YACHTS, SMALL CRAFTS, OTHER VESSELS AND PARTS THEREOF

PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

PCR 2015:06

DRAFT VERSION 2.0 FOR OPEN CONSULTATION. DO NOTE USE OR CITE.

VALID UNTIL 20XX-YY-ZZ

DRAFT VERSION FOR OPEN CONSULTATION

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

INTRODUCTION TO OPEN CONSULTATION

This draft PCR is available for open consultation from 2022-05-16 until 2022-07-15. Feel free to forward the draft to any other stakeholder you might think is relevant, including colleagues and other organizations.

We are interested in comments from stakeholders on:

- General
  - Alignment with PCRs available in other programmes for type III environmental declarations, industry-specific LCA guides or similar.
- Scope of PCR
  - Product category definition and description
  - Classification of product category using CPC codes
- Goal and scope, life cycle inventory and life cycle impact assessment
  - Functional unit/declared unit
  - System boundary
  - Allocation rules
  - Data quality requirements
  - Examples of databases for generic data
  - Impact categories and impact assessment methodology
- Additional information

Comments may be sent directly to the PCR Moderator (contact details available in Section 1). There is a template for comments on www.environdec.com that may be used.

For questions about the PCR, please contact the PCR moderator. For general questions about the International EPD® System, EPD or PCR development, please contact the Secretariat via pcr@environdec.com.

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

TABLE OF CONTENTS

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

INTRODUCTION

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD® System: a programme for type III environmental declarations[1] according to ISO 14025:2006, ISO 14040:2006, ISO 14044:2006, and product-specific standards such as EN 15804 and ISO 21930 for construction products. Environmental Product Declarations (EPD) are voluntary documents for a company or organisation to present transparent, consistent and verifiable information about the environmental performance of their products (goods or services).

The rules for the overall administration and operation of the programme are the General Programme Instructions (GPI), publicly available at www.environdec.com. A PCR complements the GPI and the normative standards by providing specific rules, requirements and guidelines for developing an EPD for one or more specific product categories (see Figure 1). A PCR should enable different practitioners using the PCR to generate consistent results when assessing products of the same product category.

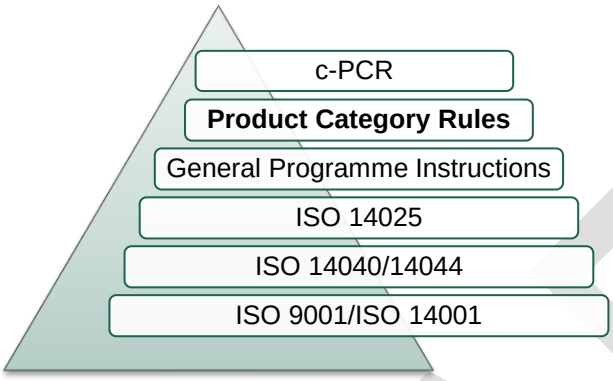

Figure 1 The hierarchy between PCRs, standards and other documents.

Within the present PCR, the following terminology is adopted:

- The term “shall” is used to indicate what is obligatory, i.e. a requirement.
- The term “should” is used to indicate a recommendation, rather than a requirement. Any deviation from a “should” requirement shall be justified in the PCR development process.
- The terms “may” or “can” is used to indicate an option that is permissible.

For definitions of further terms used in the document, see the normative standards.

A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. The latest version of the PCR is available at www.environdec.com. Stakeholder feedback on PCRs is very much encouraged. Any comments on this PCR may be sent directly to the PCR Moderator and/or the Secretariat during its development or during its period of validity.

Any references to this document shall include the PCR registration number, name and version.

The programme operator maintains the copyright of the document to ensure that it is possible to publish, update, and make it available to all organisations to develop and register EPDs. Stakeholders participating in PCR development should be acknowledged in the final document and on the website.

[1] Type III environmental declarations in the International EPD® System are referred to as EPDs, Environmental Product Declarations.

