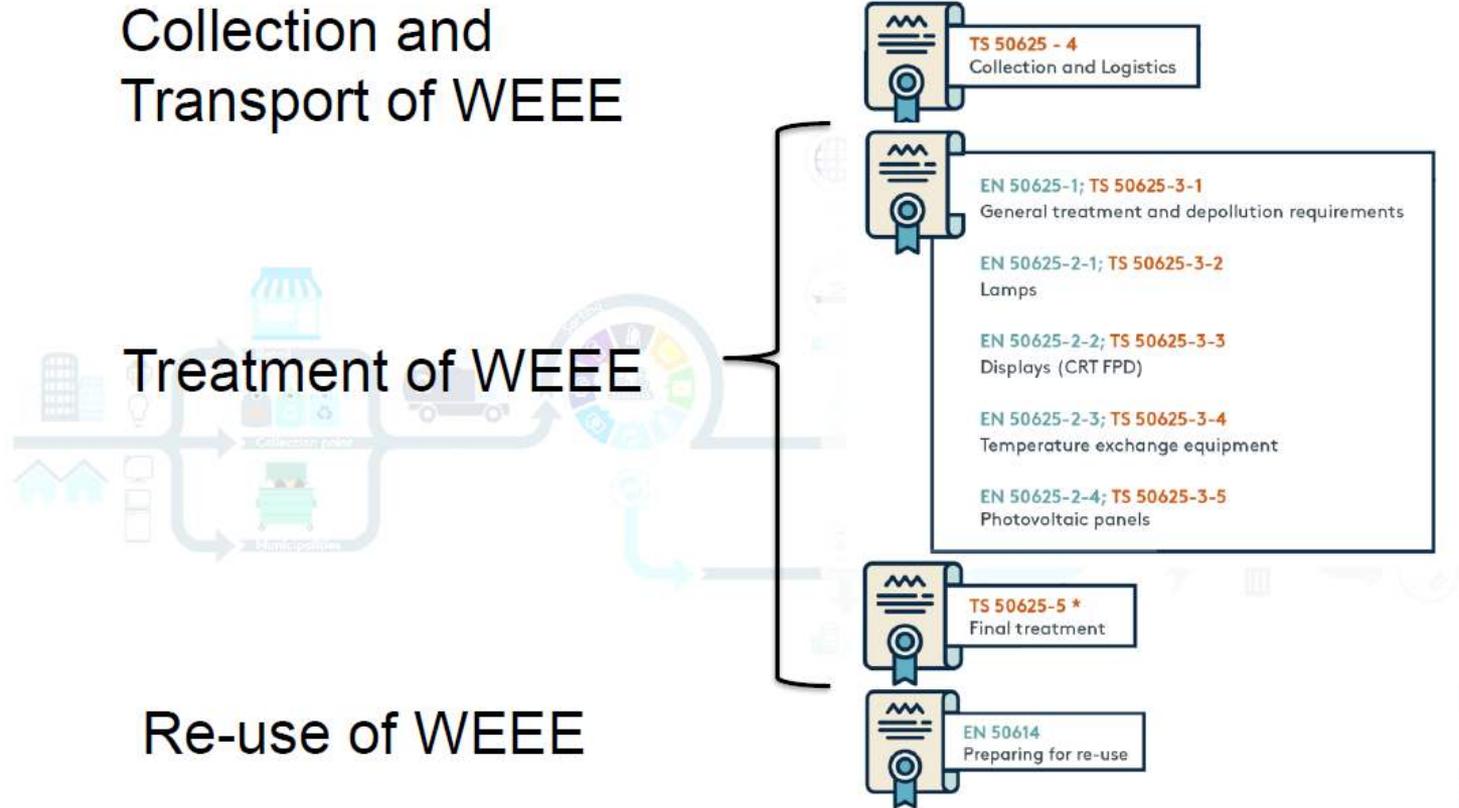
CLC/TR 45550:2020	<i>Terms and Definitions related to material efficiency</i>
EN 45552:2020	<i>General method for the assessment of the durability of ErP</i>
EN 45553:2020	<i>General method for the assessment of the ability to remanufacture ErP</i>
EN 45554:2020	<i>General methods for the assessment of the ability to repair, reuse and upgrade ErP</i>
EN 45555:2019	<i>General methods for assessing the recyclability and recoverability of ErP</i>
EN 45556:2019	<i>General method for assessing the proportion of reused components in ErP</i>
EN 45557:2020	<i>General method for assessing the proportion of recycled content in ErP</i>
EN 45558:2019	<i>General method to declare the use of critical raw materials in ErP</i>
EN 45559:2019	<i>Methods for providing information relating to material efficiency aspects of ErP</i>
EN 45560 (under dev)	<i>Method to achieve circular designs of products</i>
NP soon	Proposal to review EN 45553 to include refurbishing

