GUIDE COPANT 0000:2022

Comisión Panamericana de Normas Técnicas
Pan American Standards Commission
Comissão Panamericana de Normas Técnicas

Guidelines for addressing circularity in standards

E: Directrices para abordar la circularidad en las normas

2022-10-13

CONTENTS

Page

Page

GUIDELINES FOR ADDRESSING CIRCULARITY IN THE STANDARDS

0. Introduction

The pressure on natural resources, the evident affectation of life on earth as a result of climate change and its impact on economic development has generated an active search for tools that promote sustainable development and slow down the deterioration of resources and life on earth.

Since the Millennium Development Goals and the Sustainable Development Goals, an ambitious commitment has been made to propose other rules of the game in the way of life of societies. These include sustainable production and consumption, resource management and climate action, among others.

As a consequence, in recent years, the environmental regulatory framework and the sustainable production and consumption policies of a large number of countries have migrated from exclusive waste management to incorporate extended production responsibility and concrete strategies for the implementation of the Circular Economy.

The circular economy (hereinafter CE), has had a strong focus on end-of-life and waste management, however, it is not limited to this since the purpose is to maintain the value of components, products, materials and solutions as long as possible, through biological or technical cycles. Therefore, CE proposes to adopt a systemic and life cycle thinking, which invites to have a more sustainable perspective in production and consumption and consequently, the focus of this paper will be to address the broad concept of CE.

As this topic is not only a trend, but also a tool incorporated by many countries to promote sustainable development, this document is prepared with the purpose that the developers of standards begin to incorporate this new awareness and perspective, as well as to strengthen their competencies in this area, for the preparation of normative documents.

It is hoped that this document will enable standards developers to approach CE to guide their stakeholders during the transformation and transition to CE through the standardization process.

This document contains:

- a list of relevant definitions associated with CE;
- an introductory conceptual framework for CE;
- some aspects that make visible the importance of the support that can be given to the implementation of CE, if the standards address issues related to circularity.
- Guidance on planning standardization work and how to address circularity issues in committees.
- Indications for the inclusion of some circularity approaches and principles in the standards.
- An example where multiple issues of circularity converge.
- In its Annex A, the relationship between the SDGs and circularity.
- Annex B contains some questions that help to promote circular thinking, depending on the type of standard being developed.
- In Annex C, a chart of the main families of standards and their link to the circular economy through the technical and biological cycles.

1. OBJECT AND SCOPE OF APPLICATION

This guide provides guidance to standards developers on how to consider circularity issues in planning, drafting, revising and updating standards and other normative documents.

The guide sets out a methodology that standards developers can use to generate their own approach to circularity based on specific themes

The purpose of this document is to provide standard developers with an overview of the relationship between the provisions found in standards and circularity issues and to support the drafting of provisions to foster a transition to the circular economy. It also seeks to raise awareness that taking circularity issues into account in standards is a process that requires balancing sometimes competing priorities and recommends the use of a life cycle approach when drafting provisions.

Considering that circularity is not an independent aspect of sustainability and climate change, it is recommended that this guide be applied in conjunction with other documents.

NOTE: For example, ISO has developed guidelines 82 and 84 related to sustainability and climate change, respectively.

In addition, it promotes the development of other relevant sectoral guides, so that standard developers address circular economy issues in a manner consistent with the principles and approaches of this guide.

The provisions of this guide are applicable to any type of committee, standard or may be directed to different areas, organizations, products, services, solutions or test methods.

2. NORMATIVE REFERENCES

The following documents are normatively referenced in whole or in part in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any corrections) applies.

3. TERMS AND DEFINITIONS

For the purposes of this document, the terms and definitions found in ISO-IEC 2, ISO 14050 and the following apply:

3.1 Life cycle analysis
ACV
Compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle.

Source: ISO:14040:2020

3.2 Add value
process of increasing the value of the object of consideration (i.e., a resource)

Source: ISO/CD 59004.

3.3 biomass
material of biological origin derived from living, or recently living organisms

Source: ISO/CD 59004.

3.4 circularity
degree of alignment with the principles for a circular economy

Source: ISO/CD 59004.

3.5 composting
aerobic process designed to produce compost

Source: ISO/CD 59004.

3.6 biological cycle
cycle(s) through which renewable resources are regenerated and biological nutrients are restored in the biosphere in a way that rebuilds natural capital.

Note 1 to entry: Such cycles can involve the regrowing of renewable resources and, at various stages, cascading, composting, anaerobic digestion or the extraction of bio-chemicals.

Note 2 to entry: The biological and technical cycles can be seen as loops into the complex system of resources flowing through the economy.

Source: ISO/CD 59004.

3.7 Technical cycle. cycle(s) within the economy through which resources are used, recovered, restored, and utilized within existing or new products.

NOTE 1 Such cycles involve activities including resource extraction, production, use, sharing, maintenance, maintenance, reuse, repair, remanufacturing or recycling, energy recovery or some other form of end-of-life management.

NOTE 2 The technical and biological cycles can be seen as loops into the complex system of resources flowing through the economy.

3.8 life cycle
consecutive and interlinked stages in the life of a solution

Note: within a circular economy, traditional linear life cycle understanding is upended in support of the concept of multiple life cycles.

Source: ISO/CD 59004

3.9 Standards developer/manager
An individual or group that participates in the development of a standard.

3.10 Sustainable Development
development that meets the environmental, social and economic needs of the present without compromising the ability of future generations to meet their own needs.

NOTE Sustainable development refers to the integration of the goals of a high quality of life, health and prosperity with social justice, and the maintenance of the earth's capacity to sustain life in all its diversity. These social, economic and environmental goals are interdependent and mutually reinforcing. Sustainable development can be seen as a way to express the broadest expectations of society as a whole.

Source: ISO 26000:2010

3.11 Durability
ability to function as required, under specified conditions of use, maintenance, repair, update and upgrade until a limiting state prevents its functioning

Note 1: Durability can be expressed in units appropriate to the part or product concerned, e.g., calendar time, operating cycles, distance run, etc. The units should always be clearly stated.

Note 2: Durability is influenced by reliability, maintenance, repair, updates, and upgrades. All Inputs required for maintenance, repair and upgrades (energy & materials) should be monitored when assessing the circularity performance. Trade-offs can need to be considered in design for reliability versus reparability and other lifetime extension factors.

Note 3: Repairs and upgrades can include refurbishing.

Note 4: Defined conditions for use, maintenance, repair, and upgrade vary by product or product-group.

Source: ISO/CD 59020.

3.12 ecodesign
systematic approach that considers design and development issues of a solution based on life cycle thinking, with an aim to support sustainable development

Note 1: Other terminology used worldwide includes "environmentally conscious design (ECD)", "design for environment (DfE)", "green design" and "environmentally sustainable design".

Source: ISO 14006:2020.

3.13 circular economy
economic system that uses a systemic approach to maintain a circular flow of resources, by recovering, retaining or adding to their value, while contributing to sustainable development

Note: Resources can be considered concerning both stocks and flows.

Note: From a sustainable development perspective, the inflow of virgin resources is kept as low as possible, and the circular flow of resources (3.1.6) is kept as closed as possible to minimize emissions and losses (waste) (of resources) from the economic system.

Source: ISO/CD 59004.

3.14 circular flow of resources
systematic cycling of the provision and use of resources within technical or biological cycles

Note 1: Resources can be considered concerning both stocks and flows.

Note 2: The biological and technical cycles represent loops into the complex system of resource flows in the economy.

Source: ISO/CD 59004.

3.15 environmental impact
change in the environment, whether adverse or beneficial, resulting in whole or in part from an organization's environmental aspects (3.2.7)

SOURCE: ISO 14001:2015

3.16 value creation model
business model
organization's chosen system of interconnected and interdependent decisions and activities that determines how it creates, delivers and captures value over the short, medium and long term

Note 1: A value creation model is more than the organization's processes and the solutions it provides.

Note 2: A business model is a subset of value creation models wherein the chosen system determines how the organization creates, delivers and captures economic value.

Source: ISO/CD 59004.

3.13 interested party
Stakeholder
person or organization that can affect, be affected by, or perceive itself to be affected by a decision or activity

Note 1: To "perceive itself to be affected" means the perception has been made known to the organization.

Note 2: The terms "interested party" and "stakeholder" are used interchangeably.

SOURCE: ISO 26000:2010

3.14 life cycle thinking
consideration of the circularity aspects relevant to a solution during its life cycle

Note 1: Some documents, e.g. ISO 14001, make use of the term "life cycle perspective" to capture the notion of "life cycle thinking". While "life cycle perspective" is used, for example, in ISO 14001, "life cycle thinking" is used in IEC 62430:2019.

Source: ISO 14006:2020.

3.15 systems thinking

holistic approach to understanding how different parts of a system can influence one another and the relationship of the system to the parts over time.

NOTE 1 Process or method for thinking about complex, non-linear and interconnected systems.

NOTE 2 For the purposes of this British Standard, systems thinking refers to an organization's role in understanding and influencing the system (e.g. value chain and how value can be created in, for example, a value network) to affect the way the market performs and operates in order to deliver its circular economy objectives.

