Version 19 June 2020

Annex I

List of new standards to be drafted

Table 1: New standards to be drafted and a deadline for its adoption

	Reference information	Deadline for the adoption[1] by the CEN
1.	The standards on the circular design of fishing gear in support of Directive (EU) 2019/904	31/12/2022

Annex II

Requirements and guidance for the standards referred to in Article 1

1. General requirements as to the content of the requested standard

1.1. The standards will provide the organizations with an opportunity to establish, implement and maintain CDFG as an integral part of design and development of fishing gear by integrating corresponding requirements into the related organizational procedures and instructions. If an organization has a management system, which includes design and development, the CDFG shall be part of that management system.

1.2. The requested standard shall specify only product related technical specification for the circular design of fishing gear containing plastic and which could be applied during design and manufacturing of such fishing gear.

1.3. Any other issues which are outside design and construction phases of a fishing gear (like use, maintenance, repair, sorting or was fishing gear, preparation for recycling, disposal and recycling itself) are outside the scope of this request.

1.4. The requested standards shall specify design principles, which are based on generally acknowledged state of the art and, when relevant, shall contain reliable, accurate and reproducible testing and verification methods and procedures.

[1] 'Adoption' refers to the relevant European standardisation organisation making an adopted standard available to its members or the public.

1.5. The standards shall be based, whenever reasonable, on existing European, international or other relevant globally used technical specifications developed by organizations whose development processes are based on the principles recognized by the World Trade Organization in the field of standardization. An indicative list of some standards is given in Table 1 below.

Table 1. List of existing standards

Reference	Title
IEC 62430:2019	Environmentally conscious design – principles, requirements and guidance
ISO 14006:2020	Environmental management systems - Guidelines for incorporating eco-design
ISO 1107:2017	Fishing nets - Netting - Basic terms and definitions
ISO 1530:2003	Fishing nets - Description and designation of knotted nett
ISO 16663-1:2009	Fishing nets - Method of test for the determination of mesh size - Part 1: Opening of mesh
ISO 16663-2:2003	Fishing nets - Method of test for the determination of mesh size - Part 2: Length of mesh
ISO 1806:2002	Fishing nets - Determination of mesh breaking force of netting
ISO 1805:2006	Fishing nets - Determination of breaking force and knot breaking force of netting yarns
ISO/NP 16663	Textiles - Fishing nets and netting - Methods for the determination of mesh size
ISO 1346:2012	Fibre ropes - Polypropylene split film, monofilament and multifilament (PP2) and polypropylene high-tenacity multifilament (PP3) - 3-, 4-, 8- and 12-strand ropes
ISO 1141:2012	Fibre ropes - Polyester - 3-, 4-, 8- and 12-strand ropes) (Ropes used in fishing gear)
ISO 1140:2012	Fibre ropes - Polyamide - 3-, 4-, 8- and 12-strand ropes
ISO 16488	Marine Finfish Farms – Open net cage – Design and operation
ISO 1969:2004	Fibre ropes - Polyethylene - 3- and 4-strand ropes ((ropes used in fishing gear)
ISO 10572:2009	Mixed polyolefin fibre ropes () (ropes used in fishing gear)
ISO 10572:2009	Mixed polyolefin fibre ropes, fibre ropes of polyester /polyolefin dual fibres (ropes used in fishing gear
BS 8001:2017	Framework for implementing the principles of the circular economy in organizations: guide
EN 15343:2007	Plastics - Recycled Plastics - Plastics recycling traceability and assessment of conformity and recycled content

2. Definitions

For the purpose of the requested standards the following definitions apply

2.1. Plastic, fishing gear, waste fishing gear and producer as laid down in the Article 3 of Directive (EU) 2019/904.

2.2. Environmentally conscious design, environment, environmental impact as defined in the standard EN ISO 14006:2020.

2.3. Sustainable development is a development that "meets the needs of the present without compromising the ability of future generations to meet their own needs".

2.4. To define: circular design of the fishing gear (CDFG)[2], durability of the fishing gear

3. Principles of the CDFG

3.1. CDFG shall fit into the notion of the circular economy[3], consider the ‘’open loop, open-source concept’’[4], follow the principles of life cycle thinking and integrating CDFG into the policy and CDFG implementing strategy in organizations.

