

D1.5 – Standards initial situation

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Authors	Claudia Laabs, DIN (Task 1.5 Leader)
Contributors	LUREDERRA, MINERALI, BIOMI, NTUA, NTT, ARIÑO, MET, AMTE, LENZ
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List of acronyms

AFNOR	French standardization association
AMD	Amendment
AWI	Approved work item
BSI	British standards institution
CCMC	CEN-CENELEC management centre
CD	Committee draft
CEN	European committee for standardization
CENELEC (CLC)	European committee for electrotechnical standardization
CWA	CEN/CENELEC workshop agreement
DIN	German institute for standardization
DKE	German commission for electrical, electronic & information technologies of DIN and VDE
DIS	Draft international standard
DTS	Draft technical specification
EN	European standard
ESO	European standardization organizations
ETSI	European telecommunications standards institute
EU	European union
FDIS	Final draft international standard

ISO	International organization for standardization
IEC	International electrotechnical commission
ITU	International telecommunication union
IWA	International workshop agreement
JTC	Joint technical committee
NWI	New work item
prEN	Draft European standard
PVB	Polyvinyl butyral
PWI	Preliminary work item
re-PVB	Recycled polyvinyl butyral
SC	Subcommittee
TC	Technical committee
TR	Technical report
TS	Technical specification
WD	Working draft
WG	Working group
WI	Work item
WS	Workshop (e.g. to draft a CWA)

1 Executive Summary

This deliverable reports on the research and analysis of standardization activities in the field of polyvinyl butyral (PVB) recycling. It belongs to Work Package 1 “Fine definition of industrial specifications” and shows the results of task T1.5 “Analysis of existing standards, standards under development and further standardization activities”.

There are standardization activities on the European and international level that are of relevance when looking at PVB recycling. Test methods regarding plastic properties in general are specified by the European and international technical committees on “Plastics” (ISO/TC 61, CEN/TC 249). For each of the intended uses for re-PVB there are separate technical committees of relevance: “Glass in building” (CEN/TC 129, ISO/TC 160), “Solar photovoltaic energy systems” (CLC/TC 82, IEC/TC 82), “Textiles and textile products” (CEN/TC 248, ISO/TC 38), “Floor coverings” (CEN/TC 134, ISO/TC 219), “Secondary cells and batteries” (CLC/TC 21X, IEC/TC 21), “Electrical systems for electric road vehicles” (CLC/TC 69X, IEC/TC 69). These activities and the fact that DIN (German Institute for Standardization), as a standardization body, is part of these activities will allow an easier transfer of project results into standards under development or to give input to already existing standards to the respective technical standardization committees.

Outputs from the SUNRISE project should be compatible with the state-of-the-art in the field of PVB recycling, which is presented by standards and standardization documents. Thus, relevant documents for the envisaged SUNRISE activities and innovations were searched and assessed during this task. The list of standardization documents builds the basis for the upcoming activities in Task 8.6 “Standardization Activities” and it supports the implementation of the activities of the other work packages. As it shows the current state-of-the-art, this standards database will be the basis to identify standardization gaps that might be filled in by SUNRISE results. The identification of gaps and the standardization potentials within SUNRISE will be analysed in Task 8.6.

This report is structured into two main chapters: Chapter 2 – “Fundamentals of standardization” gives a summary of the fundamentals of standardization: Types of documents, the levels of standardization, the development of standards and the various possibilities of participation in the process of standardization are explained. Chapter 3 – “Research and analysis of current standardization activities in the field of PVB recycling” contains an overview of relevant technical committees and their scopes on international and European level and the result of the standardization research in form of a Table listing standards relevant to the SUNRISE project. In Annex I to III additional information on the keywords for the standards research, relevant ICS classes, and ISO stage codes are given.

2 Fundamentals of standardization

2.1 Benefits of standards and standardization organizations

A standard is a consensus-based technical document that provides rules, guidelines or characteristics for activities or their results, reflecting the state-of-the-art. It should be based on the consolidated results of science, technology and experience, aiming at the promotion of the optimum community benefits.¹

The application of standards has many positive benefits for a range of stakeholders, such as consumers, enterprises, policy makers, researchers, and innovators:²

- Standards enhance the safety of products
- Standards promote the interoperability of products and services
- Standards facilitate trade by diminishing trade barriers
- Standards promote common understanding
- Standards support environmental sustainability

¹ CEN, “What is a standard”, <https://www.cen.eu/work/ENdev/whatisEN/Pages/default.aspx>, accessed 16 August 2021 and DIN, “A brief introduction to standards”, <https://www.din.de/en/about-standards/a-brief-introduction-to-standards>, accessed 16 August 2021; The formal definition of a standard by ISO and IEC, https://www.iso.org/sites/ConsumersStandards/1_standards.html, accessed 16 August 2021

² CEN, Information leaflet: “CEN Compass - The world of European Standards”, <https://www.cen.eu/news/brochures/brochures/Compass.pdf>, accessed 16 August 2021 and European Commission, “Benefits of standards”, https://ec.europa.eu/growth/single-market/european-standards/policy/benefits_en, accessed 16 August 2021.

- Standards facilitate the uptake of innovation in the marketplace
- Standards reflect the outcome of research and development

There are several ways to standardization on international, European and national level. In this section, a brief overview of these opportunities is given.

There are three official standardization organizations on the international level: The International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), and the International Telecommunication Union (ITU). They work on international standardization issues, which can be addressed to them directly or via the European or national standardization bodies. On the European level, the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunication Standards Institute (ETSI) are in charge of the standardization work. On national level many standardization organizations exist. Some countries have more than one organization, some of them are financed by the government, and some are independent. They all work together under the roof of the European and the international standardization bodies.

The focus of this report lies on the international and European standardization work, due to SUNRISE being a European funded project and due to the fact that the standardization work is accumulating on the international level.

2.2 Types of standards

2.2.1 Classification of standards

In general, a standard is a technical document that defines requirements for products, services or processes. There are, however, differences with regard to their creation. Figure 1 shows different types of standardization documents depending on the development time and degree of consensus.

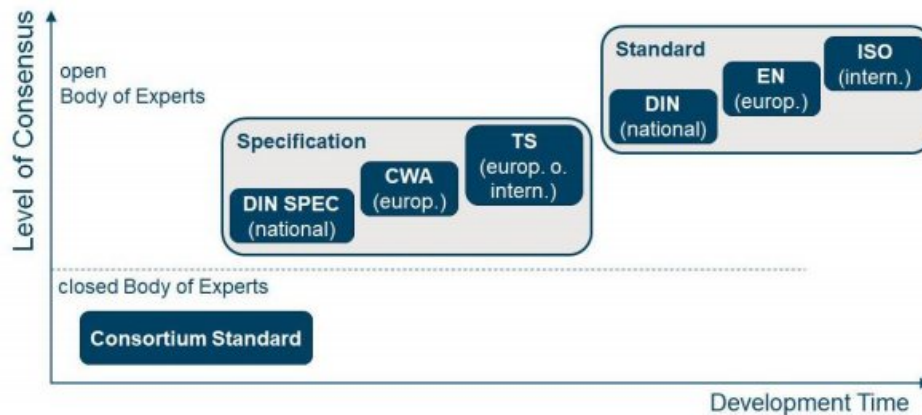


Figure 1 – Examples of different types of standardization documents

2.2.2 Consortium standard

Consortium standards are usually developed by a closed circle of experts. One of the characteristics of these standards is that not all interested parties are involved in the drafting process. The closed body of experts can, for example, be an industry-specific consortium formed by one or various companies. Although these documents have some characteristics of a standard, such as defined procedures or documentation rules, consortium standards are often not freely accessible and are developed in private.

2.2.3 Standard

The work of standardization organizations such as ISO/IEC, CEN-CENELEC and DIN focuses entirely on the transparent development of standardization documents involving an open body of experts. According to EN 45020 a standard is defined as:

"A document, established by consensus and approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context."

Consensus in this case means the general agreement of all interested parties, characterized by the absence of sustained opposition to key content. The core objective of consensus is to take into account the views of all interested parties concerned and to eliminate any counterarguments.

It is important to clarify that there are various types of existing standards, focusing on different topics of interest; e.g. related to terminology or to testing. In EN 45020 "Standardization and related activities – General vocabulary (ISO/IEC Guide2)" some common types of standards are defined as shown in Table 1.

Table 1 – Types of standards as defined in EN 45020

Type of standard	Characteristics
Basic standard	Wide-ranging coverage or general provisions for one particular field
Terminology standard	Establishes terms and their definitions
Testing standard	Specifies testing methods, sometimes supplemented with other provisions related to testing.
Product standard	Specifies requirements to be fulfilled by a product or a group of products to establish its fitness for purpose.
Process standard	Specifies requirements to be fulfilled by a process to establish its fitness for purpose.
Service standard	Specifies requirements to be fulfilled by a service to establish its fitness for purpose.
Interface standard	Specifies requirements concerned with the compatibility of products and systems at their point of connection.
Standard on data to be provided	Contains a list of characteristics for which values or other data are to be stated for specifying the product, process or service.

2.2.4 Specification

A specification is a document agreed by the participants of a temporary workshop, which is designed to meet an immediate need and form the basis for future standardization activities. The workshop is open to the direct participation of anyone with an interest in the development of the agreement. There is no geographical limit on participation. In other words, stakeholder involvement is limited to those who are directly interested in the topic.

The direct participation of interested parties and the rapid development opportunities offered by a specification are considered to be particularly attractive for research projects which have to deliver results within the duration of their project lifetime. The development of a specification is fast and flexible, on average between 10 and 12 months. Although a specification is developed outside the normal technical body structure, it is important to ensure the coherence of all the standardization documents in order to protect the credibility of international, European and national standardization. A specification does not have the status of a standard. It involves no obligation at national level. A specification shall not conflict with standards.

The different standardization bodies have different names for a specification that is developed by a temporary workshop. ISO calls it IWA (International Workshop Agreement). At European level the specification is named CWA (CEN/CENELEC Workshop Agreement). A national specification by DIN is called DIN SPEC³.

³ DIN, DIN SPEC, <https://www.din.de/en/innovation-and-research/din-spec-en>, accessed 16 August 2021

Specifications can also be developed within standards committees if, for example, the technical content is not mature enough for a standard, yet. These documents are referred to as Technical Specifications⁴ (CEN/TS, ISO/TS).

2.3 Levels of Standardization

2.3.1 Standardization landscape

Every country participating in the European and international standardization world of CEN, CENELEC, ISO and IEC follows the so called delegation principle. National standardization bodies, such as AFNOR in France, DIN in Germany or BSI in the UK send representatives to the European or international standardization committees of CEN, CENELEC, ISO and IEC to represent their national interests (see Figure 2).