Source: BS 8001

3.16 Recover value
process of recuperating the value of the object of consideration (i.e., a resource)

Source: ISO/CD 59004.

3.17 biobased resource
resource derived from biomass

Note 1: Biobased resources exclude peat and any material embedded in geological formations or transformed to fossilized material.

Note 2: Biobased resources include, e.g., trees, crops, grasses, tree litter, algae, micro-organisms, animals and wastes of biological origin, e.g. manure.

Source: ISO/CD 59004.

3.18 natural resource
asset (raw material) occurring in nature

Note 1: Natural resources can be either a renewable or non-renewable resource

Source: ISO/CD 59004.

3.19 recoverable resource
resource that can potentially be obtained from a resource that has already been processed or used

Note 1: Recovery is undertaken in order to add or recover value.

Note 2: A resource might provide no value and be considered waste.

Note 3: Other terminology used, depending on the context, includes "secondary resource", "secondary material", "post-consumption resource", "pre-consumer material", "post-consumer material" and "post-consumer material".

Source: ISO/CD 59004.

3.20 recovered resource
resource that is obtained from a resource that has already been processed or used

Note 1: Recovery is undertaken in order to add (3.1.10) or recover value.

Note 2: A resource may provide no value to the holder and be considered waste.

Note 3: Other terminology used, depending on the context, includes "secondary resource", "secondary material", "post-consumption resource", "pre-consumer material", "post-consumer material".

Source: ISO/CD 59004.

3.21 renewable resource
resource that can be grown or naturally regenerated within a foreseeable time frame

Note 1: A renewable resource is capable of being totally exhausted but can last indefinitely with proper stewardship.

Note 2: Resources that are derived from activities that occur only in the technosphere such as recycling are not considered renewable resources.

Source: ISO/CD 59004.

3.22 non-renewable resource
resource that exists in a limited amount that cannot be naturally regenerated within a foreseeable time frame

Note 1: Resources that are derived from activities that occur only in the technosphere (3.1.18) such as recycling (3.5.16) are not considered renewable resources.

Source: ISO/CD 59004.

3.23 virgin resource
natural resource that is used as a resource for the first time as input in a process or for creating a product

Note 1: Virgin resources can be either a renewable or non-renewable.

Note 2: Other terminology used, depending on the context, includes "primary resource".

Source: ISO/CD 59004.

3.24 waste
resource (3.1.5) that is considered to no longer be an asset as it temporarily provides no value to the holder and is therefore discarded

Note 1: The assignment of value to waste as a resource is linked, in part, to the available technology (e.g., landfill mining).

Note 2: Some regulations require the holder to dispose of certain types of wastes, while others assign value to waste.

Note 3: Value can be assigned to waste as a result of a need from other interested parties at which point the resource is no longer considered waste.

Note 4: Waste may include energy and gases.

Source ISO/CD 59004.

3.25 Social Responsibility
Responsibility of an organization for the impacts of its decisions and activities on society and the environment, through ethical and transparent behavior that:

- contributes to sustainable development (3.2), including the health and well-being of society;
- take into consideration the expectations of its stakeholders (3.3);
- complies with applicable legislation and is consistent with international behavioral standards; and
- is integrated throughout the organization and is put into practice in its relationships.

NOTE 1 *to* entry Activities include products, services and processes.

NOTE 2 *to* entry Relationships refer to the activities of an organization within its sphere of influence.

SOURCE: ISO 26000:2010

3.26 Risk
effect of uncertainty on objectives

Note 1: An effect is a deviation from what was planned. It can be positive, negative or both, and can address, create or result in opportunities and threats.

Note 2: Objectives can have different aspects and categories, and can be applied at different levels.

Note 3: Risk is often expressed in terms of risk sources, potential events, their consequences and their probabilities.

Source: ISO 31000.

3.27 retain value
process of maintaining the value of the object of consideration (i.e., a resource (3.1.5)) within the circular flow

Source: ISO/CD 59004.

3.28 Solution
combination of a product and a service that fulfils a need

Note 1: In this context, 'need' concerns the satisfaction of an organization's or stakeholder's interests, while also considering human needs (e.g., health, influence, competence, impartiality and meaning-making).

Source: ISO/CD 59004.

3.29 Sustainability
The state of the global system, including environmental, social and economic aspects, in which the needs of the present are met without compromising the ability of future generations to meet their own needs.

NOTE 1 *to* entry Environmental, social and economic aspects interact, are interdependent and are often defined as the three dimensions of sustainability.

NOTE 2 *to* entry Sustainability is the goal of sustainable development (3.2).

Source: ISO 82:2014

3.30 industrial symbiosis
Industrial symbiosis is the use by one company or sector of the by-products (including energy, water, logistics and materials) of another.

3.31 Value
gain(s) or benefit(s) from satisfying needs and expectations, in relation to the use of resources (3.1.5)

EXAMPLE Revenues, savings, productivity, productivity, sustainability, satisfaction, empowerment, engagement, experience, public health, trust.

Note 1: The gain can relate to the specific function and performance of a solution (3.2.1).

Note 2: Value is relative to, and determined by the perception of, the interested party(ies) (3.4.2).

Note 3: Value can be financial or non-financial e.g., social, environmental, and other gains or benefits.

Note 4: Value is dynamic over time.

Source: ISO/CD 59004

4. CIRCULAR ECONOMY IN GENERAL

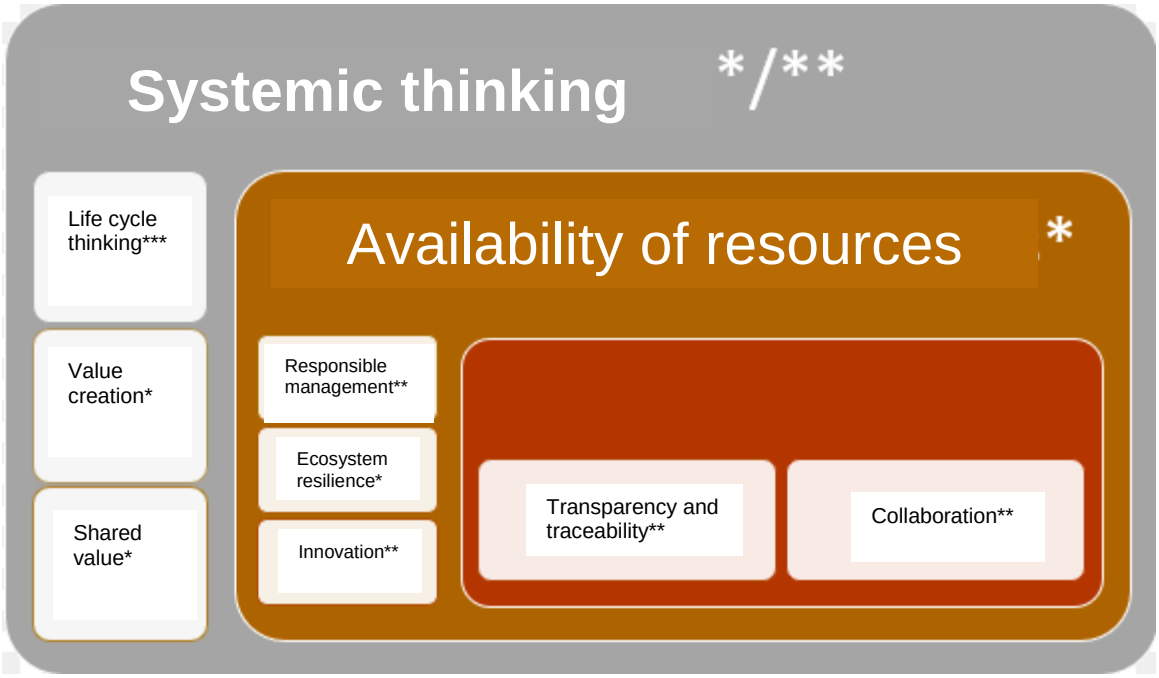
The Circular Economy is an economic system that promotes a systemic approach, with the purpose of stimulating the circular flow of resources, through strategies, actions, and statements that promote and concretize the retention, recovery, or addition of the value of a product, component, material, solution, contributing in parallel to sustainable development. This contribution can be made visible through, for example, the minimization of emissions and losses of resources from the economic system.

The circular economy makes visible the tensions between resources, business models, measurement and evaluation, and finally, the declaration of circularity. It involves natural, virgin, renewable, recoverable, non-renewable, bio-based, and other resources.

The circular economy is operated by stakeholders, including organizations, customers, consumers, etc., and is impacted by the government and its administration.

The migration from a linear to a circular system of operation depends on many factors, such as, for example, the creation of a value model, the associated value chain and network, the sphere of influence, exchanges, design, development, eco-design, logistics, to mention a few. There are still many quantitative challenges regarding circularity, which is why we are studying the impact, performance, measurement, and evaluation of circularity, as well as the association and support of indicators to promote traceability and analyze the results in order to implement continuous improvement.