3.2. The standards shall also consider requirements for the user manual in order to ensure that users of fishing gear are aware on how circular design is applied to a product and whether environmentally correct use, repair, disposal, recycling etc. should require specific actions of end users to be effective.

3.3. General principles set by the standards should allow a designer to determine the scope of the CDFG for a particular fishing gear or its component.

3.4. The CDFG standards should consider achieving a balance among the environmental, circularity and technical requirements such as functionality, quality, durability, performance, safety, economic aspects, ethical and social value, and technical and business risks.

4. Specific requirements of CDFG

The standards should evaluate and consider the following specific requirements for the CDFG of the fishing gear (non-exhaustive lists)

4.1. Technical requirements

Technical requirements, specific to the fishing gear are listed below:

4.1.1. Durability, catchability and strength of the materials used, and of the fishing gear as a whole should be inherent in any future design and development. Gear durability enhances the performance as well as the likelihood of being reused, repaired and/or recycled and that all materials utilised are reusable[5] (following definition in ISO 18603:2013), recyclable[6] or repairable.

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[2] To consider: **Design for circularity** eliminates waste as part of the design process and replaces the idea of a product's 'end-of-life' with 'the end of its period of primary use' (Ellen McArthur Foundation, 2015) **Design for recyclability** is an important principle to enable product disassembly and subsequent reuse and recycling of the product's inherent materials and components.

[3] Circular economy is 'restorative and regenerative by design, and it aims to keep products, components and materials at their biggest utility and value at all times, distinguishing between technical and biological cycles" (Ellen MacArthur’s Foundation)

[4] In the ‘’open-loop, open-source’’ concept product integrity is seen as a collective responsibility involving all stakeholders from producers to end users, product designers have to prioritize reuse (reparability, remanufacturing), upgradeability (e.g. through modular designs) and recycling.

[5] Material which has been designed to accomplish or proves its ability to accomplish a minimum number of trips or rotations in a system for reuse. A system for reuse defined as established arrangements (organizational, technical or financial) which ensure the possibility of reuse, in closed-loop, open-loop or in a hybrid system

4.1.2. Mobilising the potential of digitalisation of product information (product and material type, composition, reuse/recyclability options etc.) including solutions such as digital passports, tagging (e.g. QR or barcode) and watermarks, and exploring digital product design tools[7]

4.1.3. Currently fishing gear often is composed from materials that cannot be avoided (or replaced by a reuse model), while maintaining utility. The utility may be associated with a specific weight, volume, shape of material or product, elongation, tensile strength, tenacity, and other specific characteristics/properties. Therefore, future materials and products design should not only take into account recyclability or reusability, but should also be fit for use and maintain utility.

4.1.4. Fishing gear design should encompass innovation in preventative maintenance, repair, remanufacturing, refurbishment (modification), recycling at 'end of life' and upcycling.

4.1.5. Where possible and appropriate, reduce the costs of transport and distribution by minimising product size and weight and optimizing shape and volume for maximum packaging density.

4.1.6. Design should consider the need of mixing materials within a fishing gear and consider a clear, simple and resource efficient mechanism to separate different types of materials, and detach different parts.

4.1.7. Evaluate reduction potential of use of finite virgin plastic resources (i.e., through a virgin reduction target) in fishing gear, while maintaining the product performance. Such reduction may involve gradual elimination of virgin plastic, increased use of recycled content, potential use of renewable materials, and/or substitution by other materials. Any virgin reduction target should focus as its underlying delivery mechanisms on both eliminating the plastics not needed through innovation and reuse, and increasing recycled content for those polymers that are needed.

4.1.8. To consider materials that could be designed out of any future fishing gear, with viable alternatives developed. For example, to consider replacement of lead (e.g. by steel, tungsten, bismuth, volcanic rock etc.), copper coating and zinc, as well as problematic plastics: polyvinyl chloride (PVC), polystyrene (PS) and expanded polystyrene (EPS).

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[6] Material is deemed recyclable if its successful post-consumer collection, sorting, and recycling is proven to work in practice and at scale. When taking into account the ability of materials to be recycled, such definition must take into account ISO 18604:2, which defines material recycling as: "Reprocessing, by means of a manufacturing process, of a used packaging material into a product, a component incorporated into a product, or a secondary (recycled) raw material; excluding energy recovery and the use of the product as a fuel." This includes both mechanical (maintaining polymer structure) and chemical (breaking down polymer structure into more basic building blocks, for example via chemical or enzymatic processes, that are then built up again into new materials) recycling processes. Recycling, as defined for the environmentally conscious (friendly) circular design of fishing gear explicitly excludes technologies that do not reprocess materials back into materials but instead into fuels or energy.