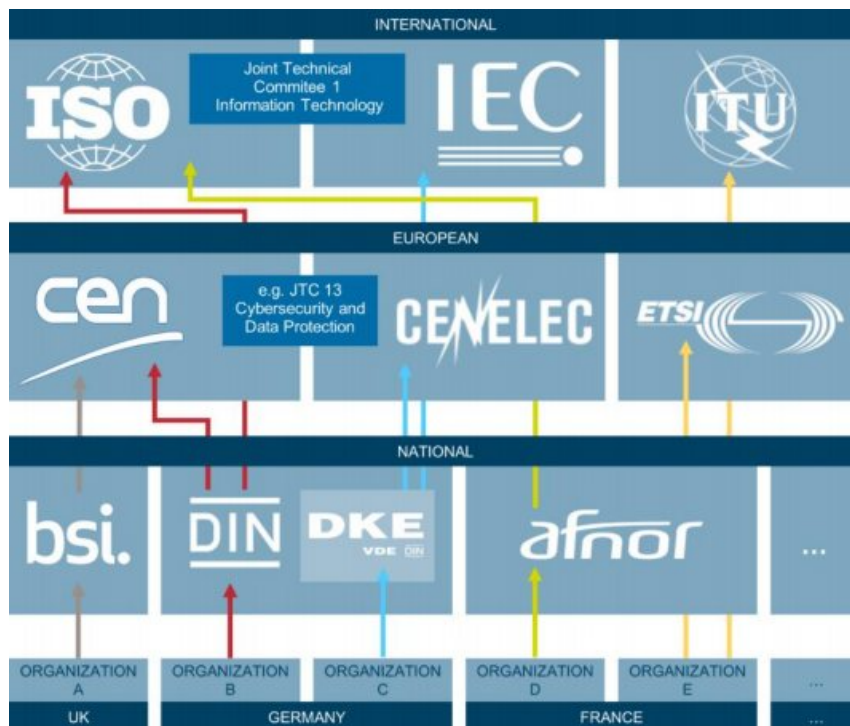


Figure 2 – National, European and international standardization landscape

An important aspect of standardization work is to ensure that the documents do not contradict each other. The importance of European and international standardization has increased noticeably in recent years. For DIN as example, around 90% of all standardization projects are nowadays carried out at European and international level.

Considering the international and European standardization landscape, the Vienna and Frankfurt Agreements are highly relevant. Those agreements between CEN and ISO (Vienna Agreement), CENELEC and IEC (Frankfurt Agreement) have the objective to carry out work at one level of standardization (where possible), and use parallel voting procedures to achieve simultaneous adoption of ISO/IEC standards as European standards (EN)⁵.

⁴ CEN, Technical Specifications, <https://www.cen.eu/work/products/TS/Pages/default.aspx>, accessed 16 August 2021.

⁵ CEN – CENELEC, “International cooperation”, <https://www.cencenelec.eu/intcoop/StandardizationOrg/Pages/default.aspx>, accessed 16 August 2021.

2.3.2 International Standardization Work

The International Organization for Standardization (ISO)⁶ and the International Electrotechnical Commission (IEC)⁷ are the responsible standardization organizations on the global level. The International Telecommunications Union (ITU)⁸ is the United Nations specialized agency in terms of information and telecommunication technologies.

ISO and IEC are made up of the national standardization organizations, with DIN and DKE representing German interests on an international level. The ITU, on the other hand, is a special unit of the United Nations, whose 191 member states develop recommendations together with companies from the private sector and other regional and national organizations. Only when they are adopted by normative organizations such as ISO, ANSI (USA) or ETSI as well as by national regulatory authorities such as the Federal Network Agency in Germany do they acquire the character of standards.

ISO has recognized regional standardization organizations representing Africa, the Arab countries, the area covered by the Commonwealth of Independent States, Europe, Latin America, the Pacific area, and the South-East Asia nations. The national bodies commit themselves to adopt ISO standards unchanged as national standards and to develop deviating standards only when there are no suitable ISO standards that can be adopted nationally⁹. In the case of IEC, similar agreements apply.

2.3.3 European Standardization Work

The main goal of standardization at European level is to harmonize the national standards of the member states of the European Union (EU). This includes on the one hand the uniform transfer of international standards and on the other hand the creation of European standards.

Based on the EU Regulation 1025/2012¹⁰ on European standardization, standards work is carried out by the three European Standardization Organizations (ESO): the European Committee for Standardization (CEN)¹¹, the European Committee for Electrotechnical Standardization (CENELEC)¹² and the European Telecommunication Standards Institute (ETSI)¹³. CEN is responsible for all non-electronic activities and CENELEC for electrotechnical standardization activities. ETSI is responsible for the standardization activities in the field of telecommunications at European level.

CEN and CENELEC members are the 27 European Union countries, 3 countries of the European Free Trade Association (Iceland, Norway and Switzerland), the Republic of North Macedonia, Serbia, Turkey and the United Kingdom. The member countries are represented by their national standardization organization. In addition, there is particularly strong cooperation between CEN and CENELEC. In contrast, the members of ETSI are directly European companies, institutes and organizations.¹⁴

2.3.4 National standardization work

National standardization bodies publish national standards and are members of the European and international standardization bodies. One example is DIN, the national standardization body of Germany.¹⁵ Any organization within Germany can participate in DIN. All incoming requests are reviewed and it is then decided by the corresponding committee whether there is a demand in the affiliated industry, whether European or international standardization

⁶ ISO, <https://www.iso.org/>, accessed 16 August 2021.

⁷ IEC, <https://www.iec.ch/>, accessed 16 August 2021.

⁸ ITU, <https://www.itu.int>, accessed 16 August 2021.

⁹ ISO, "National, regional and international standards and how they relate to regulatory regimes", https://www.iso.org/sites/ConsumersStandards/1_standards.html, accessed 16 August 2021.

¹⁰ EUR-Lex, Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012R1025>, accessed 16 August 2021.

¹¹ CEN, www.cen.eu, accessed 16 August 2021.

¹² CENELEC, www.cenelec.eu, accessed 16 August 2021.

¹³ ETSI, www.etsi.org, accessed 16 August 2021.

¹⁴ CEN, "CEN members", <https://standards.cen.eu/dyn/www/f?p=CENWEB:5>, accessed 16 August 2021, CENELEC, "List of CENELEC national committees (NCs)", <https://www.cenelec.eu/dyn/www/f?p=104:5:2709885002593701>, accessed 16 August 2021 and ETSI, "Membership of ETSI", <https://www.etsi.org/membership>, accessed 16 August 2021.

¹⁵ DIN, <https://www.din.de/en>, accessed 16 August 2021.

activities already exist and on which level the proposed work shall take place. Subjects that are ongoing on the European level will initiate a standstill clause on the national level.

If the document is developed on national level, technical committees (TCs) are responsible for the technical input. TCs are open for participation of any expert. They include members of each interest group such as research, industry and associations.

2.4 Development of standards

2.4.1 Development of an ISO standard

International Standards are developed by ISO (or IEC, for electrotechnical standards) according to the national delegation principle, with each country sending a delegation of experts to represent the national standpoint. This standpoint is developed in national committees that "mirror" the international committees. These mirror committees decide whether or not an international standard should be adopted as a national standard; this is voluntary, in contrast to European standards, which must be adopted nationally.

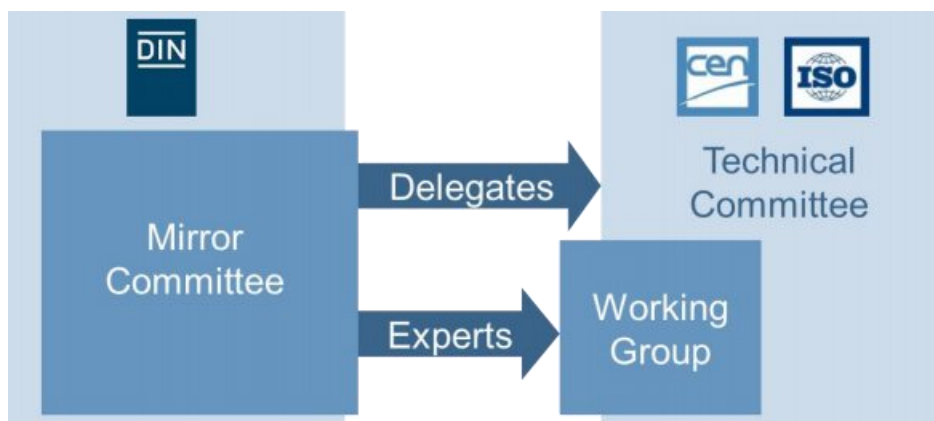


Figure 3 – DIN's involvement in European and international standards committees

International standardization work begins with a "new work item proposal". Such proposals can be submitted by:

- A member of the International Organization for Standardization (ISO), or – in electrotechnical standardization – by a member of the International Electrotechnical Commission (IEC)
- A working body of ISO or IEC
- An international organization that has liaison status
- The Technical Management Board of ISO or IEC
- The ISO or IEC Secretary General

A simple majority of national standardization organizations with an interest in the subject matter is required for the proposal to be approved. In addition, a sufficient number of these organizations must also agree to participate in the work. Only then the proposal will be accepted and the work on the standard can begin. The responsible working group (WG) discusses the subject matter and drafts a working draft (WD). Once all WG members agree on the content, the document is circulated within the responsible technical committee (TC) as committee draft (CD) for a two months voting among the members of the TC. The WG further elaborates the document taking into account the comments received during the CD ballot. The resulting enquiry draft is made available to all ISO or IEC members, who have three months to submit their national standpoint and comments. Anyone may send their comments on this enquiry draft to their national member body. The national mirror committee discusses all comments received and submits the consolidated national viewpoint to ISO.

If the criteria for approval are fulfilled during the voting procedure and no technical changes are made to the enquiry draft, the draft is published as an international standard. In case technical changes are made to the draft during the

resolution of the comments, a final draft is circulated to the ISO or IEC members for a two months approval period. Only editorial comments are allowed during this voting period. Acceptance of the final draft requires a two-thirds majority of all active members participating, and not more than a quarter of all votes may be negative. Ratification of an international standard takes place following positive voting. There is no obligation for national standardization bodies as part of ISO or IEC to adopt international standards as national standards.¹⁶

2.4.2 Development of a European Standard (EN)

European Standards are developed by CEN, CENELEC (for electrotechnical standards) or ETSI (for standards in telecommunications). Work at CEN and CENELEC is based, as on international level, on the national delegation principle: each country sends a delegation of experts to represent the national standpoint in the European committees. This standpoint is developed in national committees that "mirror" the European committees. By taking the secretariat of a European committee, national members can play a leading role in the committee's work. It is often decisive for national interests to be represented at an early stage of the development of a European Standard.