According to the authors, the circular economy may have guiding principles, some of which are fully, partially or implicitly developed in the current document:



*Mentioned by ISO 59004
** Mentioned by BS 8001
***Mentioned by other authors

5. APPROACHING CIRCULARITY IN STANDARDS

This chapter explains how to address and develop circularity in standards and the importance for organizations. At the same time, it details the minimum principles necessary to achieve the objective of addressing circularity in standards.

5.1 General information

There are similarities between addressing circularity in standards and addressing circularity in an organization. However, there are some unique challenges in standards due to the nature of their process (e.g., standards are largely developed by volunteers from a variety of organizations who meet occasionally and may not continue after the completion of a particular project). Therefore, once the relevant principles of the work have been discussed, the main task is to identify relevant and significant circularity issues (see 7.4.2 and 7.4.3) and address them by integrating them into the committee's work and including specific provisions in the technical standards.

For this, standards developers should initially identify whether there are existing public policies, related national regulations that address relevant aspects at any stage of the life cycle. Similarly, existing information related to the circular economy, including information that has already been the subject of standardization, can be used to identify and assess relevant issues.

Depending on the nature of the aspects identified and the scope of the document to be developed, standards developers should decide whether the provisions to be included should be requirements, recommendations or informative clauses.

A preliminary assessment is recommended to determine the relevance and significance of the different aspects identified. More details are provided in chapter 8.

However, it may sometimes be necessary to involve experts with general or specific knowledge on issues related to circularity, for example, in complex fields such as eco-design, environmental footprints and declarations, industrial symbiosis, climate change, innovation management, chemistry and green engineering. It may also be useful to include other types of guidance relevant to specific sectors today, on environmental provisions identified in related national or international standards, such as waste classification and disposal, chemicals management, as well as extended producer responsibility.

Guidance on the relationship between the UN SDGs and circularity is provided in Annex A for drafting standards.

These same principles can be applied in the search for partnerships to improve the use of circularity in general in the drafting of standards. This section (section 5) discusses how the circular economy can be addressed in the planning stages of standards work. Specific guidance on the identification of circular economy issues (including principles and approaches) is provided in paragraphs 6 and 7. Section 8 discusses how these issues can be addressed in the process of developing or updating standards.
Figure 1 illustrates a process for identifying and addressing circularity issues.

Note Other approaches can be used in addition to the linear representation shown in Figure 1. Figure 1.

Note The numbering in Figure 1 refers to the numbers in this guide.

Annex B addresses questions that are expected to assist in the inclusion of circularity in the development of different types of standards.

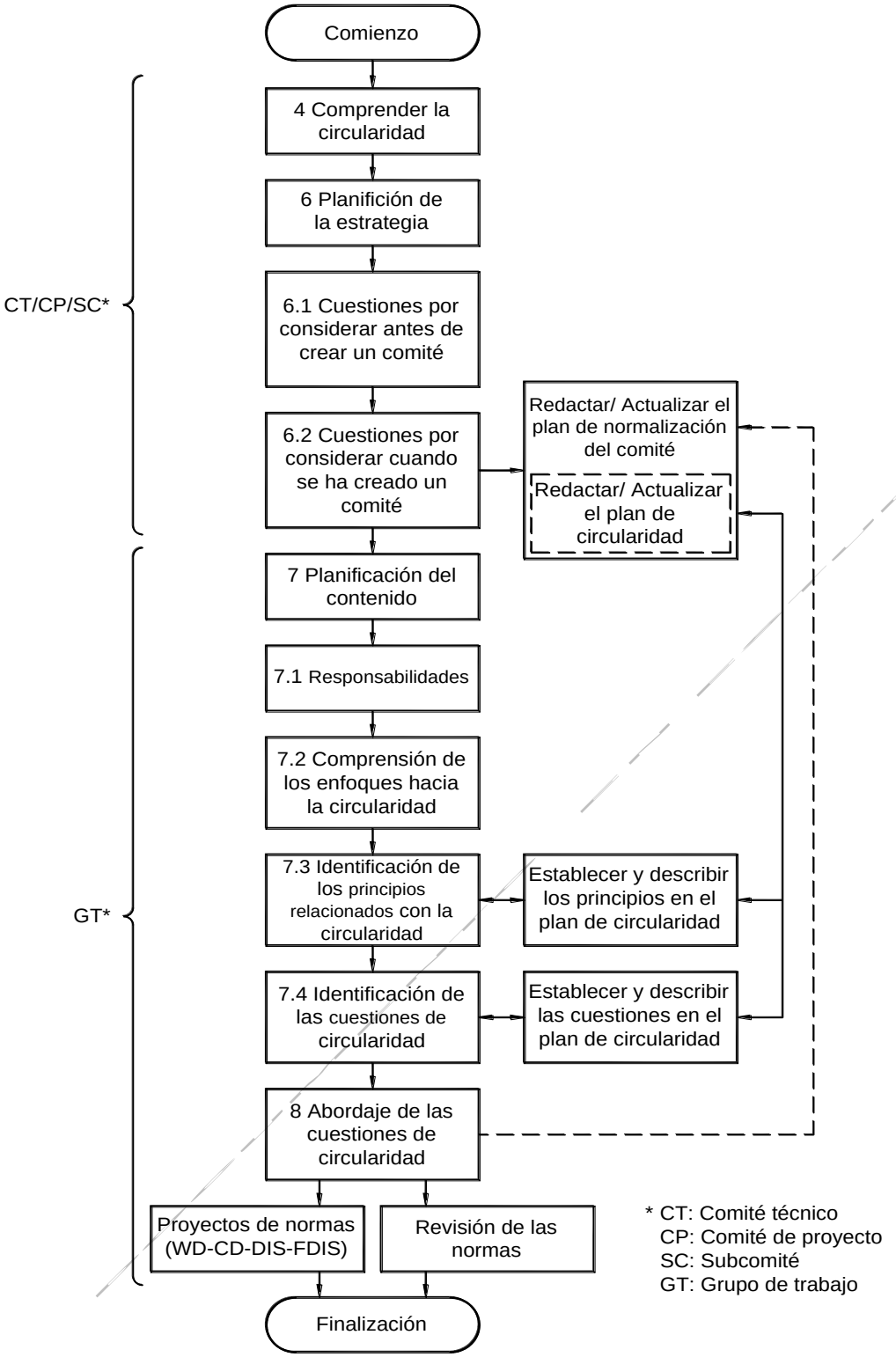


Figure 1. Process Flow jo of a standards study

To be adjusted: Addressing circularity is section 5.
Review the rest of the entries in the figure.
See if brackets should address working groups, better than outside Committee as some NSBs do not work with Working Groups.

5.2 Principles related to addressing the circular economy in standards.

5.2.1 General

The application of appropriate principles is critical to ensure that the significant impacts, risks and opportunities of the circular economy are considered when developing standards. These principles are the basis and will guide the application of future requirements and guidance in the context of the circular economy.

5.2.2 Participatory approach

An interactive process of draft development and revision focused on scientific research, best practices, technical rigor, consensus, practicality and stakeholder implementation is applied during the development of standards.

Standards developers should be diligent in repeatedly checking circular economy research] and other relevant sources. Such references are critical to address the meaning, relevance and pertinence of specific circular economy issues.

5.2.3 Clarity

The development of standards is based on clear and concise concepts, terms and definitions. Standards must be understandable and unambiguous.

If literature is consulted in languages other than the local language, caution should be exercised during translation and interpretation as it may generate multiple meanings according to each culture and different technical, regulatory and legal environments.

Because of the thematic development of the circular economy around the world, standards developers are advised to be aware of the various definitions and approaches, depending on the jurisdiction, public policies of each country or region, governmental perspectives and industry sector.

5.2.4 Stakeholder Involvement

Standards development is designed for the broadest possible audience. The participation of all identified stakeholders should be encouraged, removing barriers as much as possible.

EXAMPLE The development of standards with the support of virtual tools can encourage broader participation.

In identifying relevant and significant circular economy issues, standards developers should be aware of and, where possible, incorporate perspectives and develop consensus from a variety of countries and regions.

5.2.5 Transparency

Standards development is a transparent process involving various activities and decision-making processes. When considering circularity issues in the particular context of a standard, standards developers should present the information in an open and comprehensive manner.

5.2.6 Early integration

The consideration of the circular economy in the early stages of the work of the committee facilitates the integration of circularity aspects in the standards, since there is greater flexibility for changes and inclusion of other aspects.

On the contrary, waiting until later stages in the study may make it difficult or impossible to include important aspects of circularity, given that technical decisions have already been made.

5.2.7 Priority of the scientific approach

Preference to natural sciences (such as physics, chemistry, biology) will be given when making decisions on the study of circularity issues. If this is not possible, other scientific approaches (such as social and economic sciences) are used. Only if there is neither a natural scientific basis nor a justification based on other scientific approaches or international conventions is it possible to make decisions based on objective judgments.

5.2.8 Performance orientation

Whenever possible, requirements should be expressed in terms of performance, not as design or descriptive characteristics. This principle allows maximum freedom for technical development and reduces the risk of undesirable impacts on the market (e.g. by limiting the development of innovative solutions).