TC 111 X – Environment – Standards relevant to CE

WEEE standards cover the whole chain of
Collection | Transport | Reuse | Treatment



CLC TC 111X – WEEE standards



CLC TC 111 X – Plastics

- Creation of CLC/TC 111X/WG 12 Design for Plastics Recycling under balloting
- Tasked to drafting a Technical Specification on “Design for Plastics Recycling” to fulfil task 5 of Standardisation Request M/584

5	European standardisation deliverables on design-for-recycling guidelines for electronic and electrical equipment: large appliances- polypropylene (PP) and PS products and parts; small appliances - acrylonitrile butadiene styrene (ABS) products and parts.	2 August 2025
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Standardisation Request M/584



- Packaging
- Agriculture
- Building & Construction
- EEE
- Automotive

Standardization Request to CEN and CENELEC



45 New deliverables



11 Revisions of European Standards



9 Technical Committees



36 Months (deadline August 2025)

Europe CEN and CENELEC - Digital Product Passport under the ESPR

Legal 'architecture' of the DPP in ESPR

There are 3 'milestone' introduced ahead of the full operationalisation of the DPP:

1. Introduction of the **concept**, description of the **scope**, identification of some **key features** already in the ESP Regulation (**art. 2, 8, 9, 11, 12, 13**)
2. Identification of **essential technical requirements** to be developed through standardisation process. A safety clause is introduced in case of delays or quality of the standards not 'fit for purpose'. In such case the Commission shall adopt **common specifications** with the technical requirements needed (**art. 10, 35**).
3. Identification of the **specific information** to be included in the DPP for each product regulated when developing the corresponding Delegated Act (**art. 7, Annex III**)

ESPR – Ecodesign Sustainable Product Regulation

- Standardization request under preparation to cover Digital Product Passport
- First standards will focus on “Identifiers”