Figure 4 shows the development procedure for a European Standard. European standardization work begins with a proposal for a new work item (NWI), which might come from a member of the European standards organizations (CEN/CENELEC/ETSI), the European Commission, or another European or international organization.

Acceptance of the proposal for a NWI requires for CEN:

- 1) 55 % or more of the votes cast (abstentions not counted) are in favour; and
- 2) the population of the countries of the Members having voted positively reaches 65 % or more of the population of the countries of all Members having voted (abstentions not counted).

Acceptance of the proposal for a NWI requires for CENELEC:

- 1) a simple majority of the votes cast (abstentions not counted) is in favour; and
- 2) 71% or more of the weighted votes cast (abstentions not counted) are in favour.

In addition, a sufficient number of national standardization bodies must agree to participate, after having checked with their stakeholders that there is sufficient need - and sufficient financing - for carrying out the necessary work in the national mirror committees. Only then will the proposal be accepted and work on the standard can begin.

If there is an existing international standard on the subject, it will be adopted unchanged as a European Standard. If this is not the case, the responsible working body will draw up a manuscript for the draft standard (prEN). The draft standard is distributed to the national standardization organizations for commenting in what is called the "public enquiry" stage. National comments are to be submitted within three months. The national mirror committee discusses all comments received and submits the consolidated national standpoint. On the basis of the comments received, the responsible working group can either decide to publish the standard or to draw up and issue a final draft. In a formal vote over a two-month period, the members then decide whether to accept this final draft as a European Standard. There is no public enquiry for the final draft. The acceptance criteria for the approval of the final draft are the same as for the acceptance of a new work item (see above). Ratification of a European Standard takes place following positive voting.

After ratification the European Standard must be adopted unchanged as a national standard by all CEN or CENELEC members and any conflicting national standards must be withdrawn. In addition, a standard that has been developed at international level can be simultaneously adopted as a European Standard by means of parallel voting procedures in accordance with the Vienna Agreement (for ISO standards) or the Frankfurt Agreement (for IEC standards). Such international standards that are adopted as European standards are also to be automatically adopted by the national standards organizations.¹⁷

¹⁶ ISO/IEC Directives, Part 1, Procedures for the technical work, <https://www.iso.org/sites/directives/current/part1/index.xhtml>, accessed 17 August 2021.

¹⁷ DIN, "How are European standards developed", <https://www.din.de/en/about-standards/din-standards>, accessed 17 August 2021, CEN, "Developing a European Standard", <https://www.cen.eu/work/ENdev/how/Pages/default.aspx>, accessed 17 August 2021, CEN – CENELEC, Internal Regulations Part 2, https://boss.cen.eu/media/CEN/ref/ir2_e.pdf, accessed 17 August 2021.

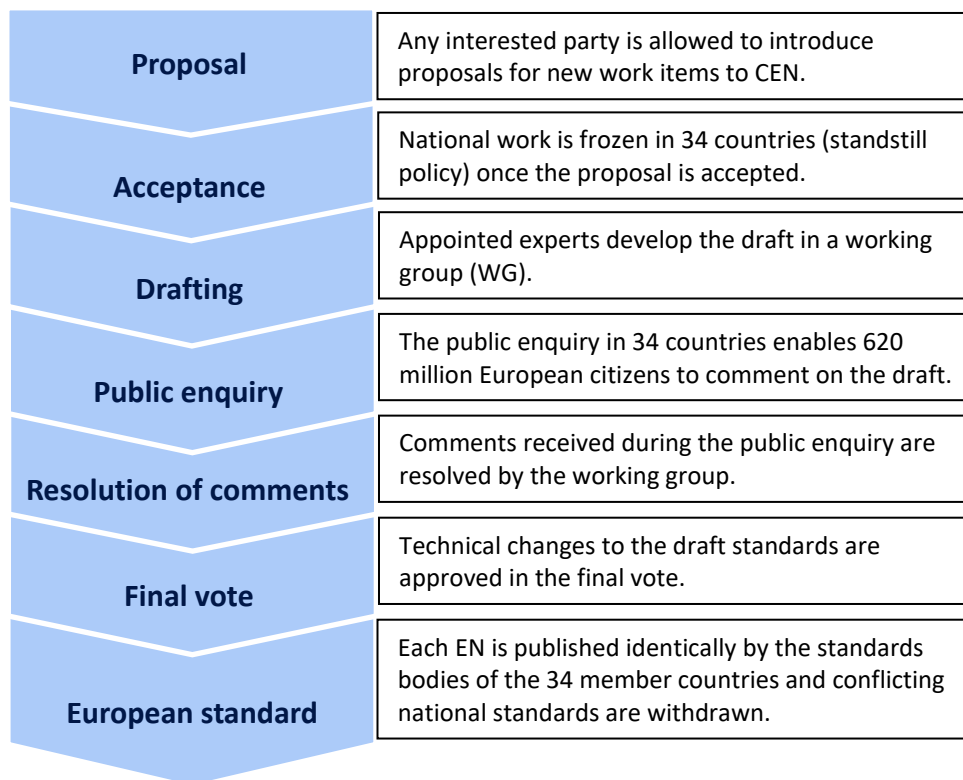


Figure 4 – Development of an EN

2.4.3 Development of a CEN Workshop Agreement (CWA)

“A CWA is an agreement developed and approved in a CEN/CENELEC Workshop; the latter is open to the direct participation of anyone with an interest in the development of the agreement. [...] A CWA does not have the status of a European Standard. It involves no obligation at national level.”¹⁸

There is a multiple step process described by CEN to develop and publish a CWA as shown in Figure 5.

It starts with the request of an interested party to a CEN member or to the CEN-CENELEC Management Centre (CCMC). For doing so, the proposer needs to prepare a draft project plan, which describes what the objective of the CEN Workshop is. Afterwards, the CEN-CENELEC Management Centre announces the proposal for a new CEN Workshop on the CEN Website for at least 30 days. This is for information and transparency reasons. Comments on the draft project plan can be made and shall be considered in the further development of the document. The next step is the kick-off meeting, where the proposed project plan is approved and the chairperson for the CEN Workshop is elected. Furthermore, the formal launch of the Workshop happens at the kick-off meeting and the formal registration of the participants who want to work on the CWA takes place. The workshop participants develop a draft CWA according to the specifications laid down in the project plan. The draft CWA is made available for comments to the registered workshop participants. A public commenting period is optional. The final CWA is published by CEN-CENELEC and reflects the consensus of identified individuals and organizations responsible for its contents. The Workshop Agreement is announced and possibly made available at national level. Conflicting national normative documents may continue to exist. Revision of a Workshop Agreement is possible. In CENELEC safety matters are excluded from being the subject of Workshop Agreements.¹⁹

¹⁸ CEN, “CWA - CEN Workshop Agreement, <https://www.cen.eu/work/products/CWA/Pages/default.aspx>, accessed 16 August 2021.

¹⁹ CEN – CENELEC, Internal Regulations Part 2, https://boss.cen.eu/media/CEN/ref/ir2_e.pdf, accessed 17 August 2021.

The CWA can be understood as a test-document. European companies can work with it and if it is found to be useful it will likely be used as basis for a new European Standard. Since a CWA is created in a rather short time, it is an ideal tool for innovation and research projects.²⁰

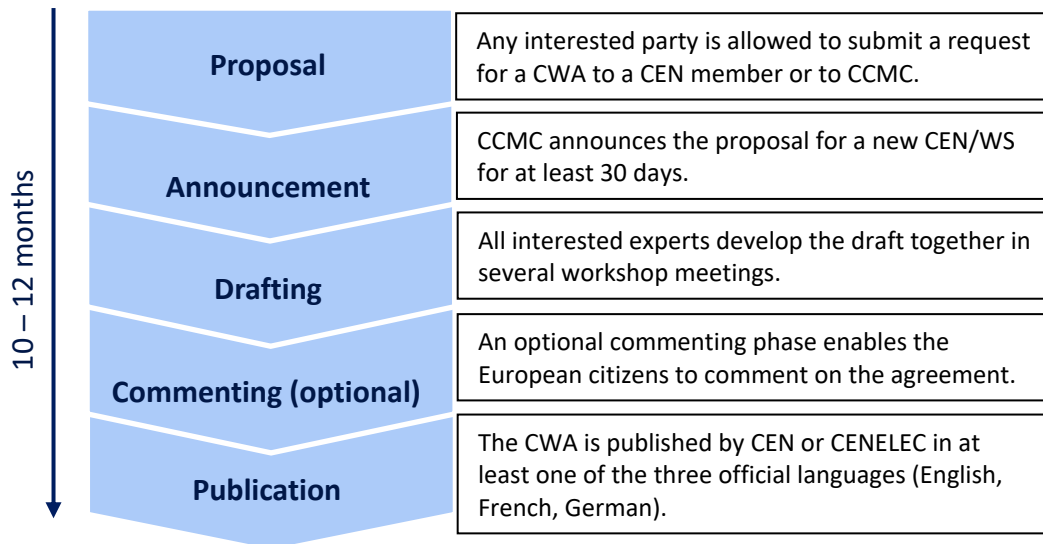


Figure 5 – Development of a CWA

3 Research and analysis of current standardization activities in the field of PVB recycling

3.1 Relevant standardization committees

3.1.1 General considerations

For the comprehensive work on standardization it is highly important to have an overview of the standardization landscape in the field of PVB recycling. It is the only way to make sure that deliverables and results of task 8.6 will address the right stakeholders and that custom-fit standards will be developed by and with the support of the responsible committees. First of all, the relevant standardization committees from ISO, IEC and CEN, CENELEC were identified for each field of intended application of PVB and recycled PVB (re-PVB). The SUNRISE consortium will assess the listed committees and decide which of them to approach for a liaison as part of the standardization strategy in Task 8.6.

3.1.2 Characterization of materials

Given that PVB is a plastic material, the most important European and international technical committees are CEN/TC 249 “Plastics” and ISO/TC 61 “Plastics”. Both committees are actively drafting standards on their own as well as in cooperation (EN ISO standards) within the framework of the Vienna Agreement (see 2.3.1 and 2.4.2 above).

Table 2 gives an overview of the structure of CEN/TC 249 and ISO/TC 61 with their subcommittees and working groups relevant for the SUNRISE project, especially for the characterization of materials but also for the mechanical and chemical recycling.