6. STRATEGY PLANNING

6.1 General information

This chapter details the steps to be followed for the planning of the standardization work to be carried out: the formation of the committee, the scope, the structure, its work plan and the involvement of stakeholders. It gives guidelines on how to address circular economy aspects in the overall work of the committee.

6.2 ISSUES TO BE CONSIDERED BEFORE CREATING A COMMITTEE

NOTE Unless otherwise indicated, in this Guide the term "Committee" includes technical committees (TC), as well as other bodies that report to them.

It is recommended that the circular economy and circularity aspects be taken into account when forming the technical committees, as well as in the subsequent phases of the standardization process. To this end, it is proposed to identify and include the UN SDGs related to the circular economy that could be supported by the work of the committee and the normative documents it will develop.

This will allow aspects related to the circular economy to be integrated into the purpose, structure and work plan of a TC from the beginning and in turn promotes awareness of the importance of fostering the circular economy among TC leaders and participants. Additionally, it serves to clarify the importance of making the circular economy an integral part of the work of the TC. Considerations that should be taken into account at this stage are as follows:

a) Scope: Has the circular economy been taken into account in a manner appropriate to the TC's scope of work?

b) Structure: How will the circular economy be addressed in the TC structure?

Options include:

- include the circular economy as specific topics to be addressed by a subcommittee;
- the TC should have knowledge of CE, as far as possible be interdisciplinary.
- integrate the circular economy into the efforts of each Technical Committee (TC).
- or a combination of these options.

c) Participation: Does the TC have the appropriate participation (respecting and taking into account the directives, regulations and procedures of the standard setting body and guidance on participation), in terms of both stakeholder diversity and knowledge and experience, to effectively address circular economy issues? What steps could be taken to address the constraints?

It is recommended that when a TC is created, the documentation include a description of how these questions have been addressed. These same concepts can be applied to the formation of SCs within TCs.

It is advisable that existing TCs also go through this process and update their purpose, structure and participation processes, as appropriate.

6.3 COMMITTEE STRATEGIC PLAN.

It is important that the technical committees have a strategic standardization plan for their field of activity.

NOTE: In ISO this plan is equivalent to the *Business plan*.

It is recommended that each committee's strategic plan include how it intends to address the circular economy in its work. The TCs that currently exist should update their standardization plans to include the circular economy.
This circular economy component of the committee's Standardization plan should be appropriate to the TC's field of work, given that circular economy issues may be more directly involved in some areas of standardization than others.

The way in which CE is intended to be addressed in the work of the committee, should include.

- defined processes describing how the circular economy will be taken into account in the selection of new work topics, including the definition of the scope of such work topics;

- programs to ensure that TC participants are aware of the importance of the circular economy and how it applies to standard drafting by including the guidance provided in this Guide;

- a description of how the work of the TC will be reviewed with respect to identifying approaches and principles relevant to the circular economy in general and how particular circularity issues might arise in the context of the standard being developed.

The committee's Standardization/study/business plan should identify relevant circular economy issues that may be applicable to all or most of the work of the TC. The committee's Standardization/study/business plan should be updated periodically. Alternatively, relevant circular economy issues may be identified at the TC level, or on a document-by-document basis, or through a combination of these approaches on a case-by-case basis (e.g., a TC-wide assessment of circularity issues).

The importance of including how circularity is addressed in the committee's strategic plan is to take it into account in the development of standards. Therefore, processes to verify that relevant circularity issues are identified and addressed in the documents that are produced are critical to its success.

7. PLANNING THE CONTENT OF THE RULES ADDRESSING CIRCULARITY

7.1 General information

Before discussing and selecting circular economy issues to be addressed in a standard, the TC should be made aware of approaches that can be used to guide the technical work and to identify and assess circular economy issues. A description of some of the approaches that could be used is given in 7.3.2 to 7.3.7. These approaches can be applied individually or in any combination, depending on the circumstances. There may also be other approaches that are not identified here.

7.2 RESPONSIBILITIES

Once the overall strategy for addressing circularity within the work of the TC is determined, agreement should be reached on how it will be implemented in the context of a specific standardization project. Unlike strategic planning, which is usually done at the TC level, this task is often done at the instance, which is responsible for developing the technical content of a specific standard.

7.3 UNDERSTANDING OF APPROACHES TO THE CIRCULAR ECONOMY

7.3.1 General

7.3.2 Systemic approach

Systems thinking suggests that organizations involved in the circular economy adopt a holistic system to understand how individual decisions and activities interact within the broader systems of which they are part, as well as being aware of the complex, non-linear and interconnected nature of the value chain to which they belong; i.e. when considering the circular economy, the organization, product, service, solution or method, within a given system, should also be addressed, related systems and subsystems should also be taken into account, as they are all interconnected and interdependent.

Thinking about these relationships is crucial to understanding how an organization creates value and how it might intervene in the "system" to influence the sustainable resource management of its portfolio of products and services.

For example, in the case of a product, this could include identifying all the components and material inputs involved in its commercialization, as well as the ways in which natural systems are affected throughout its life cycle.

On the other hand, understanding the systemic approach can include, awareness of all the inputs and outputs of processes or services and analyze the generation of by-products from them or reduce the amount of waste by tracing in all these interconnections the place or places, actors, actions to be mobilized to achieve such reduction, transformation or generation of value to become a secondary raw material.

Similarly, by including appropriate provisions directly in the text, standards developers can also encourage standards users to apply systems thinking in the application of standards.

7.3.3 Life cycle thinking

Life cycle thinking examines all stages of the life cycle of a particular product or activity in order to identify the significant environmental aspects, and from an analysis of these, actions could be taken in terms of circularity. This approach is of absolute relevance, since it is directly related to the systemic approach explained above and promotes a global vision and understanding of the universe in which the subject or object under study is immersed. The life cycle approach and subsequent analyses can make visible areas of work to make the circular economy viable or not, in an organization, product, service, solution or method.

A life cycle thinking, invites the creation of an inventory of materials, water and energy, as well as the analysis of the main resource flows at different stages.

For example, typical product life cycle stages include material acquisition, design, production, use and end-of-life. For some activities or products, it is possible that their life cycle may include different stages, for example, promotion, provision and termination. For other activities or products, life cycle thinking may not be directly applicable. Different stages may also include an element of transport, which in itself may involve a number of different sustainability issues.

From a purely environmental point of view (i.e., without considering the social and economic dimensions of sustainability), an example of the range of life-cycle issues related to manufactured equipment may include the material impact (e.g., resource depletion) and energy flows (e.g., greenhouse gas emissions) resulting from the manufacturing stage, as well as the impact resulting from its distribution and operation during the use stage of the equipment (e.g., energy use and emissions). The end-of-life stage may involve consideration of design-related issues for disassembly, which may affect the ability to recover and reuse or recycle materials. The life cycle approach can also be used to address economic and social aspects (as observed, for example, in life cycle cost and social life cycle assessments).

To understand the circularity aspects of the draft standard, standards developers should explore how the standard could contribute to a circular economy. A circular economy is

an industrial economy that is restorative (by design or intent) and aims to produce goods and services while reducing the consumption of raw materials, water and energy, and at the same time reducing waste. The analysis of the impact on resource use and energy requirements is important if activities, processes, etc., are designed for circularity. It is therefore recommended to analyze these impacts, for example, through the relevant standards on life cycle assessment, including ISO 14040 and ISO 14044.

7.3.4 Preventive approach

The precautionary approach suggests that, where threats of serious or irreversible harm to the environment or human health have been identified, lack of complete scientific certainty is not a reason to postpone cost-effective measures to help prevent or reduce environmental degradation or harm to human health. While the precautionary approach can provide a basis for action in the absence of scientific certainty, reliance should be placed on available scientific information, and efforts should be made to identify and close gaps in relevant scientific knowledge.

7.3.5 Risk-based approach

The transition from a linear to a circular economy implies changes in several areas, as well as generates various risks and opportunities. Therefore, it is important to employ approaches and tools that can assist with an analysis of the potential consequences of the decisions and activities that the circular economy invites, against different time scales.

The risk-based approach involves identifying risks by assessing their nature and significance, and then managing them taking into account circular economy criteria and with other considerations determined to be applicable to the situation. Risk management actions may include eliminating the risk altogether (e.g., by not undertaking the activity), decreasing the risk associated with the activity (e.g., by modifying the activity), mitigating the consequences of the activity, accepting some or all of the risks, or a combination of these approaches.

The choice of one or more risk areas (e.g., sales volumes, new business units, material substitution, revenue generation or environment) depends on the information available, the subject of the standard, the views of stakeholders and the type of intended user of the standard.

EXAMPLE ISO 31000 establishes principles, a framework and a process for risk management, which are applicable to any type of organization in the public or private sector. ISO/IEC Guide 51 provides specific guidance to standards developers for the inclusion of security aspects in standards.

It is useful to analyze these risks against the market context, emerging trends, existing value proposition, strategic fit, stakeholder interests, timelines, ability to reduce resource intensity, among others, as well as in circularity pilots, during implementation, etc.

7.3.6 Focus on stakeholders

As part of the ecosystem surrounding the circular economy, and as suggested by systems thinking, considering any party affected or involved by the circular economy is absolutely relevant, given that the materialization of the circular economy is a collective effort and a joint effort of all parts of the value chain to a greater or lesser extent. Adopting the

principles of the circular economy is a way to improve the relationship with these stakeholders and to maintain the organization's legitimacy and social license to operate.