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

1.1 ROLE OF THIS DOCUMENT AND COMPLEMENTARY PCRS

This PCR document serves as the main PCR for yachts, small crafts, and other vessels and as a basis for the development of complementary PCRs (c-PCRs) for more specific product categories of product systems pertaining to the naval sector. When a c-PCR exists in the International EPD® System for a more specific product category, such a c-PCR shall be used together with this PCR. Current c-PCRs related to this PCR are available at www.environdec.com.

This PCR allows for an EPD to be produced (see Figure 2) either:

- Directly using this PCR for the environmental assessment of vessels defined as pleasure and sporting boats, and for vessels whose propulsion system is predominant compared to the total installed power, i.e., the propulsion system power is more than 80% of the total installed power. For a detailed description of this PCR scope see Section 2.2.
- Using this PCR document as a basis for the development of a c-PCR for vessel components not included within the scope of any PCR available in the International EPD® System.

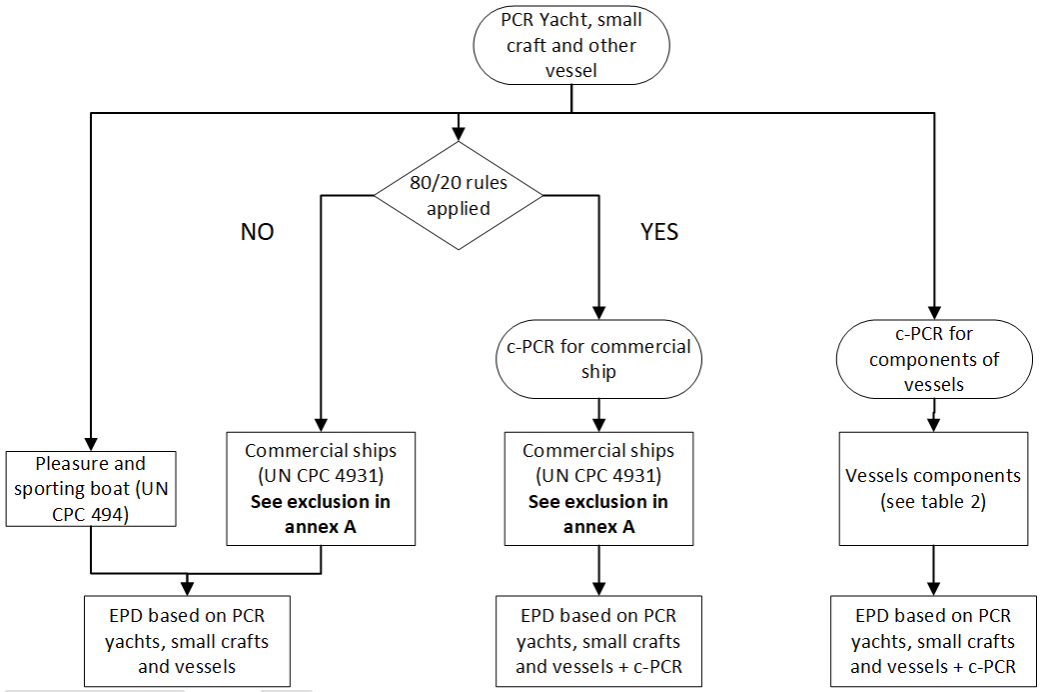

Figure 2 Overview of how this PCR document can be used directly, or together with a c-PCR, to develop an EPD. An EPD that uses a functional unit for component of vessels needs a c-PCR.

1.2 DEVELOPMENT OF C-PCR AND USE OF EXISTING PCRS

A complementary PCR (c-PCR) may be developed for a more specific category of vessel components (which are listed in Table 2) and vessels whose auxiliary products are predominant compared to the propulsion system (see description of 80/20 rules in section 2.2.1). The development of such a c-PCR follows the regular PCR development procedure. Read more at www.environdec.com.

A c-PCR should contain:

- general information, for example scope of the c-PCR, programme-related information and information about its development; and
- further specifications regarding goal and scope, LCI and LCIA, e.g., system boundaries, declared and functional unit, and other calculation rules; and
- further specifications on EPD contents, e.g., environmental indicators and additional information.