²⁰ CEN-CENELEC, CEN-CENELEC Guide 29 “CEN/CENELEC Workshop Agreements – A rapid way to standardization”, https://ftp.cencenelec.eu/EN/EuropeanStandardization/Guides/29_CENCLCGuide29.pdf, accessed 17 August 2021.

Table 2 – Plastics TCs with their SCs and WGs relevant for the SUNRISE project, especially the characterization of materials

	Technical Committee (TC)	Working Group (WG)
European level	CEN/TC 249 “Plastics”	CEN/TC 249/WG 11 “Plastics recycling” CEN/TC 249/WG 24 “Environmental aspects”
International level	ISO/TC 61 “Plastics” ISO/TC 61/SC 2 “Mechanical behavior” ISO/TC 61/SC 5 “Physical-chemical properties” ISO/TC 61/SC 6 “Ageing, chemical and environmental resistance” ISO/TC 61/SC 11 “Products” ISO/TC 61/SC 13 “Composites and reinforcement fibres” ISO/TC 61/SC 14 “Environmental aspects”	- ISO/TC 61/SC 2/WG 1 “Static behavior” ISO/TC 61/SC 2/WG 2 “Hardness and surface properties” ISO/TC 61/SC 2/WG 3 “Impact and high speed properties” ISO/TC 61/SC 2/WG 5 “Temperature dependent behavior” ISO/TC 61/SC 2/WG 7 “Fracture and fatigue behavior” ISO/TC 61/SC 5/WG 5 “Viscosity” ISO/TC 61/SC 5/WG 8 “Thermal analysis” ISO/TC 61/SC 5/WG 9 “Rheology” ISO/TC 61/SC 5/WG 11 “Analytical methods” ISO/TC 61/SC 6/WG 2 “Exposure to light” ISO/TC 61/SC 6/WG 3 “Various exposures” ISO/TC 61/SC 6/WG 7 “Basic standards” ISO/TC 61/SC 11/WG 3 “Plastics films and sheeting” ISO/TC 61/SC 13/WG 2 “Laminates and moulding compounds” ISO/TC 61/SC 14/WG 5 “Mechanical and chemical recycling”

The scope of **CEN/TC 249 “Plastics”**²¹ is:

Standardization of

- 1) terminology,
 - 2) test methods,
 - 3) specifications, classifications and designation systems,
 - 4) environmental aspects,
 - 5) joining systems and techniques,
- of plastics, plastic-based materials, semi-finished products and products (thermoplastics, thermosets, degradable plastics, bio-based polymers, thermoplastic elastomers, composites, reinforcement products for plastics, recyclates).*

²¹ European Committee for Standardization, "CEN/TC 249 Plastics", https://standards.cencenelec.eu/dyn/www/f?p=205:7:0:::FSP_ORG_ID:6230&cs=170C05F24EF08AC268C42E03B8F786259 accessed 17 September 2021.

Rubber is excluded. Specific end-product related items are also excluded if they are covered by the scope of an existing product TC.

The scope of **ISO/TC 61 “Plastics”**²² is:

Standardization of nomenclature, methods of test, and specifications applicable to materials and products in the field of plastics including processing (of products) by assembly in particular, but not limited to, polymeric adhesives, sealing, joining, welding.

Excluded: rubber, lacquers.

Note 1: By agreement, standards in relation to thermoplastic elastomers are developed and maintained by ISO/TC 45 and by ISO/TC 61.

Note 2: Joining technology (including equipment and training) between plastic pipes (including all types of reinforced plastics), and/or fittings, valves and auxiliary equipment, and the assessment of the properties of the resulting joints are developed and maintained by ISO/TC 138.

This TC has published 709 ISO standards so far and currently works on 103 ISO standards. Members from 33 countries are actively participating in ISO/TC 61 and members from further 38 countries have an observing status. Additionally, ISO/TC 61 maintains liaisons with 16 ISO committees, 1 IEC committee and 6 international organizations.

3.1.3 Glass in building, road vehicles and for railway applications

The main applications of PVB are in the form of laminated safety glass used for windshields and other glass in road vehicles, in architectural applications and railway applications. The European and international technical committees dealing with glass for road vehicles, in building and railway applications and their relevant subcommittees and working groups are given in Table 3. Additionally, CEN/TC 350 "Sustainability of construction works" with its subcommittee CEN/TC 350/SC 1 "Circular Economy in the Construction Sector" is of interest for the SUNRISE project as SUNRISE supports the circular economy through efficient recycling of PVB.

Standardization of requirements for glass in architectural applications is being carried out in a separate technical committee at both levels European and international (CEN/TC 129 and ISO/TC 160) while for road vehicles and railway applications the standardization for safety glass is included in the general technical committees (see Table 3). Therefore only the scope of committees for glass in building are given here.

The scope of **CEN/TC 129 “Glass in building”**²³ is:

Standardization in the field of glass used in building including:

- *definitions of all types of glass products, basic and processed;*
- *definition of characteristics;*
- *test methods for measurement of characteristics;*
- *calculation methods for characteristics;*
- *requirements e.g. durability;*
- *classifications e.g. anti-bandit glazing;*
- *glazing methods.*

²² International Organization for Standardization, “ISO/TC 61 Plastics”, <https://www.iso.org/committee/49256.html> accessed 17 September 2021.

²³ European Committee for Standardization, "CEN/TC 129 Glass in building", https://standards.cencenelec.eu/dyn/www/f?p=205:7:0:::FSP_ORG_ID:6111&cs=1288AE330B2D3F57B40952A625687579E accessed 18 September 2021.

Table 3 – TCs with their SCs and WGs relevant for the SUNRISE project regarding glass in building, for railway applications and road vehicles

	Technical Committee (TC)	Working Group (WG)
European level	CEN/TC 129 "Glass in building"	CEN/TC 129/WG 3 "Laminated glass" CEN/TC 129/WG 8 "Mechanical strength" CEN/TC 129/WG 9 "Light and energy transmission, thermal insulation" CEN/TC 129/WG 10 "Sound insulating glazed assemblies" CEN/TC 129/WG 13 "Safety glazing"
	CEN/TC 256 "Railway applications" CEN/TC 256/SC 3 "Rolling stock systems"	CEN/TC 256/SC 3/WG 49 "Glazing"
	CEN/TC 301 "Road vehicles"	
	CEN/TC 350 "Sustainability of construction works" CEN/TC 350/SC 1 "Circular Economy in the Construction Sector"	
	CEN/TC 351 "Construction Products - Assessment of release of dangerous substances"	
International level	ISO/TC 22 "Road vehicles"	ISO/TC 22/SC 35/WG 2 "Safety glazing"
	ISO/TC 160 "Glass in building" ISO/TC 160/SC 1 "Product considerations" ISO/TC 160/SC 2 "Use considerations"	ISO/TC 160/SC 1/WG 3 "Laminated glass" ISO/TC 160/SC 2/WG 1 "Design strength of glazing" ISO/TC 160/SC 2/WG 2 "Light and energy transmission properties and thermal properties of glazing" ISO/TC 160/SC 2/WG 3 "Airborne sound insulation of glazing" ISO/TC 160/SC 2/WG 6 "Safety glazing tests" ISO/TC 160/SC 2/WG 7 "Security glazing tests"
	ISO/TC 269 "Railway applications" ISO/TC 269/SC 2 "Rolling stock"	ISO/TC 269/SC 2/WG 3 "Body side glazing for railway rolling stock"

The scope of **ISO/TC 160 "Glass in building"** ²⁴ is:

Standardization in the field of glass in building, including terminology, performance requirements and methods of calculation and test, design and construction rules, classification and specification of materials, including dimensional properties.

This TC has published 56 ISO standards so far and currently works on 12 ISO standards. Members from 25 countries are actively participating in ISO/TC 160 and members from further 28 countries have an observing status. Additionally, ISO/TC 160 maintains liaisons with four ISO committees and two international organizations.

3.1.4 Photovoltaic applications

Standardization for photovoltaic applications is being carried out in the electrotechnical European and international committees 82 "Solar photovoltaic energy systems". Requirements for building integrated photovoltaics are also specified by ISO/TC 160/SC 1/WG 9 "Glass in building - Building integrated photovoltaics". See Table 4.

The scope of **CLC/TC 82 "Solar photovoltaic energy systems"**²⁵ is:

To prepare European Standards for systems of and components for photovoltaic conversion of solar energy into electrical energy and for all elements in the entire photovoltaic energy system. The standards will deal with EMC, Machine, CPD and LVD directives. The CLC/TC 82 will especially develop standards in areas where there are special European concerns. The CLC/TC 82 will cooperate closely with IEC/TC 82 and the National Committees. The aim will be to support the accelerated market introduction by harmonization of standards.

The scope of **IEC/TC 82 "Solar photovoltaic energy systems"**²⁶ is:

To prepare international standards for systems of photovoltaic conversion of solar energy into electrical energy and for all the elements in the entire photovoltaic energy system. In this context, the concept "photovoltaic energy system" includes the entire field from light input to a photovoltaic cell to and including the interface with the electrical system(s) to which energy is supplied.

NOTE: It is recognized that there is some common interest between TC 47 and TC 82, therefore these two Committees shall maintain liaison.

This TC has published 170 IEC standards so far and currently works on 68 IEC standards. Members from 43 countries are actively participating in IEC/TC 82 and members from further 12 countries have an observing status. Additionally, IEC/TC 82 maintains liaisons with 29 IEC committees, 3 ISO committees and 3 international organizations.

For the scope of ISO/TC 160 see 3.1.3.

Table 4 – TCs with their SCs and WGs relevant for the SUNRISE project regarding photovoltaic applications

	Technical Committee (TC)	Working Group (WG)
European level	CLC/TC 82 "Solar photovoltaic energy systems"	
International level	IEC/TC 82 "Solar photovoltaic energy systems"	
	ISO/TC 160 "Glass in building" ISO/TC 160/SC 1 "Product considerations"	ISO/TC 160/SC 1/WG 9 "Glass in building - Building integrated photovoltaics"

²⁴ International Organization for Standardization, "ISO/TC 160 Glass in building", <https://www.iso.org/committee/53408.html> accessed 18 September 2021.

²⁵ European Electrotechnical Committee for Standardization, "CLC/TC 82 Solar photovoltaic energy systems", https://standards.cencenelec.eu/dyn/www/f?p=305:7:0:25:::FSP_ORG_ID,FSP_LANG_ID:1258463 accessed 18 September 2021.

²⁶ International Electrotechnical Commission, "IEC/TC 82 Solar photovoltaic energy systems", https://www.iec.ch/dyn/www/f?p=103:7:::FSP_ORG_ID:1276 accessed 18 September 2021.