Similarly, with other types of impact, the impact related to stakeholders can be beneficial or adverse in the transition, start-up, implementation and application or not in this type of initiatives.

Different stakeholder groups, internal and external, may be affected by circularity issues, either individually or collectively, and standard developers should take into account any group that could potentially be impacted by the use or application of a standard. In addition to consumers, customers, workers, organizations involved in the supply chain and communities, this also includes the potential impact on future generations and the general public, especially when considering circularity issues associated with issues such as climate change or broader issues such as circularity assessment and measurement.

7.3.7 Focus on what is relevant and not misleading

The information provided on aspects of circularity will always be relevant to the value of the data to be communicated and its purpose will never be to distract attention from the most damaging impacts on the environment.

7.4 IDENTIFICATION OF THE PRINCIPLES RELATED TO CIRCULARITY

7.4.1 General

In addition to the general approaches that are considered in the process of developing all standards, the WG should agree on some principles related to circularity that are particularly relevant to the specific area. These principles may be kept for the exclusive use of the WG to guide its work, or they may also be included in the standard in order to guide the user of the standard.

7.4.2 Systemic thinking

Standards developers should encourage stakeholders to apply this principle in the development or updating of standards documents by approaching discussions and thinking about their products, methods, services, etc., from a long-term systems perspective considering the impacts of interactions between environmental, social and economic systems, taking into account the life cycle perspective of their solutions. from a long-term systems perspective considering the impacts of interactions between environmental, social and economic systems, taking into account the life cycle perspective of their solutions.

7.4.4 Responsible management

Standards developers should assist in raising stakeholder awareness of this principle, which invites stakeholders to understand that an organization is responsible for managing all stages of its decisions and activities, from inception through to compliance and end-of-life. These stages could include what is happening in its supply chain and customer base and should take into account economic, environmental and social issues, both current and projected into the future.

Stakeholders should manage the direct and indirect impacts of their decisions and activities within the broader systems of which they are a part.

Responsible stewardship refers to accountability that can be shared or wholly owned by an individual, organization or community and is becoming increasingly important for the implementation of circular economy principles along the value chain.

7.4.5 Value creation

Standards developers should promote that stakeholders involved in the development or updating of a normative document on products, management systems, methods, services, etc., propose solutions that regenerate, retain or add value by providing effective responses through the efficient use of resources and contribute to satisfy society's needs. The standards developers must promote that the interested parties involved in the development or updating of a normative document on products, management systems, methods, services, etc., propose solutions that regenerate, retain or add value, providing effective answers through the efficient use of resources and contribute to satisfy the needs of society, that is, that the objects or subjects of study can maintain their maximum value and usefulness at all times.

On the other hand, the focus should also be on minimizing or at least discussing aspects related to the extraction of non-renewable resources and managing renewable resources to regenerate and improve their value over time in the design and development of standards.

7.4.6 Shared value

Standards developers should promote that organizations and stakeholders understand and indeed collaborate during the development of the standard, along the value chain or value network in an inclusive and equitable manner, for the benefit and welfare of society, sharing the value created with the solution.

7.4.7 Resource availability approach

During the development of a standards document, standards developers should promote that the discussions and content of standards address issues with sustainable management and regeneration of resources, their stocks and flows to contribute to availability for present and future generations, with the aim of continuing to regenerate, retain or add value, while promoting ecosystem quality and resilience.

7.4.8 Resource traceability

Developers should encourage discussions during the development of a policy document, as well as the inclusion of aspects related to traceability and circular flow of resources and declared information, as this promotes clear communication, transparency and recognizes the interests of the various stakeholders.

7.4.9 Ecosystem resilience

Standards developers should promote related discussions and include in the documents aspects on the development and implementation of [circular] practices and strategies that

protect and contribute to the regeneration of ecosystems and their biodiversity, taking into account planetary boundaries.

7.4.10 Transparency

Standards developers should collaborate during discussions of circularity issues to raise organizations' awareness of transparency as a pillar of circularity, i.e. explain that they should be open about decisions and activities that affect their ability to transition to a more circular and sustainable mode of operation and are willing to communicate these in a clear, accurate, timely, honest and complete manner.

The principle of transparency does not necessarily mean that proprietary information must be made public, nor does it imply providing information that is privileged or that may breach legal, commercial, security or personal privacy obligations. However, as with collaboration, building trust, both internally and externally, is key.

Standard developers should be transparent in their decisions and activities. They should present information in an open and comprehensive manner when considering different sustainable development issues in the context of a particular standard and its provisions (if any), which are included to address the potential impact of an issue on society, the economy or the environment.

In new standards or updates, compliance with this principle can be demonstrated by including a statement indicating whether this Guide was taken into account during its preparation.

7.4.11 Collaboration

Standards developers should promote stakeholder awareness of the importance of collaboration as a trigger for circularity internally and externally, an issue that can facilitate the development of a standard and/or promote its implementation. stakeholders should collaborate internally and externally through formal and/or informal agreements to create mutual value.

For example, it is unlikely that an organization can make substantial progress in transitioning to a more circular and sustainable mode of operation without collaboration. Progressive collaboration between companies (e.g., in supply chains and across sectors), governments, academia, civil society and consumers is essential for this to occur.

7.4.12 Stakeholder interests

Working with different organizations, each with different motivations, cultures and requirements, can be challenging; however, developers of technical standards should respect, consider and respond to the needs of relevant stakeholders and, where possible and practical, engage them in an exchange of ideas and exchange of information that draws on information from a broad and balanced base of knowledgeable, experienced and representative people, e.g. people reflecting geographic, ethnic, gender and stakeholder diversity.

7.4.13 Ethical considerations

Technical standards have global implications, so standards developers should follow the ISO Code of Conduct and the ISO and Icontec Code of Ethics and give due consideration to all intergenerational, interregional and intrasocial factors.

7.3.14 Communication

CB is a series of actions that comes to life when communicated to stakeholders. Standard developers should therefore encourage the inclusion of aspects that lead to documenting and reporting information on the organization's transition to CB and sustainability, to raise awareness among internal and external stakeholders, but also to record and communicate progress and achievements to all of them.

The principles of the CB are traceability and transparency, therefore the developers of standards should promote awareness of environmental declarations, apply the corresponding general framework of the ISO 14020 series where applicable, and ensure that they respond to the circularity actions of the 59000 series.

7.5 IDENTIFICATION OF CIRCULAR ECONOMY ISSUES

7.5.1 General

In relation to the principles and approaches described in 7.2 and 7.3, standard developers should identify circularity issues that are considered relevant and significant to the subject area for which a standard is being developed. Many sources of information on the circular economy, sustainability and sustainable development can be useful in this process. These sources include applied case records, material data sheets, risk or trend studies, legal requirements, product declarations, sustainability reports, impact assessment reports, published peer-reviewed scientific studies, and the results of stakeholder consultations.

Circularity issues can also be identified by considering the structure of key sustainability issues and issues related to sustainability and sustainable development. See the list of reference documents in the Bibliography.

Although the circular economy contributes to the fulfillment of sustainable development, since it is a developing and expanding thematic area, it addresses some particular issues, but it also relies on the three pillars of sustainability, (society, environment and economy). Therefore, we cite the particular issues of the circular economy and the interactions between the three fundamental dimensions, to alert on the connection that should be maintained as much as possible between the three pillars and the circular economy.

This has already been developed previously

In relation to sustainable development, a wide range of potential issues may arise, including, but not limited to, the following:

a) the company;

- social equity ;

- labor relations ;
- health and safety;
- education, training and literacy;
- community participation;
- culture;
- quality of life;

b) the environment;

- Use of natural resources;
- energy use and climate change;
- pollution of land, water or air;
- protection of biodiversity and natural habitats.

c) the economy:

- employment ;
- poverty;
- business;
- income;
- economic performance and development;
- technology and innovation;
- supply chain and value.

Standards developers should determine the relevance and importance of each issue in the context of the particular standard.

EXAMPLE In the context of social responsibility, ISO 26000:2010 established seven core topics, which collectively consider 37 different issues that were identified through a stakeholder-based approach. The ISO 26000:2010 core topics and issues are presented in Annex A for reference.

7.5.2 Identification of relevant circular economy issues

Not all circular economy and applicable sustainability issues are relevant to all types of standards. In order to identify which circular economy issues are relevant, standard developers should consider the issues in the context of the subject matter and the

purpose and scope of the standard, the intended users and the overall objectives of the standard.

To determine relevance, standards developers should:

- understand and discuss the purpose and scope of the specific standard, and identify related activities and products;
- identify and, where necessary, engage relevant stakeholders;
- examine the variety of ways in which the standard, depending on its content, could have a positive or negative impact on circularity and sustainability.

It is important to consider the timing and duration of any impact; standards developers should identify both issues that arise in relation to the day-to-day use or application of the activity or product, as well as issues that only arise occasionally under very specific circumstances.