A c-PCR shall be compliant with the following specification:

- system boundary, as described in Section 4.3;
- operating profiles, if applicable, as described in Section 4.7.4.5

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

If a PCR applicable to a naval component already exists in the International EPD® System, all the criteria defined in the existing PCR shall be used, except:

- system boundary of the present PCR shall be considered in addition to the system boundary of the existing PCR, as described in Section 5.3 of this PCR;
- operating profiles of the present PCR, if applicable, shall replace use phase of the existing PCR as described in Section 5.10.3.

In this scenario, the resulting EPD will be based on both PCRs. The EPD will be comparable with other EPDs if the same PCRs have been used. In EPD you shall indicate which existing PCR you have considered for the evaluation of environmental parameters.

The hull and the deck, together with their respective structures, represents the foundation for the vessel building while all the fittings, machinery, systems… will be fitted on them.

All c-PCRs currently available and under development are displayed at www.environdec.com.

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Yachts, small crafts, other vessels and parts thereof
Registration number and version:	2015:06, draft version 2.0
Programme:	The International EPD® System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
PCR Moderator:	Alessandro Bordignon – Quota Sette s.r.l. alessandro.bordignon@quotasette.it
PCR Committee:	Quotasette s.r.l., MaPPIng LCA, Northern Light s.r.l., MolBNL (University of Trieste – Department of Engineering and Architecture), Water Revolution Foundation, MICAD s.r.l., NavalDesign&Consulting SRL.
Date of publication and last revision:	*To be added by the Secretariat*
Valid until:	*To be added by the Secretariat*
Schedule for renewal:	A PCR is valid for a pre-determined time period to ensure that it is updated at regular intervals. When the PCR is about to expire, the PCR Moderator shall initiate a discussion with the Secretariat how to proceed with updating the PCR and renewing its validity. A PCR may be also updated without prolonging its period of validity, provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for the latest version of the PCR. When there has been an update of the PCR, the new version should be used to develop EPDs. The old version may however be used for 90 days after the publication date of the new version, as long as the old version has not expired.
Standards conformance:	General Programme Instructions of the International EPD® System, version 4.0, based on ISO 14025 and ISO 14040/14044.
PCR language(s):	At the time of publication, this PCR was available in English. If the PCR is available in several languages, these are available at www.environdec.com. In case of translated versions, the English version takes precedence in case of any discrepancies.

2.2 SCOPE OF PCR

2.2.1 PRODUCT CATEGORY DEFINITION AND DESCRIPTION

This document provides main Product Category Rules (PCR) for the assessment of the environmental performance of yachts, small crafts, and other vessels and vessel components and the declaration of this performance by an EPD.

See section 6 for definitions of key terms used in this main PCR.

The term vessel refers to anything that can float and has a propulsion and manoeuvring system (throughout the document the term vessel means yacht, large yacht and small craft unless otherwise specified). This description covers many different types of vessels with different functions and sizes. However, they all have the following minimum characteristics in common:

- a hull with associated structures that gives the floating characteristic,
- a propulsion system that allows the vessel to move across the water surface,
- a manoeuvring system that allows the direction of movement to be set.

In some vessels, the manoeuvring system is integrated with the propulsion system (as in vessels with rudders or cycloidal propellers).

In addition, vessels are usually equipped with products necessary for safe navigation and manoeuvring, such as power system components, steering system components, mooring and anchoring system components and others. All components belonging to the product categories described above can be defined as a feature of the maritime industry because the materials, technical standards, and production processes are specifically designed for application in the maritime field. All these components within the PCR will be called vessel components, see Table 2 for details.

Vessels can have different functions: there are vessels used for pleasure or sporting competitions (such as large yachts and small boats), vessels used for scientific research at sea or commercial vessels; the latter type of vessel is usually equipped with a set of specific components and installations which are needed to fulfil the function for which the vessel is designed. This could be, for example, cranes or winches for handling cargo, refrigerators for storing fishery products, accommodation for passengers, etc. These components are commonly designed for land-based applications and then adapted to be installed on board.