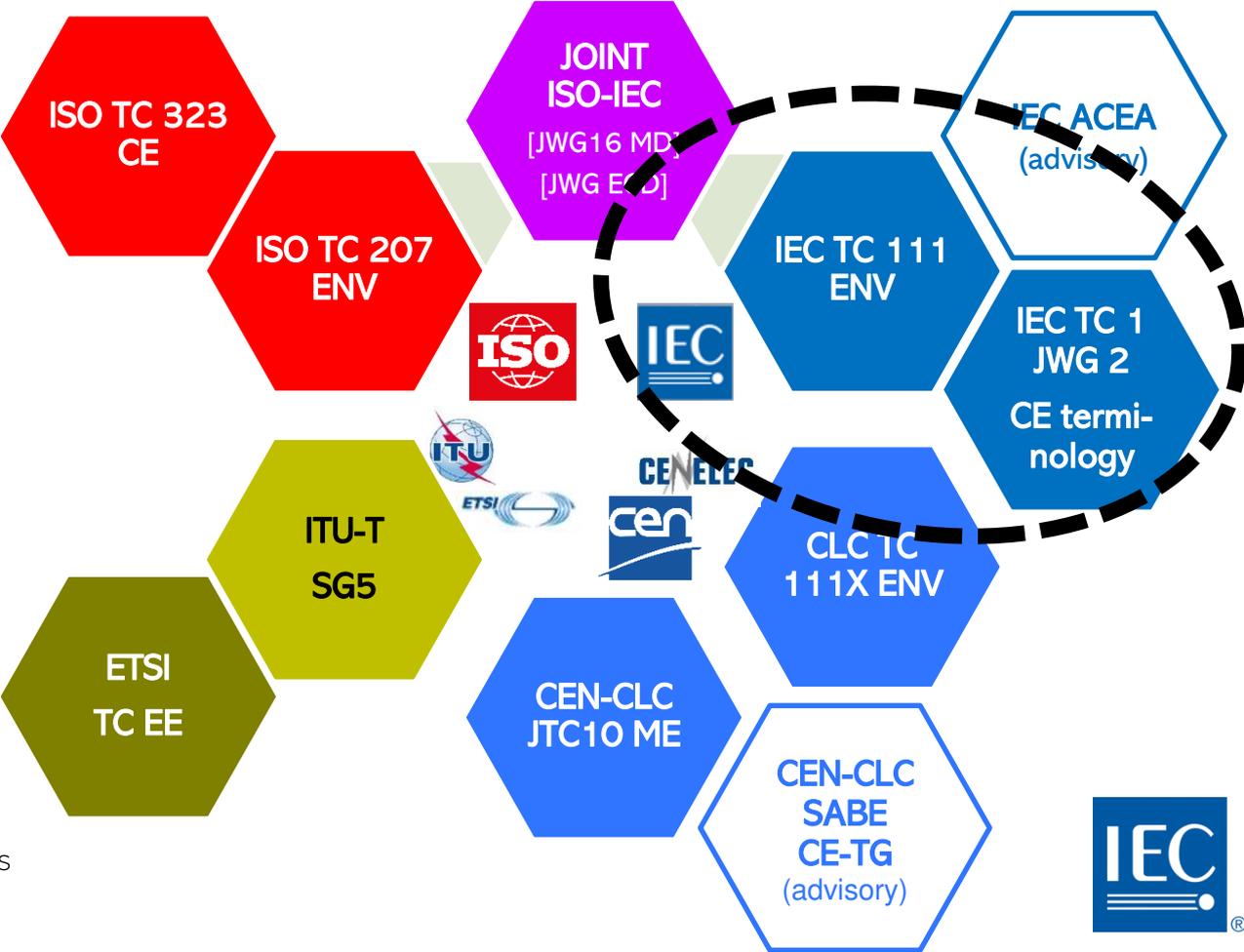
Why DPP in ESPR

The ESPR Impact Assessment clearly indicated that some of the problems hindering more **circularity** of our economy and higher **environmental sustainability** of the products placed on the market are connected to lack of consistent access to relevant information, where the relevancy is a function of different stakeholders' interest

The Digital Product Passport (DPP) is a tool designed to address this problem. In particular:

- It will exploit the great potential that digital solutions provide to collect, organise, and store information in efficient and secure ways
- It will include **product-specific** information relevant to promote circularity, sustainability and related legal compliance.
- The final objective is for the DPP to become the “**one entry point**” to have access to all existing information related to a product during its entire life cycle

SDOs developing Circular Economy, Material Efficiency, and Environment Horizontal standards



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IEC TC 111 – Environmental standardization for electrical and electronic products and systems

- Prepare horizontal (basic and generic) standards and other standardization deliverables (e.g. TS, TR)
- Cooperation with IEC product committees and ACEA to ensure consistency in IEC Standards
- Monitor regional standardization and regulatory activities to become focal point for discussion
- Environmental issues in EEE addressed:
 - Chemical substances management
 - Environmentally conscious design (ECD)
 - Life cycle evaluation of greenhouse gas (GHG) emissions
 - Circular economy, incl. waste management
 - Environmental performance assessment of products

- Established in Oct 2004
- Countries: 28 members and 10 observers
- TC 111 Officers:
 - Secr.: A. Sturchio (IT)
 - Assist. Secr.: A. Legnani (IT)
 - Vice-Chair: M. Takenaka (JP)
 - Chair: vacant
- Experts: 251 from 37 countries
- Liaisons: 23 IEC, 10 ISO, 4 Other (ECMA, ECOS, IAEG, FEICA) (incl. WG Liaison)
- Publications: 27
- Active groups: 15

TC 111 standards relevant to circular economy – Substances and materials in products (incl. circularity related) data sharing

IEC 62474:2018 (Ed.2) – *Material declaration for products of and for the electrotechnical industry*

- Defines requirements for reporting the substances and materials used in electronic and electrical products
- Composed a written standard plus a Database standard (list of regulated substances applicable to EEE)
- Substances Database updated on a regular basis. Free access at <http://std.iec.ch/iec62474/iec62474.nsf/>



ISO-IEC 82474-1 (under dev.) – Material declaration for products (Linked to ISO TC 207/SC1)