7.5.3 Identification of significant circularity issues

Where relevant circularity issues have been identified, standard developers should examine these issues and prepare criteria for deciding whether any of them have any significance. The significance of an issue that has been identified as relevant to the scope of a standard is directly related to the potential magnitude of its impact on circularity, whether that impact is positive or negative, direct or specific, or indirect and cumulative. The importance of an issue may vary independently of its relevance.

In determining materiality, standards developers may use criteria drawn from topics such as:

- impact on the environment and natural resources;
- the use and consumption of energy, materials and natural resources (e.g., renewable versus non-renewable);
- compliance with legal and other requirements;
- the impact on the economy, economic development, employment and poverty eradication;
- the impact on public and occupational health and safety;
- issues of interest to relevant stakeholders;
- the potential effects of taking or not taking action on the focus or issue, including issues related to the cost of implementation and economic viability;

NOTE "Impact" can be positive or negative.

EXAMPLES If the issue of working conditions has been identified as relevant to the subject matter and scope of a specific standard, the use of child labor, even if it is a serious problem, could be of very little significance for a product standard for a product

type where labor standards and skill levels within the sector are generally high; however, it could be very significant for a product standard related to another sector where labor standards and skill levels within the sector are generally low.

8. ADDRESSING SUSTAINABILITY ISSUES

8.1 GENERAL

When relevant and significant circularity issues that could be addressed by the standard have been identified, standard developers should decide whether and how to provide guidance or requirements within the standard, depending on the purpose, scope and type of standard. Standard developers are also encouraged to introduce methods or indicators for the assessment of circularity, where appropriate.

If these provisions are included directly in a standard, using it is more likely to promote circularity, value chain collaboration and the circular economy effectively while increasing its beneficial effects.

Standards developers should recognize that there may be a number of appropriate ways to address circularity and that the resources and capabilities to implement particular solutions may vary considerably, and should therefore avoid introducing requirements that discourage implementation of the standard.

Since circularity and progress towards the circular economy depends on many social, environmental, economic, geographic and technical variables, standards developers should avoid making general conclusions about the "circular" nature of a given activity, product or material.

8.2 APPROACH TO CIRCULARITY IN SOME TYPES OF STANDARDS

8.2.1 General

Depending on the type of standard being worked on, standards developers may need to take into account particular considerations when incorporating specific provisions in the standard to address circularity.

8.2.2 Process standards

Process standards and standards specifying measures and definitions may directly or indirectly regulate or affect physical or social processes, which may, in turn, have an impact on circularity. In developing such standards, attention should be paid to the nature of such underlying processes and their consequences, including the following, in particular:

- the environmental consequences (e.g., those associated with production, distribution and energy use) of producing the materials needed to implement the standard;

- the environmental and health and safety consequences of the operational implementation of the processes specified by the standard;

- the potential for resource savings by improving procedures, measurement and definitions through standardization;

- the potential to facilitate the development of technologies that promote new jobs and new industries, or provide similar beneficial services or economic benefits (and any resulting environmental or social benefits).

- the potential to consider the life cycle of the materials to be involved in the process or of the products and services resulting from it.

8.2.3 Management system standards

Management system standards can indirectly alter the circularity impact of the processes regulated by the management system. For example, management systems can directly alter the activities of workers, the additional stakeholders involved and the systematic strategies for identifying and managing issues associated with circularity.

Management systems are typically characterized by the "Plan-Do-Check-Act" model (e.g. NTC-ISO 9001 on quality management or NTC-ISO 14001 on environmental management systems).

8.2.4 Product standards

Product standards, including standards for services, may have many different circularity and circular economy issues. Standard developers should consider the different sustainability issues of products and services, and how they might be affected by the scope and application of the standard.

Some examples are:

- The resources used and costs during the product life cycle;

- The elimination of greenhouse gases and emissions during the product life cycle;

- The possibility of using recycled materials, co-products or by-products from other processes;

- the product's potential to be repaired during its stage of use;

- the nature and distribution of environmental, social or economic benefits that may result from the use of the products or services;

- the impact on economic development or innovation;

- the impact of the end-of-life stage.

- the potential to optimize the value of the materials or keep them for as long as possible

- the potential for recycling, reuse or disassembly of the product at the end of its service life

8.3 SOLUTIONS TO ADDRESS THE CONFLICT BETWEEN MULTIPLE CIRCULARITY ISSUES

When multiple circularity issues are identified as relevant and significant, multiple solutions may emerge to address these issues. In such cases, conflicts may arise, i.e., implementing a solution for one issue may prevent a solution for another issue from being implemented, or may even exacerbate the impact of the other issue.

In such cases, standards developers should seek conciliation in case of conflicts, whenever possible. Alternatively, standards developers could offer several options, in order to make standards users aware of the issues and allow them to decide which option to adopt.

When multiple circularity issues are addressed in a given standard and there are obvious conflicts, standards developers should:

- identify conflicting solutions that apply to the issues;
- determine whether there is an obvious preference for a particular solution, based on the relevance, importance or frequency with which the issues occur;
- if there are no obvious preferences, clearly explain the options within the standard;
- recommend that these issues be explicitly considered by the committee or group developing the standard;

Based on the committee's deliberations, and depending on whether the standard contains requirements or recommendations, ensure that the standard requires or recommends, as appropriate, that specific sustainability-related decisions made by users of the standards are also disclosed to interested parties.

8.4 Examples of the circularity approach in standards

Several examples of how to address circularity in different types of standards are described below.

Table 1 - Examples of inclusion of circularity aspects in normative documents.

Type of standard	Reference	General Purpose	Some associated numerals
Product	NTC 174:2018 Concrete. Concrete aggregates specifications	Establishes gradation and quality requirements for fine and coarse aggregates (except light and heavy aggregates) for use in concrete.	3.2.1 Recycled aggregate: Granular material that is derived, separated, removed from a solid waste source and processed to be used in the form of raw material or product. (...) 5. General characteristics. 5.1. The fine aggregate shall be composed of natural sand, crushed sand or other recycled aggregate or a combination of these. (...)
Product	NTC 6246:2017 Pavements. Mixtures hot-mix asphalt with asphaltic concrete modified with recycled rubber grains (GCR)	Establishes the minimum requirements to be met by hot mix asphalt mixtures with reclaimed rubber grain modified asphalt cement (gcr) for use in paving works.	4.1.2 Recycled rubber granules. (...) Table 1 - CGR minimum requirements. (...)
			Remarks: Requirements are set for this recycled feedstock, such as moisture content, steel, non-ferrous materials, contaminating fibers, relative density, particle size.
Requirements	NTC 6657: 2022 Material neutrality. Principles, requirements and recommendations	Specifies the principles, requirements and recommendations for managing and declaring material neutrality(ies) through material use optimization activities and/or offsetting with material credits or investing in leveraging projects	6. 3.11 Material quantity compensation. (...) 6.3.11.3 Plastic category. (...) NOTES It is recommended that, as far as possible, the offset should be made using material credits or investments in projects for the use of the same type of resin that contains the reporting entity's materials. For example, if the entity uses polystyrene in the subject, it should, if possible, acquire plastic credits that have been generated through the use of polystyrene.
Requirements	CEN/TS 14541:2007 Plastics pipes and fittings for non-pressure applications. Use of non-virgin PVC-U, PP and PE materials.	Specifies definitions, requirements, recommendations and test methods for the use of non-virgin PVC-U, PP, PE materials.	4.2 Externally reprocessable and recyclable materials with agreed specifications Exhaust reprocessible and recyclable materials with agreed specification that are available in relevant quantities and time intervals should be allowed to be added to virgin material or own reprocessible material or a mixture of these two materials for the production of tubes, provided that the following conditions apply - The specification for each material should be agreed between the supplier of external reprocessable or recyclable material and the product manufacturer.