Depending on the size of the vessel, these specific components and installations may be predominant in terms of power consumption, weight and environmental impacts compared to the products required for the main purpose that all vessels have in common, i.e., navigation. This is usual for larger commercial and work vessels, while for smaller vessels the propulsion system is usually the predominant element.

This PCR document provides a main framework for assessing the environmental performance of vessels that are in private or commercial use for sport or leisure, which corresponds to UN CPC 494 Pleasure and sporting boats. This document can also be applied to other vessels, which correspond to UN CPC 4931, excluding those for which the propulsion power, i.e., the maximum installed power that can be transmitted to the elements that provide thrust to the vessel, does not exceed 80% of the total installed power on board.

Furthermore, ships for cargo transport and cruise ship are excluded from the scope of this PCR because of their peculiar scope.

Table 1 reports a brief description of the vessel type, description, and relative CPC Code for which this PCR is applicable; for a detailed list of exclusion and inclusion, see annex A.

Table 1 CPC main codes includes in this PCR (for complete list see annex A)

CPC CODE	VESSEL TYPE	VESSEL DESCRIPTION
49311	Passenger vessel	Vessel designed for the transport of more than 12 passengers without arrangement for accommodations. Large yacht
49315	Fishing vessel	Vessel designed for fishing and preserving the catch.
49316	Tugs and pusher craft	Vessel designed for pushing or towing other vessels or barges.
49319	Lifeboat	Small boat or raft kept in another vessel that people can use to leave the vessel in case of emergency.
	Research vessel	Vessel designed for conducting scientific research.
	Supply vessel	Vessel designed to operate in the offshore industry with oil and gas platforms or with offshore wind turbines.
494	Pleasure and sporting boats	Yachts and small crafts which are in private or commercial use for sport or leisure.