- Defines requirements for reporting substances and materials used in any type of product,
- Includes circularity information, such as:
 - (total) recycled content, pre-consumer and post-consumer recycled content
 - renewed content
 - reused content

Composed a written standard plus a Database standard. Provides format for substances lists. Lists themselves to be owned by specific sector

TC 111 standards relevant to circular economy – Material efficiency, circularity and ECD

IEC TR 62874:2016 – *Guidance on material efficiency considerations in environmentally conscious design of electrical and electronic products*

- Support Ecodesign
- Focus on optimal and efficient use of materials in products
- Target audience: designers and developers of EE products and their supply chain

IEC 62430:2019: *Environmentally conscious design – Principles, requirements and Guidance*

- Standard developed together with ISO TC 207 (ISO and IEC Dual Logo)
- Applicable to any product (incl. services,



IEC/TS 63428 (under dev.) – *Guidance on material circularity considerations in environmental conscious design*

- Support organisations to embed material circularity aspects into the design and development of products
- Applicable to any electrotechnical products

TC 111 standards relevant to circular economy – End-of-life mgm.

IEC/TR 62635: 2012 – *Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment*

- Support recyclers to safely recycle and improve their recycling processes
- Common method for calculating recyclability and recoverability rates
- Approach for exchange of information on end-of-life scenarios between EEE manufacturers and recyclers
- **NEW:** This document is undergoing NP ballot to be reviewed and uplifted to an IS

IEC 63395 (under dev.): *Sustainable management of waste electrical and electronic equipment (e-waste)*

- WG 18 established 2021
- Specifies the requirements for the sustainable management of waste electrical and electronic equipment



e-tech
News & views from the IEC

Categories ▾ Issues

A global effort against e-waste

By Natalie Mouyal, 24 June 2021

<https://www.iec.ch/blog/iec-efforts-curb-e-waste>

TC 111 standards relevant to circular economy – Reuse

IEC 63333 (under dev.) – *General method for assessing the proportion of reused components in products*

- The standard proposes methods to assess the proportion of reused components in products
- Four calculation methods based on mass of reused components and the number of reused components are proposed
- Intended to be used by manufacturers that want to declare the reused content in their products.
- This document is based on the European EN 45556:2019, which is part of a family of publications developed by the European CEN-CLC JTC10



		111/655/CDV	
COMMITTEE DRAFT FOR VOTE (CDV)			
PROJECT NUMBER: IEC 63333 ED1			
DATE OF CIRCULATION: 2022-05-06		CLOSING DATE FOR VOTING: 2022-07-29	
SUPERSEDED DOCUMENTS: 111/615/CD, 111/652A/CC			
IEC TC 111 : ENVIRONMENTAL STANDARDIZATION FOR ELECTRICAL AND ELECTRONIC PRODUCTS AND SYSTEMS			
SECRETARIAT: Italy	SECRETARY: Mr Marco Iadevaia		
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 2, TC 9, TC 18, TC 20, TC 21, TC 23, TC 34, SC 34D, TC 59, TC 62, SC 85B, TC 80, TC 82, TC 88, TC 100, TC 110, TC 121, TC 124, TC 125, ACEA	PROPOSED HORIZONTAL STANDARD: <input checked="" type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.		
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input checked="" type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY			
<input type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING		<input checked="" type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING	
This document is still under study and subject to change. It should not be used for reference purposes. Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.			
Title: General method for assessing the proportion of reused components in products			
PROPOSED STABILITY DATE: 2025			
NOTE FROM TC/SC OFFICERS:			

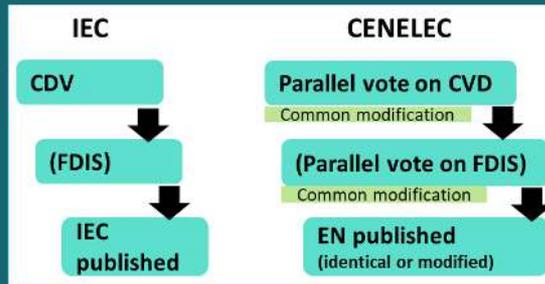
Frankfurt and Vienna Agreements



Frankfurt Agreement: ↔

- Commitment by IEC & CLC to undertake work primarily at International level
- Three modalities possible:
 - Common planning of NWI (prio IEC)
 - Conversion of European Standards into International Standards
 - Parallel voting with possibility to adapt to European needs (common modifications)