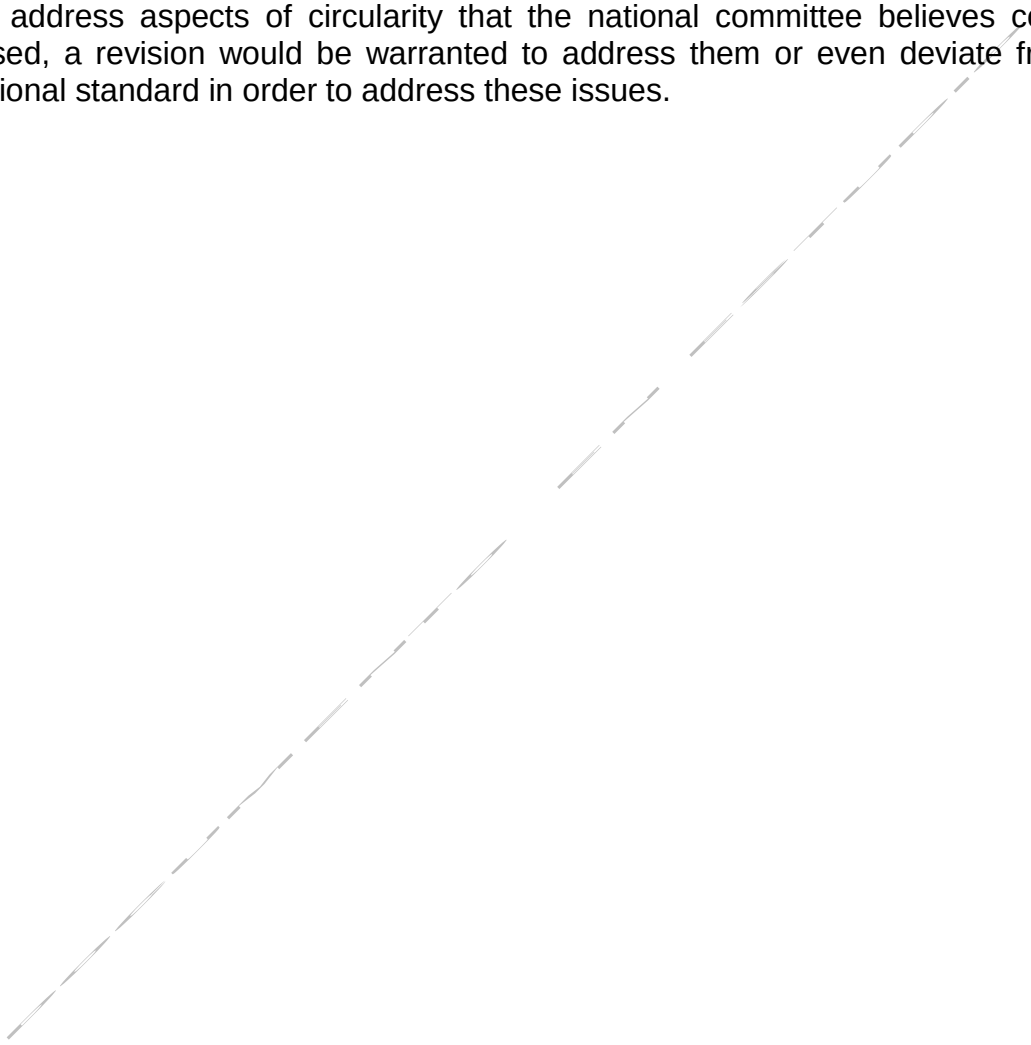
			- It must at least cover the characteristics given in Tables 1, 2 and 3 for PVC-U, PP and PE. Other characteristics are specified in EN 15346 for PVC, EN 15345 for PP and EN 15344 for PE. (...) - The maximum amount of external reprocessable or recyclable material to be added should be specified by the product manufacturer. - The amount of external reprocessable and recyclable material that is actually added in each production run must be recorded by the product manufacturer,
	EN 14180:2003 sterilizers for medical purposes		ANNEX TO TEST METHODS (.) NOTE 1 By performing the tests simultaneously, as described in the test methods below, the total number of tests and test equipment waste is reduced. As a result, the environmental impact can be reduced (see also Annex F).
	IRAM 2400:2003 on maintenance of insulating mineral oils electric		3 HYGIENE AND ENVIRONMENTAL PROTECTION MEASURES NOTE In the case of bedding or oil treatment, it is recommended that users and owners of "transformers or equipment containing insulating mineral oil, determine the content of DPC or PCB (polychlorinated diphenyls), in order to comply with the legal provisions in force.
	IEC 63333 ED1 General method for assessing the proportion of reused components in products	This document deals with the assessment of the proportion of reused components in products on a horizontal level, which can be applied at any point in the life of the product.	4.2.2 Proportion of reused components by mass on product level The following formula shall be applied to obtain the proportion of reused components by mass on a product level

To all participating countries: you are welcome to submit specific examples of standards of any kind where circularity aspects are included. These examples will be evaluated at the December 16 meeting and we will define which ones to include in our final text.

ANALYSIS AND UPDATING OF STANDARDS

All technical standards are required to undergo periodic reviews. If a standard did not previously address circularity adequately, this can be used as an argument for proposing an update, and the TC should consider conducting the review and consulting with experts regarding whether or not to update the standard. Committees and experts should keep in mind that the importance or relevance of specific circularity issues may have changed since the standard was developed or updated.

On the other hand, if work was done on the adoption of an international standard and it did not address aspects of circularity that the national committee believes could be addressed, a revision would be warranted to address them or even deviate from the international standard in order to address these issues.



ANNEX A
(Informative)

RELATIONSHIP BETWEEN THE SDG AND CIRCULARITY.

Considering that CE calls for a transition and transformation of the production system, business models, and the way of relating within value chains, but also promotes the reduction of waste generation through recovery, retention or value addition, it can be inferred that CE is strongly related to SDG 12 'Sustainable Consumption and Production'.

Through certain circular actions, it is possible to contribute, for example, to the achievement of the following SDG 12 targets, mainly:

12.2 By 2030, achieving sustainable management and efficient use of natural resources
12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and land in order to minimize their adverse effects on human health and the environment.
12.5 By 2030, significantly reduce waste generation through waste prevention, reduction, recycling and reuse activities

However, it is evident through various publications or studies a strong relationship between other SDGs and their goals, assuming a contribution of circular actions with the fulfillment of these.

Some of these interactions are shown below:

	SDG 6	SDG 7	SDG 8	SDG 9	SDG 12	SDG 13	SDG 15
GOAL 1	X	X		*			X
GOAL 2	X	X	X	X	X	*	X
GOAL 3	X	X	*	*		*	X
GOAL 4	X		X	X	X		
GOAL 5				*	X		
GOAL 6							
GOAL 7					*		
GOAL 8			*				
GOAL 9			*				*
			*				

x Direct contribution
* Your progress supports the EC

Within the implementation of circularity actions and requirements in the standards, a holistic perspective of the proposed solution is invited. Thus, the solution can of course respond to issues related to SDG 12 sustainable production and consumption and indirectly promote SDG 8 which aims at economic growth, but there should also be consistency and coherence with other important issues such as, for example, some framed in climate action and protection under SDG 13 and biodiversity management under SDG 15, among many other possibilities.

It is recommended that indicators be progressively adopted that associate circular actions with the achievement of the targets of each SDG. It is also encouraged to consider how other circular actions can promote the achievement of other SDGs related to water and energy management, among others.

ANNEX B
(Informative)

EXAMPLE OF A LIST OF CIRCULARITY ISSUES

The following is a series of questions that can be addressed to encourage circular thinking, depending on the type of standard under study. These questions can be useful both for the standard developer and for stakeholders who are in the process of developing a type of standard and thus generate actions, search for information and/or incorporate requirements or relevant aspects of circularity in the standards.

B.1 Cross-cutting questions to any type of standard (product, process, service or test method).

CONTEXT ANALYSIS

- Are there any regulations in your country regarding Circular Economy?
- Does your industry have circular economy initiatives?
- Have you identified relevant international literature on circular economy that affects the subject of study (product, component, material, service) of the standard?

LIFE CYCLE THINKING

- Are the different types of environmental impacts assessed throughout the life cycle (cite application of LCA standards)?
- Can some risks and opportunities in the implementation of the circular economy be addressed vis-à-vis the subject of study (product, component, material, service) in the standard?

SCOPE OF CIRCULARITY

- Have you identified the circularity issues applicable to that subject of study? Can you choose which aspects are most relevant and minimum one circularity aspect to develop and include in the standard? For example:
    - Promotion of R&D for innovative circular solutions
    - Promoting reuse, sharing, remanufacturing and recycling
    - Incorporate information related to readiness for reuse.
    - Adoption of technologies to support circular solutions
    - Use of materials from sustainable sources
    - Improve inclusion and ensure social responsibility throughout the organization's value network.
    - Increase awareness and education about CE throughout the value network.
    - Circular Design
    - Resource management
    - Procurement
    - Industrial or territorial symbiosis
    - Provision of solutions

- Reverse logistics
- Waste management during the transition to the circular economy

COMMUNICATION AND ENVIRONMENTAL DECLARATIONS

- Is it necessary to include a circularity communication numeral?
- Have you identified standards that promote and suggest a framework for environmental declarations and communications?

OTHER

- Do the standard address change management issues that enable cultural change within organizations to facilitate the implementation and maintenance of CE?
- Do you have internal and external information management policies related to circularity?

B.2 Cross-cutting questions to process or product standards.

- How are all products, components and materials maintained at their maximum value and utility at all times?
- Does the design of any product allow for dismantling and separation of components and materials at end-of-life?
- Have products/services been designed to maximize product or service life extension?
- How is waste avoided during manufacturing and distribution activities?
- Does another Stakeholder derive value from your product at the end of the use phase?
- Have you thought about what happens to your products at the end of the use phase?
- Does another party derive value from your product at the end of the use phase?
- Can components and materials be separated into manageable, uncontaminated streams to facilitate reuse and recycling?
- During the formulation of your product or process have you identified chemicals within your formulation that limit or enhance the CE of your product or process?
- Have you made the substitution of raw materials and chemical products, preferring those with less danger, with respect to the original formula or product?
- Are there any chemicals that, as an output of your process, can be considered as by-products for another process?
- Have you determined the complete composition of the materials and chemical ingredients of your products, materials and components and the manufacturing process(es) used to create them?
- Have you implemented a packaging return chain?
- Have you created an inventory of materials, especially those on banned lists, classified as hazardous or highly hazardous?