[7] E.g. https://recyclass.eu/

4.2. Circularity requirements

Circularity requirements aim at optimising the product lifetime, reusability, upgradability, reparability, recycled content and recyclability. The standards should consider:

4.2.1. The following circularity requirements: modification, reusability, end-of-life recycling and efficient dismantling of fishing gear.

4.2.2. Increasing recycled content in products, while ensuring their performance and safety for human and environment.

4.2.3. Enabling remanufacturing and high-quality recycling.

4.2.4. Standardised approaches to gear/polymer labelling and marking (e.g. colour coding, electronic marking) to ensure traceability of fishing gear and enable material identification by recyclers.

4.2.5. Avoiding use of mixed materials, less diverse parts within a gear or its components, and increased use of internally recovered or recycled materials from process waste.

4.2.6. Avoiding use of anti-fouling coating on aquaculture gear that poses a challenge for recycling

4.2.7. Incentivising product-as-a-service or other models where producers keep the ownership of the product or the responsibility for its performance throughout its lifecycle

4.3. Environmental requirements

These requirements aim to address the most significant environmental impacts along the life cycle of fishing gear, by considering environmentally conscious circular design of fishing gear at the gear design stage. The standards should consider the following environmental requirements:

4.3.1. Establishing sustainability principles (e.g. considering carbon and environmental footprints) by reducing energy and water consumption, reducing process waste, emissions to air, water and soil during manufacture

4.3.2. To consider reducing environmental impact across lifecycle of product: within supply chain of material used and transport and distribution; by using extension strategy to enhance life of product; and during management of recycling at end of life

4.3.3. Rewarding products with high sustainability performance (including environmental, economic and social pillars) with incentives (e.g. lower taxes, fees).

4.3.4. Any materials or components within a fishing gear should be in line with the REACH[8] regulation and should not contain (i.e., through plating or coating) nor have as a manufacturing requirement, hazardous chemicals that pose a significant risk to human health or to the environment.

[8] REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals

5. Guidance on Implementing the CDFG

The guidance should apply to design and development of fishing gear in multiple organizations and to the activities occurring in different locations.

5.1. CDFG scope

5.1.1. The standards should identify relevant stakeholders - organizations that are designing and developing fishing gear (directly concerned by the standards) and organizations that are indirectly concerned by fishing gear design stage e.g. producers, manufacturers, importers, repairers, performers of preventive maintenance, assemblers, recyclers and/or users of fishing gear in real life conditions (fishing and aquaculture). In addition, to identify the role of stakeholders that are concerned by negative environmental impact of fishing gear lost at sea or mismanaged at end of life.

5.1.2. The organization shall determine the scope of CDFG for fishing gear and/or its individual components. This scope will be dependent on the range of activities that the organization can influence through design and development. Activities to consider could be choice of raw materials, manufacturing methods, logistics, sale, use and maintenance arrangements for the product, and disposal at the end of life. These activities could be internal or external to the organization.

5.1.3. This scope shall consider the relevant stakeholder requirements and environmental aspects relevant to the product (or product group, as applicable).

5.2. Analysis of stakeholder requirements

The CDFG standards shall consider product requirements at the design and development stage but with consequent positive impact on gear performance and on the environment at any life cycle stage. These could include legal requirements, technical standards, voluntary agreements, customer requirements and specifications, requirements from internal functions (e.g. logistics, production/service/maintenance, sales, procurement etc.). Requirements could be mandatory (legal requirements) and optional. As requirements are changing with time, it is important to have a process to periodically check for changes that could affect organizations' products.

5.3. The process of incorporating CDFG into design and development of fishing gear

The standards should evaluate and describe how the organization establishes, implements and maintains a process to ensure that the following tasks are carried out during design and development of fishing gear (non-exhaustive list):

5.3.1. To specify the functions, specification and characteristics to be met by fishing gear.

5.3.2. When designing and developing fishing gear to consider the balance between the various environmental aspects including relevant stakeholder requirements and other requirements such as function, technical requirements, quality, performance, safety, economic aspects, ethical and social value, and technical and business risks.