3.1.5 Peelable coatings

Peelable coatings based on virgin and recycled PVB are a niche product for temporary coating protection and therefore, no separate technical committees exist on European or international level. Basic properties such as thickness, peelability (tensile strength and elongation), porosity, UV resistance etc. can be measured using test methods from standards for either plastics (see technical committees under 3.1.2) or paints and varnishes (CEN/TC 139 and ISO/TC 35, see Table 5).

Table 5 – TCs with their SCs and WGs relevant for the SUNRISE project regarding peelable coatings

	Technical Committee (TC)	Working Group (WG)
European level	CEN/TC 139 “Paints and varnishes”	
International level	ISO/TC 35 “Paints and varnishes” ISO/TC 35/SC 9 “General test methods for paints and varnishes”	ISO/TC 35/SC 9/WG 31 “Properties after application”

The scope of **CEN/TC 139 “Paints and varnishes”**²⁷ is:

Standardization in the field of paints, varnishes and related products. Establishment of methods of test and requirements for coating materials and coatings. Definition of terms.

The scope of **ISO/TC 35 “Paints and varnishes”**²⁸ is:

Standardization in the field of paints, varnishes and related products, including raw materials.

This TC has published 280 ISO standards so far and currently works on 40 ISO standards. Members from 30 countries are actively participating in ISO/TC 35 and members from further 35 countries have an observing status. Additionally, ISO/TC 35 maintains liaisons with 11 ISO committees and 3 international organizations.

3.1.6 Carpet production

For the application of PVB in carpet production the European and international committees given in Table 6 are relevant for the SUNRISE project.

The scope of **CEN/TC 134 “Resilient, textile, laminate and modular mechanical locked floor coverings”**²⁹ is:

Standardization of definitions, requirements, classification and test methods, and development of guidance documents and reports for resilient, textile, laminate and modular mechanical locked floor coverings. The main use areas for floor coverings within the scope of CEN/TC 134 are residential (homes, apartments) and commercial, (health care, education, hospitality, public buildings, offices, retail, transportation). These areas are limited to indoor use. Excluded are screeds, raised access floors, paving, surfaces for sports areas, as well as parquet, wood veneer and bamboo floorings.

²⁷ European Committee for Standardization, "CEN/TC 139 Paints and varnishes", https://standards.cencenelec.eu/dyn/www/f?p=205:7:0::::FSP_ORG_ID:6121&cs=17645CA4A01E77761FDFACFBBC7388875 accessed 18 September 2021.

²⁸ International Organization for Standardization, "ISO/TC 35 Paints and varnishes", <https://www.iso.org/committee/47962.html> accessed 18 September 2021.

²⁹ European Committee for Standardization, "CEN/TC 134 Resilient, textile, laminate and modular mechanical locked floor coverings", https://standards.cencenelec.eu/dyn/www/f?p=205:7:0::::FSP_ORG_ID:6116&cs=1DC35683E32D0CD853B6F13D4B2C314E4 accessed 18 September 2021.

The scope of **CEN/TC 248 “Textiles and textile products”**³⁰ is:

Standardization of the following aspects of textiles, textile products and textile components of products: 1) test methods; 2) terms and definitions; 3) specifications, and if necessary classifications, in terms of their expected behaviour, in particular where required by other CEN Technical Committees or the CEC or EFTA. Equipment relevant for the testing and use of textiles.

Table 6 – TCs with their SCs and WGs relevant for the SUNRISE project regarding carpet production

	Technical Committee (TC)	Working Group (WG)
European level	CEN/TC 134 “Resilient, textile, laminate and modular mechanical locked floor coverings”	CEN/TC 134/WG 8 “Textile floor coverings”
	CEN/TC 248 “Textiles and textile products”	CEN/TC 248/WG 26 “Textiles -Test methods for analysis of EC restricted substances” CEN/TC 248/WG 39 “Circular Economy for textile products and the textile chain”
International level	ISO/TC 38 “Textiles”	ISO/TC 38/WG 22 “Composition and chemical testing” ISO/TC 38/WG 23 “Biological properties of textiles”
	ISO/TC 38/SC 1 “Tests for coloured textiles and colorants”	ISO/TC 38/SC 1/WG 1 “Light and weathering” ISO/TC 38/SC 1/WG 13 “Miscellaneous technical projects”
	ISO/TC 38/SC 2 “Cleansing, finishing and water resistance tests”	ISO/TC 38/SC 2/WG 1 “Professional cleaning”
	ISO/TC 38/SC 24 “Conditioning atmospheres and physical tests for textile fabrics”	ISO/TC 38/SC 24/WG 2 “Fabrics - Physical Tests”
	ISO/TC 219 “Floor coverings”	ISO/TC 219/WG 1 “Textile floor coverings”

The scope of **ISO/TC 38 “Textiles”**³¹ is:

Standardization of:

- *fibres, yarns, threads, cords, rope, cloth and other fabricated textile materials; and the methods of test, terminology and definitions relating thereto;*
- *textile industry raw materials, auxiliaries and chemical products required for processing and testing;*
- *specifications for textile products.*
- *micro plastics from textile source and the methods of test, specifications, terminology and definitions relating thereto;*
- *traceability and responsible sourcing of animal fibers in the textile supply chain and the methods of test, specifications, terminology and definitions relating thereto;*

³⁰ European Committee for Standardization, "CEN/TC 248 Textiles and textile products", https://standards.cencenelec.eu/dyn/www/f?p=205:7:0:::FSP_ORG_ID:6229&cs=10D5E9507DBA0195D1D470609DD93A3DC accessed 18 September 2021.

³¹ International Organization for Standardization, "ISO/TC 38 Textiles", <https://www.iso.org/committee/48148.html> accessed 18 September 2021.

- *ethical and environmental issues in the textile supply chain and the methods of test, specifications, terminology and definitions relating thereto.*

This TC has published 415 ISO standards so far and currently works on 37 ISO standards. Members from 31 countries are actively participating in ISO/TC 38 and members from further 46 countries have an observing status. Additionally, ISO/TC 38 maintains liaisons with 13 ISO committees and 10 international organizations.

The scope of **ISO/TC 219 “Floor coverings”**³² is:

Standardization in the field of textile, resilient and laminate floor coverings.

Excluded:

- *wood, ceramic, terrazzo, concrete and raised access type floorings.*

This TC has published 84 ISO standards so far and currently works on 5 ISO standards. Members from 28 countries are actively participating in ISO/TC 219 and members from further 16 countries have an observing status. Additionally, ISO/TC 219 maintains liaisons with 7 ISO committees and 5 international organizations.

3.1.7 PVB in batteries

For the application of PVB in batteries the international committees IEC/TC 21 “Secondary cells and batteries” and IEC/TC 69 “Electric road vehicles and electric industrial trucks” and their European counterparts CLC/TC 21X “Secondary cells and batteries” and CLC/TC 69X “Electrical systems for electric road vehicles” are of relevance for the SUNRISE project. Additionally, some of the standards from IEC/TC 111 “Environmental standardization for electrical and electronic products and systems” can be of interest. See Table 7.

Table 7 – TCs with their SCs and WGs relevant for the SUNRISE project regarding PVB in batteries

	Technical Committee (TC)	Working Group (WG)
European level	CLC/TC 21X “Secondary cells and batteries”	
	CLC/TC 69X “Electrical systems for electric road vehicles”	
International level	IEC/TC 21 “Secondary cells and batteries”	IEC/TC 21/SC 21A “Secondary cells and batteries containing alkaline or other non-acid electrolytes”
	IEC/TC 69 “Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks”	
	IEC/TC 111 “Environmental standardization for electrical and electronic products and systems”	

The scope of **CLC/TC 21X “Secondary cells and batteries”**³³ is:

To execute the following standardization activities for secondary cells and batteries: - to implement IEC/TC 21/SC 21A documents into CENELEC standards; - to prepare Product Standards, general requirements and

³² International Organization for Standardization, "ISO/TC 219 Floor coverings", <https://www.iso.org/committee/54988.html> accessed 18 September 2021.

³³ European Electrotechnical Committee for Standardization, "CLC/TC 21X Secondary cells and batteries", https://standards.cenelec.eu/dyn/www/f?p=305:7:0:25:::FSP_ORG_ID,FSP_LANG_ID:1257217 accessed 19 September 2021.

methods of testing included; - to prepare Safety Standards and associated Codes of Practice; - to consider Environmental Requirements (EC Rules) for the products.

The scope of **CLC/TC 69X “Electrical systems for electric road vehicles”**³⁴ is:

To prepare European standards related to electrical systems for road vehicles, totally or partly propelled from self-contained power sources

The scope of **IEC/TC 21 “Secondary cells and batteries”**³⁵ is:

To provide standards for all secondary cells and batteries related to product (dimension and performance), safety (including marking and labelling), testing, and safe application (installation, maintenance, operation) irrespective of type or application or configuration (hybrid, stand alone, module). Main applications are:

- *automotive (car, motorcycle, truck) for starting, lighting, ignition, start/stop;*
- *industrial (telecom, UPS, reliable power supply and traction);*
- *electrical vehicles (full electrical vehicle, hybrid car, bicycle);*
- *portable (computer, tool, lamp);*
- *onboard batteries (aircraft, railway, ship, motor-home);*
- *energy storage (renewable, on- grid and off-grid).*

All electrochemical systems are considered such as Lead acid, Nickel based (NiMH, NiCd) and Lithium based. New battery technologies and chemistries such as flow batteries and High temperature batteries (e.g. sodium sulfur, sodium nickel chloride) are included. The work is shared between TC 21 and SC 21A according to technologies and applications. For standardization of applications and system integration, TC 21 is cooperating with the responsible Committees, TC 9, TC 34, TC 69, TC 82, TC 105, TC 116, TC 120 and ISO/TC 22/SC 21.

This TC has published 49 IEC standards so far and currently works on 4 IEC standards. Members from 25 countries are actively participating in IEC/TC 21 and members from further 18 countries have an observing status. Additionally, IEC/TC 21 maintains liaisons with 16 IEC committees and 7 ISO committees.

The scope of **IEC/TC 69 “Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks”**³⁶ is:

To prepare publications on electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks (hereafter EV) drawing current from a rechargeable energy storage system (RESS). Possibilities to transfer power/energy include conductive power/energy transfer, wireless power/energy transfer and battery swap.

The different publications can cover, but are not limited to:

- *general requirements (e.g. safety, EMC, construction, testing);*
- *functional requirements (e.g. charging modes);*
- *communication between the EV and the EV supply equipment;*
- *electrical power/energy transfer between EV and supply network (G2V and V2G);*
- *management of the corresponding infrastructures in view of offering the associated value added services.*

³⁴ European Electrotechnical Committee for Standardization, "CLC/TC 69X Electrical systems for electric road vehicles", https://standards.cencenelec.eu/dyn/www/f?p=305:7:0:25:::FSP_ORG_ID,FSP_LANG_ID:1258145 accessed 19 September 2021.