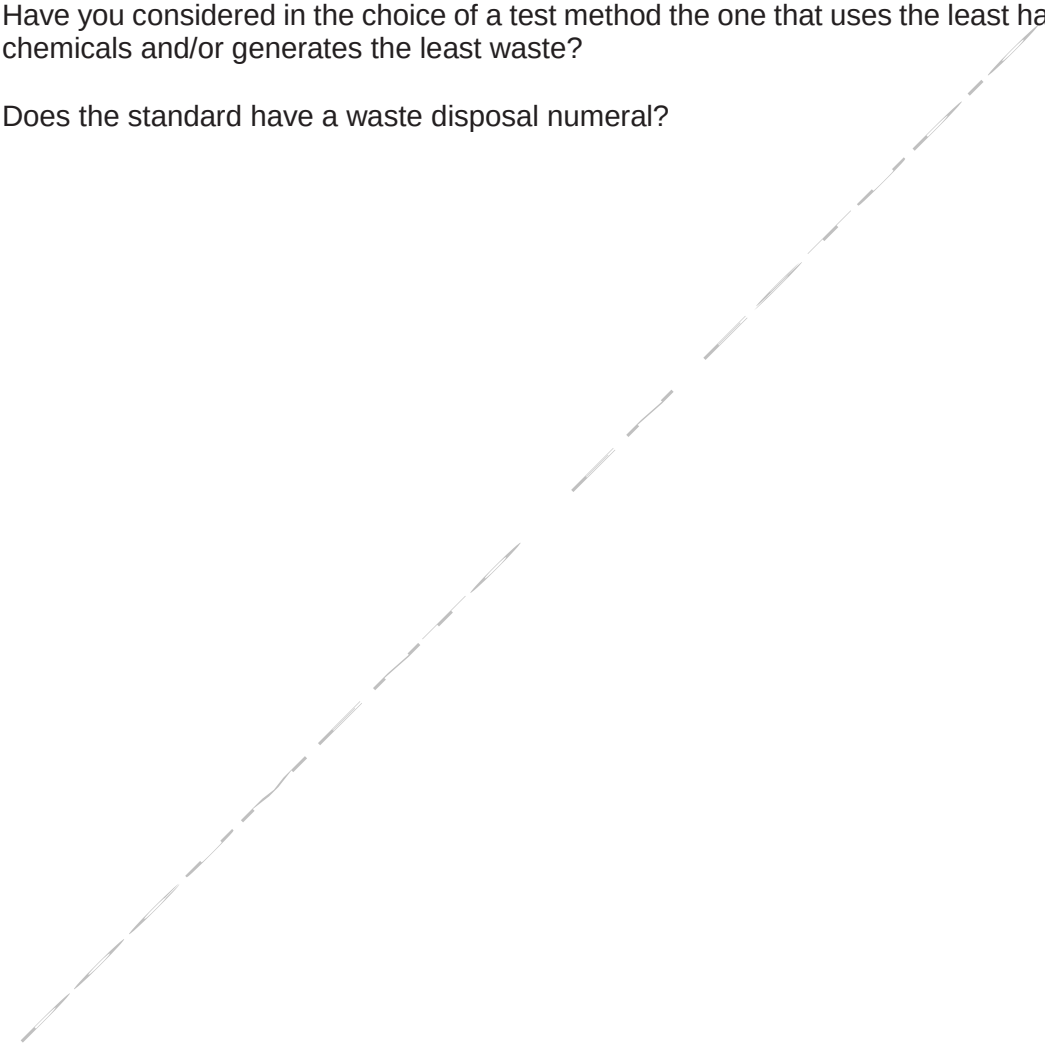
B.1.3 Adoption or development of test methods

- Have you created an inventory of materials, especially those on banned lists, classified as hazardous or highly hazardous?

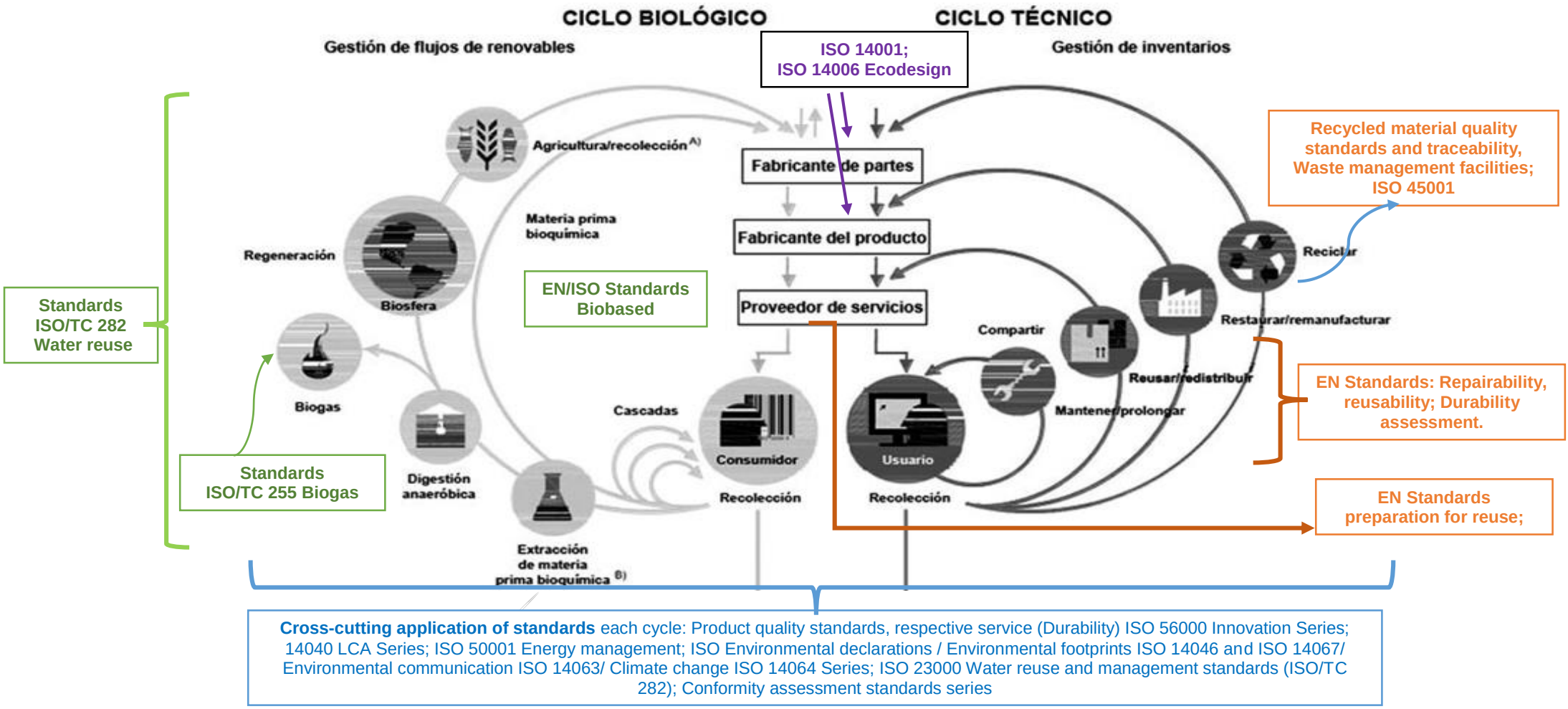
    - You can reduce the amount of:
    - chemicals used, especially hazardous chemicals?
    - waste generated in the test
    - sample tested without impairing the test result or metrological aspects
    - without affecting the quality of the information obtained.

- Have you considered in the choice of a test method the one that uses the least hazardous chemicals and/or generates the least waste?

- Does the standard have a waste disposal numeral?



ANNEX C
(Informative)
Examples of the relationship between some families of standards and topics with the biological and technical cycles of the circular economy.



SOURCE: BS 8001 modified.

BIBLIOGRAPHY

NTC-ISO 14001, Sistemas de gestión ambiental. Requisitos con orientación para su uso.

NTC-ISO 14040, Gestión ambiental. Análisis del ciclo de vida. Principios y marco de referencia.

NTC-ISO 14044, Gestión ambiental. Análisis de ciclo de vida. Requisitos y directrices. Requisitos del ciclo de vida.

NTC-ISO 14064 (todas las partes), Gases de efecto invernadero.

ISO 26000:2010, *Guidance on Social Responsibility.*

NTC-ISO 31000, Gestión del riesgo. Principios y directrices.

BS 8001:2017, Framework for implementing the principles of the circular economy in. organizations. Guide

ISO/CD 59004, Circular Economy - Terminology, Principles and Guidance for Implementation

ISO/CD 59020, Circular Economy - Measuring and assessing circularity

ISO Guide 82:2014, Guidelines for addressing sustainability in standards.

ISO Guide 64:2008, Guide for addressing environmental issues in product standards

Schroeder, P., Anggraeni, K., & Weber, U. (2018). The Relevance of Circular Economy Practices to the Sustainable Development Goals. Journal of Industrial Ecology. doi:10.1111/jiec.12732.