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

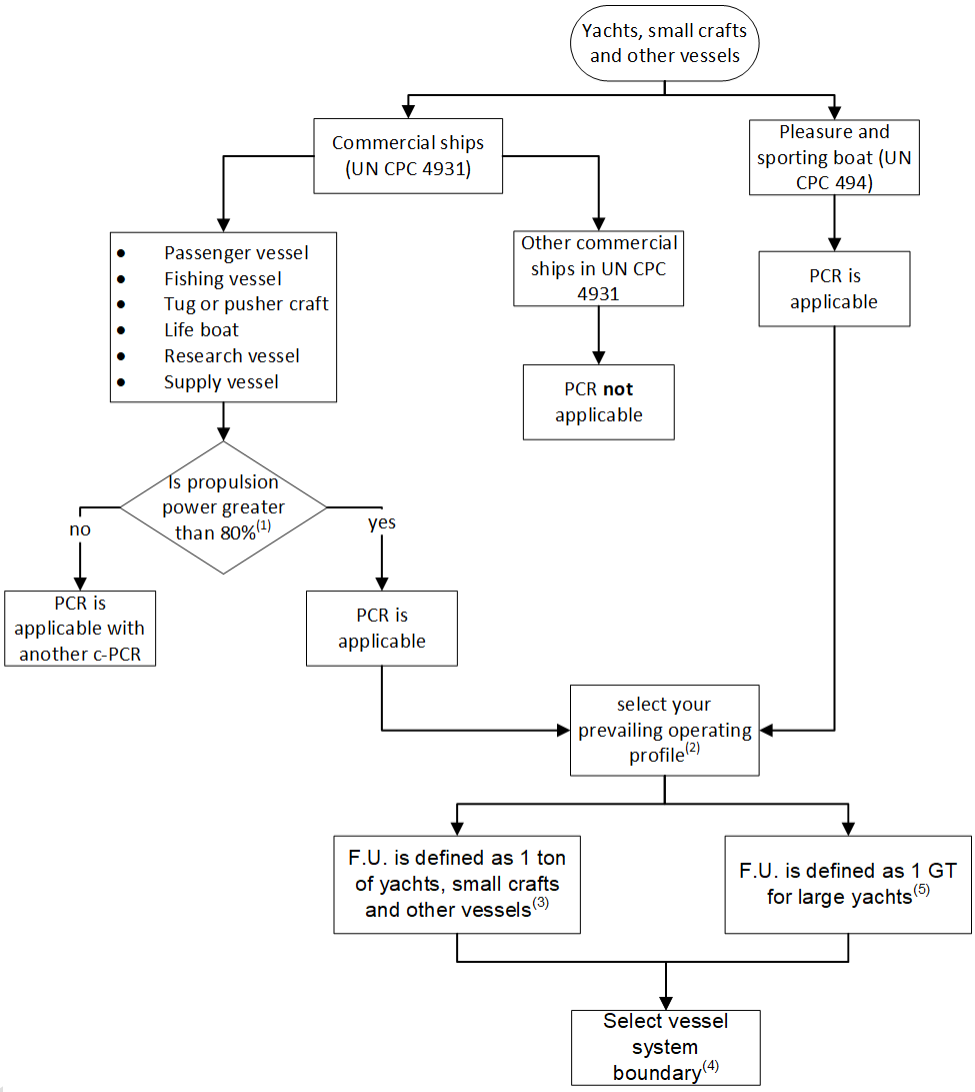

Figure 3 Block diagram describing the vessel types included within the scope of the PCR.
Notes: (1) Described in Section 1.2.1; (2) Described in Table 7; (3) Described in Section 4.1.1; (4) Described in Table 3; (5) Described in section 4.1.2

To define different life cycle boundaries and data quality requirements for the development of C-PCR, ten main products group have been identified, that represent the main products that may be installed onboard:

- Hull and structures
- Machinery & propulsion
- Generic systems
- Ship systems
- Generic electrical system & electronics
- Ship characteristic electrical system & electronics
- Insulation and fitting structures
- Fittings
- Deck machinery and equipment
- Paintings

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

The description of the product group structure can be seen in Table 2.

Table 2 Classification and description of vessel components

MAIN PRODUCT GROUPS		DESCRIPTION	EXAMPLE
Hull and structures	HS	Main external surfaces such as hull, decks with necessaries structures.	Hull, Deck, Superstructure, Structures, Hull Appendages, Masts, Rollbars, Equipment Bases, …
Machinery & Propulsion	MP	All elements needed to move the boat and to produce energy on board.	Main Propulsion, Energy generation, Propulsion, Steering System, Manoeuvring Thrusters, Stabilizing Systems, …
Generic systems	GS	Systems not linked to the navigation function.	HVAC System, Black & Grey Water System, Fresh Water System, Hydraulic System, Pool Water System, Compressed Air System, Equipment, Piping & Ducts, Valves Mountings, …
Ship systems	SS	System essential for navigation and for vessel safety.	Fuel Oil System, Bilge System, Black & Grey Water System, Fire Fighting System, Fire Extinguishing System, Sea Water System, Exhaust Gas System, Heat Exchange System, Air Vent System, Refrigeration System, Waste Oil & Sludge System, Ballast System, Lubricating Oil System, Scupper System, …
Generic Electrical System & Electronics	GE	Electrical systems not linked to the navigation function.	Energy Storage, Electric Distribution, Cables & Wires, Automation & Monitoring System, Lighting System, Entertainment & Domotic System, IT System & Network, Security System, Helideck Monitoring System, …
Ship Electrical Systems & Electronics	SE	Electrical system essential for navigation and for vessel safety.	Fire Detection System, Navigation System, Communication System, Dynamic Positioning System, Cathodic Protection, Cathodic Antifouling System, …
Insulation and fitting structures	IS	Internal surfaces coatings.	Fire & Noise Insulation, Vibration Control System, Floor System, Ceiling System, Wall System, …
Fittings	FI	Group of components needed to improve liveability of the vessel.	Fixed Furniture, Loose Furniture, Sanitary, Mirrors, Upholstery & Cushions, Lighting Fixtures, Household Appliances, Gym / SPA Equipment, Teak Outfit, …
Deck machinery and equipment	DE	Groups of components installed on external areas needed for navigation and safety of the boat.	Mooring Equipment, Door & Hatches, Windows & Portholes, Ladders & Gangways, Shell Doors, Lifts, Cranes, Tender & Toys, Life & Fire Appliances, Deck Outfitting, Technical Area Outfitting, Rigging & Sailing Equipment, ...
Paintings	PA	Surfaces treatment.	Varnish, gelcoat, antifouling varnish, …

2.2.2 GEOGRAPHICAL SCOPE

This PCR may be used globally.