³⁵ International Electrotechnical Commission, "IEC/TC 21 Secondary cells and batteries", https://www.iec.ch/dyn/www/f?p=103:7:::FSP_ORG_ID:1290 accessed 19 September 2021.

³⁶ International Electrotechnical Commission, "IEC/TC 69 Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks", https://www.iec.ch/dyn/www/f?p=103:7:::FSP_ORG_ID:1255 accessed 19 September 2021.

EV include but are not limited to passenger cars and buses, two and three-wheel and light four-wheel vehicles, trucks and goods vehicles, trailers and special and industrial trucks.

Trains, trams and trolleybuses are out of scope of TC 69.

This TC has published 23 IEC standards so far and currently works on 36 IEC standards. Members from 30 countries are actively participating in IEC/TC 69 and members from further 14 countries have an observing status. Additionally, IEC/TC 69 maintains liaisons with 19 IEC committees, 4 ISO committees and 4 international organizations.

3.1.8 Other applications / TCs of general interest

In case re-PVB is used as insulating material, standards from IEC/TC 112 "Evaluation and qualification of electrical insulating materials and systems" are of interest. Table 8 includes also technical committees working on more general topics of potential relevance for the SUNRISE project.

Table 8 – TCs with their SCs and WGs relevant for the SUNRISE project regarding other applications

	Technical Committee (TC)	Working Group (WG)
International level	IEC/TC 112 "Evaluation and qualification of electrical insulating materials and systems"	
	ISO/TC 308 "Chain of custody"	
	ISO/TC 323 "Circular economy"	

3.1.9 Life cycle assessment, life cycle costing, social life cycle assessment

The relevant international technical committee issuing standards relevant for life cycle assessment, life cycle costing and social life cycle assessment is ISO/TC 207 "Environmental management". See Table 9 for active working groups.

Table 9 – TCs with their SCs and WGs relevant for the SUNRISE project regarding life cycle assessment

	Technical Committee (TC)	Working Group (WG)
European level	The standards of ISO/TC 207 are directly adopted by CEN as EN ISO standards without any modifications. A separate CEN/TC is not needed.	
International level	ISO/TC 207 "Environmental management" ISO/TC 207/SC 5 "Life cycle assessment"	ISO/TC 207/SC 5/WG 12 "Life cycle assessment - Requirements and guidelines" ISO/TC 207/SC 5/WG 15 "Social life cycle assessments"

The scope of **ISO/TC 207 "Environmental management"**³⁷ is:

Standardization in the field of environmental management to address environmental and climate impacts, including related social and economic aspects, in support of sustainable development.

³⁷ International Organization for Standardization, "ISO/TC 207 Environmental management", <https://www.iso.org/committee/54808.html> accessed 19 September 2021.

Excluded:

test methods of pollutants, setting limit values and levels of environmental performance, and standardization of products.

Note 1: TC 207 is focused on environmental management systems, auditing, verification/validation and related investigations, environmental labelling, environmental performance evaluation, life cycle assessment, climate change and its mitigation and adaptation, ecodesign, material efficiency, environmental economics and environmental and climate finance.

Note 2: Where appropriate, the ISO/TC 207 works in cooperation with existing committees on subjects that may support environmental management.

This TC has published 57 ISO standards so far and currently works on 18 ISO standards. Members from 81 countries are actively participating in ISO/TC 207 and members from further 42 countries have an observing status. Additionally, ISO/TC 207 maintains liaisons with 28 ISO committees and 32 international organizations.

3.2 Research of standards

The objective of the research of existing standards is to give an overview of the current standardization activities in the field of PVB usage and recycling including quality, environmental and safety aspects of the different applications for re-PVB. This is input for the different work packages and supports the identification of standardization gaps in Task 8.6.

The research of existing standards and draft standards was performed using relevant keywords. The keywords are given in Annex I. The search was carried out by using the search engine Perinorm. The database includes standards from the European organizations CEN, CENELEC, ETSI and the international organizations ISO, IEC and ITU as well as the standards of European national organizations and Non-European national organizations. Using a keyword search option, a list of standards can be generated, which then can be downloaded.

The international classification for standards (ICS) can be used as additional criterion to find relevant standards in a specific field. The international classification for standards (ICS) serves as a structure for catalogues of international, regional and national standards and other normative documents, and as a basis for standing-order systems for international, regional and national standards.³⁸ ICS classes deemed relevant for the SUNRISE project are listed in Annex II.

Additionally, the standards mentioned in the SUNRISE proposal as well as standards provided by project partners were added to the list, if not already included. Draft standards can be commented by the national standardization bodies and liaison organizations. Ideally, input to standardization projects is submitted as early as possible, i.e. during the preparatory / working draft stage (stage code 20.xx) or the committee stage (stage code 30.xx). Comments from the general public are possible during the enquiry stage (40.xx) via the national standardization body of the residence country. An overview of the ISO stage codes is given in Annex III. These stage codes are also used by CEN.

Table 10 summarizes the results of the standards research. It is structured in the same way as Chapter 3.1 using subheadings for the different applications of PVB starting with the standards for the characterization of materials and ending with the standards relevant for life cycle assessments. The first column gives the standard number. Where an international standard is also available as European standard this is stated in this column by “adopted as EN ...”. Within each subheading the standards are sorted in alpha-numerical order. The second column gives the full title of the standard. Only active standards and draft standards are included in Table 10. Standards that have been withdrawn are not included.

³⁸ ICS edition 7, publication by ISO,

https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/international_classification_for_standards.pdf. All ICS classes are listed here: <https://www.iso.org/standards-catalogue/browse-by-ics.html> both accessed 17 August 2021.

Table 10 – Summary of standards relevant for the SUNRISE project

Standard number	Title
Characterization of materials	
ASTM C1371	<i>Standard test method for determination of emittance of materials near room temperature using portable emissometers</i>
ASTM D542	<i>Standard test method for index of refraction of transparent organic plastics</i>
ASTM D635	<i>Standard test method for rate of burning and/or extent and time of burning of plastics in a horizontal position</i>
ASTM D638	<i>Standard test method for tensile properties of plastics</i>
ASTM D648	<i>Standard test method for deflection temperature of plastics under flexural load in the edgewise position</i>
ASTM D696	<i>Standard test method for coefficient of linear thermal expansion of plastics between -30 °C and 30 °C with a vitreous silica dilatometer</i>
ASTM D790	<i>Standard test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials</i>
ASTM D792	<i>Standard test methods for density and specific gravity (relative density) of plastics by displacement</i>
ASTM D1003	<i>Standard test method for haze and luminous transmittance of transparent plastics</i>
ASTM D1004	<i>Standard test method for tear resistance (Graves tear) of plastic film and sheeting</i>
ASTM D1929	<i>Standard test method for determining ignition temperature of plastics</i>
ASTM D2843	<i>Standard test method for density of smoke from the burning or decomposition of plastics</i>
ASTM D5026	<i>Standard test method for plastics: Dynamic mechanical properties: In tension</i>
ASTM E84	<i>Standard test method for surface burning characteristics of building materials</i>
ASTM E313	<i>Standard practice for calculating yellowness and whiteness indices from instrumentally measured color coordinates</i>
ASTM E831	<i>Standard test method for linear thermal expansion of solid materials by thermomechanical analysis</i>
ASTM E1354	<i>Standard test method for heat and visible smoke release rates for materials and products using an oxygen consumption calorimeter</i>
ASTM F433	<i>Standard practice for evaluating thermal conductivity of gasket materials</i>
EN 410	<i>Glass in building – Determination of luminous and solar characteristics of glazing</i>
EN 2155-3	<i>Aerospace series – Test methods for transparent materials for aircraft glazing – Part 3: Determination of refractive index</i>
EN 12664	<i>Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meter methods – Dry and moist products of medium and low thermal resistance</i>
EN 12939	<i>Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Thick products of high and medium thermal resistance</i>

Standard number	Title
IEC 62631 (all parts) adopted as EN 62631 and EN IEC 62631 (depending on the specific part)	<i>Dielectric and resistive properties of solid insulating materials</i>
ISO 48-4,	<i>Rubber, vulcanized or thermoplastic — Determination of hardness — Part 4: Indentation hardness by durometer method (Shore hardness)</i>
ISO 178 adopted as EN ISO 178	<i>Plastics — Determination of flexural properties</i>
ISO 180 adopted as EN ISO 180	<i>Plastics — Determination of Izod impact strength</i>
ISO 489	<i>Plastics – Determination of refractive index</i>
ISO 527-1 adopted as EN ISO 527-1	<i>Plastics — Determination of tensile properties — Part 1: General principles</i>
ISO 527-4 adopted as EN ISO 527-4	<i>Plastics — Determination of tensile properties — Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites</i>
ISO 1133-1 adopted as EN ISO 1133-1	<i>Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 1: Standard method</i>
ISO 1183-1 adopted as EN IS 1183-1	<i>Plastics – Methods for determining the density of non-cellular plastics – Part 1: Immersion method, liquid pycnometer method and titration method</i>
ISO 1183-2 adopted as EN IS 1183-2	<i>Plastics – Methods for determining the density of non-cellular plastics – Part 2: Density gradient column method</i>
ISO 1183-3 adopted as EN IS 1183-3	<i>Plastics – Methods for determining the density of non-cellular plastics – Part 3: Gas pycnometer method</i>
ISO 1628-1 adopted as EN ISO 1628-1	<i>Plastics — Determination of the viscosity of polymers in dilute solution using capillary viscometers — Part 1: General principles</i>
ISO 2781	<i>Rubber, vulcanized or thermoplastic – Determination of density</i>
ISO 4892-2 adopted as EN ISO 4892-2	<i>Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps</i>
ISO 6427 adopted as EN ISO 6427	<i>Plastics — Determination of matter extractable by organic solvents (conventional methods)</i>
ISO 9050	<i>Glass in building – Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing factors</i>
ISO 11357-1 adopted as EN ISO 11357-1	<i>Plastics — Differential scanning calorimetry (DSC) — Part 1: General principles</i>
ISO 11358-1 adopted as EN ISO 11358-1	<i>Plastics — Thermogravimetry (TG) of polymers — Part 1: General principles</i>
ISO 11359-1	<i>Plastics – Thermomechanical analysis (TMA) – Part 1: General principles</i>
ISO 11359-2	<i>Plastics – Thermomechanical analysis (TMA) – Part 2: Determination of coefficient of linear thermal expansion and glass transition temperature</i>
ISO 11359-3	<i>Plastics – Thermomechanical analysis (TMA) – Part 3: Determination of penetration temperature</i>