IEC handles the full text and CLC publishes foreword & common modifications



Vienna Agreement: ↔

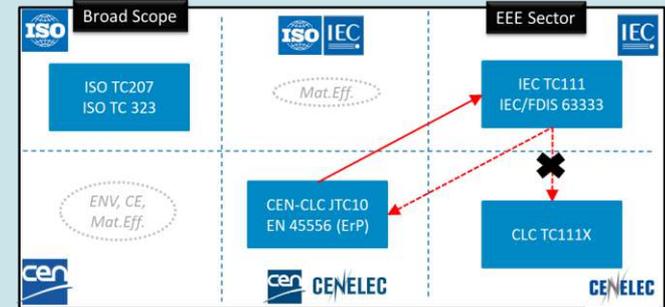
- Agreement between ISO & CEN:
 - cooperation betw. CEN/ISO TCs
 - allows (parallel) development of identical European and International standards by establishing consensus at the drafting phase only once
- ISO and CEN can also adopt each others published standards by submitting them to their own adoption procedures

EU standards going international

EN 45556 (reused content) was mistakenly offered to TC 111 to become an international standard

Challenges:

- Frankfurt and Vienna agreements don't apply to joint CEN-CLC standards (!)
- There is no joint committee in ISO and IEC equivalent to JTC 10 to receive a JTC10 std
- Mismatch of product scope of EN 45556 (ErP) vs. IEC (EEE)



After much discussion:

- EN 45556 was formally offered to IEC
- NP approved;
- IEC 63333 developed as copycat of EN 45556 (FDIS)
- When published will be offered back to JTC10 and, if approved, IEC/EN 63333 will replace EN 45556

IEC TC 1 / JWG 2 – To develop a new IEV part on circular economy and material efficiency

<https://www.electropedia.org/>

IEC 60050 – 193 (under dev.) – *International Electrotechnical Vocabulary (IEV) – Part 193: Circular economy and material efficiency*

- Electropedia (or IEV Online) is the World's Online Electrotechnical Vocabulary
- IEV part 193 will contain terms, definitions and concept diagrams linked to circular economy and material efficiency
- IEC TC 1 / JWG 2 is a joint working group developing IEV part 193
- First ballot expected end of 2023

International Electrotechnical Commission

Queries, comments, suggestions? Please [contact us](#).

Electropedia: The World's Online Electrotechnical Vocabulary

Query: Language: Subject area:

Search also in definitions Numbers correspond to table below

Electropedia is produced by the [IEC](#), the world's leading organization that prepares and publishes International Standards for all electrical, electronic and related technologies – collectively known as “[electrotechnology](#)”. Electropedia (also known as the “IEV Online”) contains all the terms and definitions in the International Electrotechnical Vocabulary or IEV which is published also as a set of publications in the IEC 60050 series that can be ordered separately from the [IEC webstore](#).

Electropedia is the world's most comprehensive online terminology database on “electrotechnology”, containing more than 22 000 terminological entries in **English** and **French** organized by subject area, with equivalent terms in various other languages: **Arabic, Chinese, Czech, Dutch (Belgian), Finnish, German, Italian, Japanese, Korean, Mongolian, Norwegian (Bokmål and Nynorsk), Polish, Portuguese, Russian, Serbian, Slovenian, Spanish and Swedish** (coverage varies by subject area).

The world's experts in electrotechnical terminology work to produce Electropedia under the responsibility of IEC [Technical Committee 1](#) (Terminology), one of the 204 IEC [Technical Committees and Subcommittees](#).

Subject areas - Click on title for list of terms

102 Mathematics - General concepts and linear algebra	601 Generation, transmission and distribution of electricity - General
103 Mathematics - Functions	602 Generation, transmission and distribution of electricity - Generation
112 Quantities and units	603 Generation, transmission and distribution of electricity - Power systems planning and management
113 Physics for electrotechnology	605 Generation, transmission and distribution of electricity - Substations
114 Electrochemistry	614 Generation, transmission and distribution of electricity - Operation
121 Electromagnetism	617 Organization/Market of electricity
131 Circuit theory	651 Live working
141 Polyphase systems and circuits	691 Tariffs for electricity
151 Electrical and magnetic devices	692 Generation, transmission and distribution of electrical energy – Dependability and quality of service of electric power systems
161 Electromagnetic compatibility	701 Telecommunications, channels and networks
171 Digital technology – Fundamental concepts	702 Oscillations, signals and related devices
192 Dependability	
195 Earthing and protection against electric shock	
212 Electrical insulating solids, liquids and gases	
221 Magnetic materials and components	
311 Electrical and electronic measurements - General terms relating to measurements	