5.3.3. To identify and evaluate relevant environmental parameters, taking into account legal and other relevant stakeholder requirements, and significant environmental aspects;

5.3.4. To determine improvement and innovation strategies with environmental and functionality objectives for the fishing gear with its functionality, circularity and environmental parameters

5.4. CDFG methods and tools selection

To achieve the desired outcome as regards performance and low environmental footprint of fishing gear, organizations may consider specific procedures (CDFG methods and tools). These could be CDFG benchmarking, CDFG checklists and guidelines, environmental quality function deployment, life cycle tool based assessment (EEA – environmental effect analysis and LCA – life-cycle assessment), design and development methods and tools.

5.5. CDFG review

5.5.1. The standards should consider that organizations establish, implement and maintain a process to review the ability to further reduce negative environmental impacts of fishing gear. These reviews to be conducted at planned intervals or when necessary, to ensure that each life cycle stage is considered, taking into account changes in both internal and external factors (such as revised relevant stakeholder requirements). Improvement actions shall be determined and implemented based on knowledge gained through the review.

5.5.2. Documented information obtained from the reviews specified above, including the assigned actions arising from the review, shall be created, retained and may serve as a reference for the future development of the product and continuous improvement activities[9].

5.6. Information exchange

As part of the CDFG, the organization shall exchange information with relevant stakeholders in the value chain to achieve its product performance and environmental objectives. The information to be exchanged in the value chain should prevent adverse environmental impacts throughout the entire life cycle of the product. The guidance standards shall recommend the content of the information to be exchanged.

5.7. Examples of strategies for improving products environmental performance

The standards should provide examples of strategies for improving products environmental performance throughout the life cycle as part of the CDFG while achieving a balance with relevant stakeholder requirements and other requirements. Such examples could facilitate incorporation of CDFG into the design and development. When selecting those strategies, trade-offs between environmental and gear performance and functionality aspects can often be identified. The actual strategy used will vary,

[9] Continuous improvement refers to a recurring process to improve performance over time, according to a plan set by the organization. Using plan-do-check-act (PDCA) cycle can facilitate continual improvement

dependent on the type of gear, its component and material and the relevant environmental and functionality aspects of each product.

Following example of product related environmental improvement strategies is referred to in IEC 62430:2019 and its relevance need to be evaluated in relation to CDFG of fishing gear.

5.7.1. Design for Material Sourcing

- Reduce weight and volume of product
- Increase use of recycled materials to replace/reduce virgin materials e.g. by identifying relevant gear components and materials
- Increase use of renewable materials e.g. dolly ropes from natural materials
- Increase incorporation of used components
- Eliminate hazardous substances

5.7.2. Design for Manufacture/Assembly

- Reduce process waste e.g. gathering and recycling of cut-offs during fishing gear assembling. The evaluation of energy consumption should consider the whole product lifecycle (product footprint).
- Use internally recovered or recycled materials from process waste
- Reduce number of parts e.g. by optimizing gear design while considering performance, increased lifetime and reduced maintenance/repair need

5.7.3. Design for Transport and Distribution

- Minimise product size and weight
- Optimise shape and volume for maximum packaging density
- Optimise packaging e.g. by looking at logistics key performance indicators and best practises
- Increase use of recycled materials in packaging, for instance by creating a platform with stakeholders from both recycling and packaging industries.
- Eliminate hazardous substances in packaging

5.7.4. Design for Use (Including installation, maintenance and repair)

- Increase access to spare parts e.g. by developing supply chains with stakeholders (distribution centres, net lofts, cooperatives etc.)
- Maximise ease of maintenance e.g. to consider mending guidelines of the material used, for example, nylon twine to repair PE netting.
- Maximize ease of reuse and disassembly
- Avoid design aspects detrimental to reuse
- Eliminate potentially hazardous substances that can be released during use
- Maximize ease of materials recycling e.g. to consider the need to develop new technologies on materials recycling and incentives to recyclers.

5.7.5. Design for End of Life

- Avoid design aspects detrimental to materials recycling e.g. it is difficult to avoid the use of High performance Synthetic fibres. The balance among durability, performance, recycling and environmental impact needs to be evaluated.
- Reduce amount of residual waste generated e.g. consider partner companies that could transform the waste into other products (like clothing, household parts, furniture etc.).