Standard number	Title
NFRC 300	<i>Test method for determining the solar optical properties of glazing materials and systems.</i>
UL 94	<i>Tests for flammability of plastic materials for parts in devices and appliances</i>
Glass in building, road vehicles and for railway applications	
ASTM D882	<i>Standard test method for tensile properties of thin plastic sheeting</i>
EN 356	<i>Glass in building – Security glazing – Testing and classification of resistance against manual attack</i>
EN 1063	<i>Glass in building – Security glazing – Testing and classification of resistance against bullet attack</i>
EN 12488	<i>Glass in building – Glazing recommendations – Assembly principles for vertical and sloping glazing</i>
EN 12600	<i>Glass in building - Pendulum test - Impact test method and classification for flat glass</i>
EN 12758	<i>Glass in building - Glazing and airborne sound insulation - Product descriptions, determination of properties and extension rules</i>
EN 13541	<i>Glass in building – Security glazing – Testing and classification of resistance against explosion pressure</i>
EN 14449	<i>Glass in building – Laminated glass and laminated safety glass – Evaluation of conformity/Product standard</i>
EN 15152	<i>Railway applications – Windscreens for trains</i>
EN 16612	<i>Glass in building – Determination of the lateral load resistance of glass panes by calculation</i>
EN 17416	<i>Glass in building – Assessment of release of dangerous substances – Determination of emissions into indoor air from glass products</i>
ISO 3536	<i>Road vehicles – Safety glazing materials – Vocabulary</i>
ISO 3538	<i>Road vehicles – Safety glazing materials – Test methods for optical properties</i>
ISO 3917	<i>Road vehicles Safety glazing materials – Test methods for resistance to radiation, high temperature, humidity, fire and simulated weathering</i>
ISO 12543-1 adopted as EN ISO 12543-1	<i>Glass in building – Laminated glass and laminated safety glass – Part 1: Definitions and description of component parts</i>
ISO 12543-2 adopted as EN ISO 12543-2	<i>Glass in building - Laminated glass and laminated safety glass - Part 2: Laminated safety glass</i>
ISO 12543-3 adopted as EN ISO 12543-3	<i>Glass in building - Laminated glass and laminated safety glass - Part 3: Laminated glass</i>
ISO 12543-4 adopted as EN ISO 12543-4	<i>Glass in building - Laminated glass and laminated safety glass - Part 4: Test methods for durability</i>
ISO 12543-5 adopted as EN ISO 12543-5	<i>Glass in building - Laminated glass and laminated safety glass - Part 5: Dimensions and edge finishing</i>
ISO 12543-6 adopted as EN ISO 12543-6	<i>Glass in building - Laminated glass and laminated safety glass - Part 6: Appearance</i>

Standard number	Title
ISO 16932	<i>Glass in building – Destructive-windstorm-resistant security glazing – Test and classification</i>
ISO 16933	<i>Glass in building – Explosion-resistant security glazing – Test and classification for arena air-blast loading</i>
ISO 16934	<i>Glass in building – Explosion-resistant security glazing – Test and classification by shock-tube loading</i>
ISO 16935	<i>Glass in building – Bullet-resistant security glazing – Test and classification</i>
ISO 16936-1	<i>Glass in building – Forced-entry security glazing – Part 1: Test and classification by repetitive ball drop</i>
ISO 16936-2	<i>Glass in building – Forced-entry security glazing – Part 2: Test and classification by repetitive impact of a hammer and axe at room temperature</i>
ISO 16936-3	<i>Glass in building – Forced-entry security glazing – Part 3: Test and classification by manual attack</i>
ISO 16936-4	<i>Glass in building – Forced-entry security glazing – Part 1: Test and classification by pendulum impact under thermally and fire stressed conditions</i>
ISO 23013	<i>Road vehicles – Determination of resistance to forced entry of security glass constructions used vehicle glazing – Test of glazing systems</i>
E/ECE/324 Addendum 42: Regulation No. 43	<p>AGREEMENT</p> <p>CONCERNING THE ADOPTION OF UNIFORM TECHNICAL PRESCRIPTIONS FOR WHEELED VEHICLES, EQUIPMENT AND PARTS WHICH CAN BE FITTED AND/OR BE USED ON WHEELED VEHICLES AND THE CONDITIONS FOR RECIPROCAL RECOGNITION OF APPROVALS GRANTED ON THE BASIS OF THESE PRESCRIPTIONS</p> <p><i>Uniform provisions concerning the approval of safety glazing materials and their installation on vehicles</i></p>
Photovoltaic applications	
EN 50583-1	<i>Photovoltaics in buildings - Part 1: BIPV modules</i>
EN 50583-2	<i>Photovoltaics in buildings - Part 2: BIPV systems</i>
IEC 61215-1 adopted as EN 61215-1	<i>Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1: Test requirements</i>
IEC 61215-1-1 adopted as EN 61215-1-1	<i>Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules</i>
IEC 61215-1-2 adopted as EN 61215-1-2	<i>Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-2: Special requirements for testing of thin-film Cadmium Telluride (CdTe) based photovoltaic (PV) modules</i>
IEC 61215-1-3 adopted as EN 61215-1-3	<i>Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-3: Special requirements for testing of thin-film amorphous silicon based photovoltaic (PV) modules</i>
IEC 61215-1-4 adopted as EN 61215-1-4	<i>Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-4: Special requirements for testing of thin-film Cu(In,Ga)(S,Se)_2 based photovoltaic (PV) modules</i>

Standard number	Title
IEC 61215-2 adopted as EN 61215-2	<i>Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures</i>
IEC 61730-1	<i>Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction</i>
IEC 61730-2	<i>Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing</i>
IEC 63092-1	<i>Photovoltaics in buildings - Part 1: Requirements for building-integrated photovoltaic modules</i>
IEC 63092-2	<i>Photovoltaics in buildings - Part 2: Requirements for building-integrated photovoltaic systems</i>
IEC/PWI 63092-3	<i>Photovoltaics in buildings – Part 3: Evaluation methodology of SHGC for Building integrated photovoltaic modules with various designs</i>
ISO/CD 23237	<i>Glass in building –Testing method of light transmittance for glass photovoltaic (PV) module in buildings</i>
ISO/DTS 21486	<i>Glass in building – Retesting substrate for laminated solar photovoltaic glass for use in buildings</i>
ISO/TS 18178	<i>Glass in building – Laminated solar photovoltaic glass for use in buildings</i>
ISO/TS 21480	<i>Glass in building – General technical requirements of building integrated photovoltaic modules recycling</i>
UL 7103	<i>Outline for investigation for building-integrated photovoltaic roof coverings</i>
Peelable coatings	
ISO 16474- 3 adopted as EN ISO 16474-3	<i>Paints and varnishes – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps</i>
Carpet production	
CEN/TR 16741	<i>Textiles and textile products – Guidance on health and environmental issues related to chemical content of textile products intended for clothing, interior textiles and upholstery</i>
EN 1307	<i>Textile floor coverings – Classification</i>
EN 1318	<i>Textile floor coverings – Determination of the apparent effective thickness of the backing</i>
EN 12280-3	<i>Rubber- or plastic-coated fabrics – Accelerated ageing tests – Part 3: Environmental ageing</i>
EN 13758-1	<i>Textiles – Solar UV protective properties – Part 1: Method of test for apparel fabrics</i>
ISO 105 series (with 94 parts) Adopted as EN 20105 series or EN ISO 105 series (depending on year of publication)	<i>Textiles – Tests for colour fastness</i>
ISO 11378-1	<i>Textile floor coverings – Laboratory soiling tests – Part 1: Kappasoil test</i>
ISO 11378-2 adopted as EN ISO 11378-2	<i>Textile floor coverings – Laboratory soiling tests – Part 2: Drum test</i>

Standard number	Title
ISO 11857 adopted as EN ISO 11857	<i>Textile floor coverings – Determination of resistance to delamination</i>
ISO 12947-2 adopted as EN ISO 12947-2	<i>Textiles – Determination of the abrasion resistance of fabrics by the Martindale method – Part 2: Determination of specimen breakdown</i>
ISO 13934-1 adopted as EN ISO 13934-1	<i>Textiles – Tensile properties of fabrics – Part 1: Determination of maximum force and elongation at maximum force using the strip method</i>
ISO 14184-1 adopted as EN ISO 14184-1	<i>Textiles – Determination of formaldehyde – Part 1: Free and hydrolysed formaldehyde (water extraction method)</i>
ISO 14389 adopted as EN ISO 14389	<i>Textiles – Determination of the phthalate content – Tetrahydrofuran method</i>
ISO 18168	<i>Textile floor coverings – Colour fastness to shampooing</i>
ISO 18184	<i>Textiles – Determination of antiviral activity of textile products</i>
ISO 20743 adopted as EN ISO 20743	<i>Textiles – Determination of antibacterial activity of textile products</i>
PVB in batteries	
BSI PAS 7062	<i>Electric vehicle battery cells. Health and safety, environmental and quality management considerations in cell manufacturing and finished cell. Code of practice</i>
IEC 62133-2 adopted as EN 62133-2	<i>Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems</i>
IEC 62485-3 adopted as EN 62485-3	<i>Safety requirements for secondary batteries and battery installations - Part 3: Traction batteries</i>
IEC 62660-1 adopted as EN IEC 62660-1	<i>Secondary lithium-ion cells for the propulsion of electric road vehicles – Part 1: Performance testing</i>
IEC 62660-2 adopted as EN IEC 62660-2	<i>Secondary lithium-ion cells for the propulsion of electric road vehicles – Part 2: Reliability and abuse testing</i>
IEC 62660-3 adopted as EN IEC 62660-3	<i>Secondary lithium-ion cells for the propulsion of electric road vehicles – Part 3: Safety requirements</i>
IEC/TR 62660-4	<i>Secondary lithium-ion cells for the propulsion of electric road vehicles – Part 4: Candidate alternative test methods for the internal short circuit test of IEC 62660-3</i>
UN Manual of tests and criteria, Part III, Subsection 38.3 (known as UN 38.3 tests or UN/DOT 38.3 tests)	<i>UN Manual of tests and criteria, Part III: Classification procedures, test methods and criteria relating to various hazard classes, Section 38 Classification procedures, tests methods and criteria relating to substances and articles of transport class 9, Subsection 38.3 Lithium metal and lithium ion batteries</i>
Other applications / general standards	
CEN/TR 15353	<i>Plastics – Recycled plastics – Guidelines for the development of standards relating for recycled plastics</i>
CEN/TS 16010	<i>Plastics – Recycled plastics – Sampling procedures for testing plastics waste and recyclates</i>
CEN/TS 16011	<i>Plastics – Recycled plastics – Sample preparation</i>
DIN SPEC 91446	<i>Classification of recycled plastics by Data Quality Levels for use and (digital) trading</i>