CE & ME International Standard. landscape

- final approval / published
- under development

SDO	Type	TC	Topic	Publication specifics
	Horizontal	111	● IEC TR 62635 EoL & recyclability rate calculation	Assessment
		111	● IEC TR 62824 Material efficiency considerations in ECD	Basic concepts, terms
		111	● IEC TR/WD Material circularity considerations in ECD	Basic concepts
		111	● IEC/CD 63333 Proportion of reused components (≡ EN 45556)	Assessment method
		56	● IEC 62309 Dependability of products with reused parts	Requirement
		56	● IEC 62402 Obsolescence management	Requirement, guidance
		1	● JWG2 develop circular economy and material efficiency terminology	Terminology
	Product	2	● IEC 60034-23 Rotating electrical machines - Repair, overhaul...	Requirement
		62	● IEC 63077 Refurbishment medical imaging equipment	Requirement
		62	● IEC/CDV 63120 Refurbishment medical electrical equipment	Requirement
	Dual-Logo	111/207	● (ISO/IEC) IEC 62430 Environmentally conscious design (ECD)	Requirement/Guidance
		111/207	● (ISO/IEC) IEC/WD 82474-1 – Material Declaration	Requirement; cross-sect
	MS / Generic	207	● ISO 14009 EMS – Material circulation in design & development	Basic concepts, guidance
		207/323	● ISO/CD Secondary Materials - Principles, sustainability & traceability	Basic concepts, guidance
		323	● ISO/CDV 59004 CE – Framework and principles for implementation	Terms, guidance
		323	● ISO/CDV 59010 CE – Guidelines on business models and value chains	Basic concepts, guidance
		323	● ISO/CDV 59020 CE – Measuring circularity framework	Assessment, guidance
		323	● ISO/CD TR 59031 CE – Performance-based approach – cases studies	Use case studies
		323	● ISO/CD 59040 CE – Product Circularity Data Sheet	Requirements
	ICT	ITU-T	<ul style="list-style-type: none"> ● L.1023 (09/20) Assessment method for circular scoring ● L.1022 (10/19) CE - Definitions and concepts for ME for ICT 	<ul style="list-style-type: none"> Assessment Terminology



CE & ME standard. landscape in Europe

- final approval / published
- under development
- under preparation

SDO	Type	TC	Topic	Publication specifics
 	Generic/ Horizontal	JTC10	<ul style="list-style-type: none"> ● CLC/TR 45550 Terms and Definitions related to material efficiency ● EN 45552 Method to assess of the durability of ErP ● EN 45553 Method to assess of the ability to remanufacture ErP ● EN 45554 Method to assess the ability to repair, reuse & upgrade ErP ● EN 45555 Method to assess the recyclability and recoverability of ErP ● EN 45556 Method to assess proportion of reused components in ErP ● EN 45557 Method to assess the proportion of recycled content in ErP ● EN 45558 Method to declare the use of critical raw materials in ErP ● EN 45559 Method for providing information on ME aspects of ErP ● EN 45556 Method to Method to achieve circular designs of products 	Terminology Assessment method Assessment method Assessment method Assessment method Assessment method Assessment method Use dclaration requirem. Communication requir. Prod. Design requirem.
  	Product	varia	<ul style="list-style-type: none"> ● ETSI TR 103476 CE in ICT - Definitions, concepts and metrics ● Circular design of fishing gears ● Servers – group of standards on ME aspects like firmware update, data deletion, repair, upgrade, disassembly, and CRMs ● Displays – group of standards on ME aspects like repair, reuse, dismantling, recycling, halogen-FR free parts, etc. ● Household appliances – group of standards on ME aspects like 	Terms, metrics, guidance Requirements, guidance Requirements, guidance Requirements, guidance Requirements, guidance
	National	BSI	<ul style="list-style-type: none"> ● BS 8001 - Framework for implementing the principles of the CE in organizations - Guide 	Principles, guidance



Questions?

ACEA Advisory Committee on
Environmental Aspects

IEC International
Electrotechnical
Commission