Standard number	Title
EN 15343	<i>Plastics – Recycled plastics – Plastics recycling traceability and assessment of conformity and recycled content</i>
EN 15347	<i>Plastics – Recycled Plastics – Characterisation of plastics wastes</i>
IEC 60317-1 adopted as EN IEC 60317-17	<i>Specifications for particular types of winding wires – Part 1: Polyvinyl acetal enamelled round copper wire, class 105</i>
IEC 60317-12 adopted as EN IEC 60317-12	<i>Specifications for particular types of winding wires – Part 12: Polyvinyl acetal enamelled round copper wire, class 120</i>
IEC 60317-17 adopted as EN IEC 60317-17	<i>Specifications for particular types of winding wires – Part 17: Polyvinyl acetal enamelled rectangular copper wire, class 105</i>
IEC 60317-18 adopted as EN IEC 60317-18	<i>Specifications for particular types of winding wires – Part 18: Polyvinyl acetal enamelled rectangular copper wire, class 120</i>
IEC 60317-67 adopted as EN 60317-67	<i>Specifications for particular types of winding wires – Part 67: Polyvinyl acetal enamelled rectangular aluminium wire, class 105</i>
IEC 60317-68 adopted as EN 60317-68	<i>Specifications for particular types of winding wires – Part 68: Polyvinyl acetal enamelled rectangular aluminium wire, class 120</i>
IEC 60317-80 adopted as EN IEC 60317-80	<i>Specifications for particular types of winding wires – Part 80: Polyvinyl acetal enamelled rectangular copper wire, class 120, with a bonding layer</i>
IEC 60243-1 adopted as EN 60243-1	<i>Electric strength of insulating materials – Test methods – Part 1: Tests at power frequencies</i>
IEC 61621 adopted as EN 61621	<i>Dry, solid insulating materials – Resistance to high voltage, low-current arc discharges</i>
IEC 62321-3-3 adopted as EN IEC 62321-3-3	<i>Determination of certain substances in electrotechnical products – Part 3-3: Screening – Polybrominated biphenyls, polybrominated diphenyl ethers and phthalates in polymers by gas chromatography-mass spectrometry using a pyrolyzer/thermal desorption accessory (Py/TDGCMS)</i>
IEC 62321-8 adopted as EN 62321-8	<i>Determination of certain substances in electrotechnical products – Part 8: Phthalates in polymers by gas chromatography-mass spectrometry (GC-MS), gas chromatography-mass spectrometry using a pyrolyzer/thermal desorption accessory (Py/TD-GC-MS)</i>
IEC 62631-1 adopted as EN 62631-1	<i>Dielectric and resistive properties of solid insulating materials – Part 1: General</i>
ISO 21702	<i>Measurement of antiviral activity on plastics and other non-porous surfaces</i>
ISO 22095	<i>Chain of custody – General terminology and models</i>
ISO 22196	<i>Measurement of antibacterial activity on plastics and other non-porous surfaces</i>
Life cycle	
DIN SPEC 77234	<i>Guideline to evaluate lifecycle costs in product-service systems</i>
IEC 60300-3-3 adopted as EN 60300-3-3	<i>Dependability management – Part 3-3: Application guide – Life cycle costing</i>
ISO 14040 adopted as EN ISO 14040	<i>Environmental management – Life cycle assessment – Principles and framework</i>

Standard number	Title
ISO 14044 adopted as EN ISO 14044	<i>Environmental management – Life cycle assessment – Requirements and guidelines</i>
ISO 14051 adopted as EN ISO 14051	<i>Environmental management – Material flow cost accounting – General framework</i>
ISO 14052 adopted as EN ISO 14052	<i>Environmental management – Material flow cost accounting – Guidance for practical implementation in a supply chain</i>
ISO/AWI 14075	<i>Principles and framework for social life cycle assessment</i>
ISO/AWI 59014	<i>Secondary materials – Principles, sustainability and traceability requirements</i>
ISO/TR 14047	<i>Environmental management – Life cycle assessment – Illustrative examples on how to apply ISO 14044 to impact assessment situations</i>
ISO/TR 14049	<i>Environmental management – Life cycle assessment – Illustrative examples on how to apply ISO 14044 to goal and scope definition and inventory analysis</i>
ISO/TS 14048	<i>Environmental management – Life cycle assessment – Data documentation format</i>
ISO/TS 14071 adopted as CEN ISO/TS 14071	<i>Environmental management – Life cycle assessment – Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006</i>
ISO/TS 14072	<i>Environmental management – Life cycle assessment – Requirements and guidelines for organizational life cycle assessment</i>
ISO/WD TS 14074	<i>Environmental management – Life cycle assessment – Principles, requirements and guidelines for normalization, weighting and interpretation</i>

Annex I – Keywords for the standards research (in alphabetical order)

Keyword list sorted by application / topic	
Characterization of PVB / re-PVB	
Artificial Weathering	Hardness Shore A
Mass measurement method (MFR)	Mechanical Properties
Multiple extrusion cycles	Polyvinyl butyral /acetal
Restabilization - Reprocessing	Solution Viscometry
Tensile Tests	UV light
Yellowness index	
PVB in construction glass and windshields	
Laminated samples	Physico-chemical properties
Rheological properties (MFR)	Tensile properties (determination, plastics)
Thermal properties	Safety / security glass
Scaling up and production of films by cast extrusion	Scaling up PVB compounds
PVB for photovoltaic applications	
Building integrated photovoltaic	Photovoltaic(s)
PV module(s)	
PVB for peelable coatings	
Artificial weathering	Elongation
Peel adhesion	Tensile strength
UV resistance	Water resistance
PVB in carpet production	
Colour fastness (textiles)	Phthalate(s)
PVB in batteries	
Batteries	Calendar life
Charge and discharge	Cycle efficiency
Cycle life	Direct current (DC)
Direct current internal resistance (DCIR)	Electric vehicle (EV) cells
Electrolyte conductivity	Equivalent series resistance (ESR)
Gel electrolyte	Impedance
Self-discharge	Solid electrolyte interphase (SEI)
PVB in other applications	
Antibacterial properties	Antiviral properties
Chain of custody	Circular economy
Insulating materials	Recycling

Life cycle	
Environmental impact	Life cycle assessment
Life cycle cost	Social life cycle assessment

Annex II – ICS classes relevant for the SUNRISE project

03. Services. Company organization. Management and quality. Administration. Transport. Sociology				
100.01 Company organization and management in general		120.10 Quality management and quality assurance		
13 Environment. Health protection. Safety				
020.01 Environmental protection in general	020.10 Environmental management	020.60 Product life-cycles	030.50 Recycling	310 Protection against crime
17 Metrology and measurement. Physical phenomena				
220.99 Other standards related to electricity and magnetism				
27 Energy and heat transfer engineering				
160 Solar energy engineering				
29 Electrical engineering				
020 Electrical engineering in general	035.01 Insulating materials in general	220.20 Acid secondary cells and batteries	220.30 Alkaline secondary cells and batteries	220.99 Other cells and batteries
43 Road vehicles engineering				
040.10 Electrical and electronic equipment	040.65 Glazing and wiper systems	120 Electric road vehicles		
59 Textile and leather technology				
060.01 Textile fibers in general	080.01 Textiles in general	080.30 Textile fabrics	080.40 Coated fabrics	080.99 Other products of the textile industry
81 Glass and ceramics industries				
040.20 Glass in building				
83 Rubber and plastic industries				
080.01 Plastics in general	080.20 Thermoplastic materials		140.99 Other rubber and plastics products	
87 Paint and colour industries				
040 Paints and varnishes				
97 Domestic and commercial equipment. Entertainment. Sports				
150 Floor coverings				

Annex III – ISO stage codes³⁹

STAGE	SUB-STAGE						
	00	20	60	90 – Decision			
	Registration	Start of main action	Completion of main action	92 Repeat an earlier phase	93 Repeat current phase	98 Abandon	99 Proceed
00 Preliminary stage	00.00	00.20	00.60			00.98	00.99
	Proposal for new project received	Proposal for new project under review	Close of review			Proposal for new project abandoned	Approval to ballot proposal for new project
10 Proposal stage	10.00	10.20	10.60	10.92		10.98	10.99
	Proposal for new project registered	New project ballot initiated	Close of voting	Proposal returned to submitter for further definition		New project rejected	New project approved
20 Preparatory stage	20.00	20.20	20.60			20.98	20.99
	New project registered in TC/SC work programme	Working draft (WD) study initiated	Close of comment period			Project cancelled	WD approved for registration as CD
30 Committee stage	30.00	30.20	30.60	30.92		30.98	30.99
	Committee draft (CD) registered	CD study/ballot initiated	Close of voting/comment period	CD referred back to Working Group		Project cancelled	CD approved for registration as DIS
40 Enquiry stage	40.00	40.20	40.60	40.92	40.93	40.98	40.99
	DIS registered	DIS ballot initiated: <i>12 weeks</i>	Close of voting	Full report circulated: DIS referred back to TC or SC	Full report circulated: decision for new DIS ballot	Project cancelled	Full report circulated: DIS approved for registration as FDIS

³⁹ ISO/IEC Directives Part 1 and consolidated ISO supplement, 2021 (see Annex SD), https://isotc.iso.org/livelink/livelink/fetch/2000/2122/4230450/4230452/Consolidated_ISO-IEC_Part-1_%28E%29_2021.pdf?nodeid=21825221&vernum=-2, accessed 20 August 2021.

STAGE	SUB-STAGE						
	00	20	60	90 – Decision			
	Registration	Start of main action	Completion of main action	92 Repeat an earlier phase	93 Repeat current phase	98 Abandon	99 Proceed
50 Approval stage	50.00	50.20	50.60	50.92		50.98	50.99
	Final text received or FDIS registered for formal approval	Proof sent to secretariat or FDIS ballot initiated: <i>8 weeks</i>	Close of voting. Proof returned by secretariat	FDIS or proof referred back to TC or SC		Project cancelled	FDIS or proof approved for publication
60 Publication stage	60.00		60.60				
	International Standard under publication		International Standard published				
90 Review stage		90.20	90.60	90.92	90.93		90.99
		International Standard under systematic review	Close of review	International Standard to be revised	International Standard confirmed		Withdrawal of International Standard proposed by TC or SC
95 Withdrawal stage		95.20	95.60	95.92			95.99
		Withdrawal ballot initiated	Close of voting	Decision not to withdraw International Standard			Withdrawal of International Standard