2.2.3 EPD VALIDITY

An EPD based on this PCR shall be valid for a 5-year period starting from the date of the verification report (“approval date”), or until the EPD has been de-registered from the International EPD® System.

An EPD shall be updated and re-verified during its validity if changes in technology or other circumstances have led to:

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

- an increase of 10% or more of any of the declared indicators of environmental impact,
- errors in the declared information, or
- significant changes to the declared product information, content declaration, or additional environmental, social or economic information.

If such changes have occurred, but the EPD is not updated, the EPD owner shall contact the Secretariat to de-register the EPD.

3 PCR REVIEW AND BACKGROUND INFORMATION

This main PCR was developed in accordance with the PCR development process described in the GPI of the International EPD® System, including open consultation and review.

3.1 OPEN CONSULTATION

3.1.1 VERSION 1.0

This PCR was available for open consultation from 2015-04-22 until 2015-06-22 during which any stakeholder was able to provide comments by contacting the PCR Moderator and/or the Secretariat.

3.1.2 VERSION 2.0

This main PCR is available for open consultation from *2022-05-16* until *2022-07-15*, during which any stakeholder is able to provide comments by contacting the PCR Moderator and/or the Secretariat.

Add information about any physical or web-based meetings held during the open consultation phase, if applicable.

Stakeholders were invited via e-mail or other means to take part in the open consultation and were encouraged to forward the invitation to other relevant stakeholders. The following stakeholders provided comments during the open consultation and agreed to be listed as contributors in the PCR and at www.environdec.com.

- *List of stakeholder names and affiliation to be added after the open consultation*

3.2 PCR REVIEW

3.2.1 VERSION 1.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members is available at www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR Committee, and if there were conflicts of interest they were excused from the review.
Chair of the PCR review:	Greg Doudrich

3.2.2 VERSION 2.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members is available at www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR Committee, and if there were conflicts of interest they were excused from the review.
Chair of the PCR review:	*Added by the Secretariat*
Review dates:	*Added by the Secretariat*

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

As part of the development of this main PCR, existing PCRs and other internationally standardized methods that could potentially act as PCRs were considered to avoid unnecessary overlaps in scope and to ensure harmonisation with established methods of relevance for the product category. The existence of such documents was checked among the following EPD programmes and international standardisation bodies:

- International EPD® System. www.environdec.com.

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

- AENOR Global EPD
- Institut Bauen & Umwelt e.V.
- Norwegian EPD Foundation / EPD Norge
- SCS Global Services
- PEP Ecopassport
- KITECH
- EPD Italy
- EPD Denmark
- Stichting MRPI
- EPD Ireland
- RTS EPD
- Programme INIES

No existing PCRs or other relevant internationally standardized methods with overlapping scope were identified.

3.4 REASONING FOR DEVELOPMENT OF PCR

This main PCR was developed to enable publication of EPDs for this product category based on ISO 14025, ISO 14040/14044 and to be used as the basis for complementary PCRs (c-PCR) for more specific product categories within its scope (which then shall be used together with this main PCR to develop EPDs). The PCR (together with a c-PCR, if available) enables different practitioners to generate consistent results when assessing the environmental impact of products of the same product category, and thereby it supports comparability of products within a product category.

3.5 UNDERLYING STUDIES USED FOR PCR DEVELOPMENT

The methodological choices made during the development of this main PCR (declared, system boundary, allocation methods, impact categories, data quality rules, etc.) were primarily based on the following underlying studies:

- Fourth IMO GHG Study 2020 – Final report (MEPC 75/7/15)
- IMO - Marine Environment Protection Committee. MEPC 75/7/15 - Reduction of GHG emissions from ships. Fourth IMO GHG Study 2020. vol. 53. 2020.
- Water Revolution Foundation internal report on shore power demands and impacts calculations based on the main used marinas for yachts over 30 meters. The content of the report is going to be submitted to a scientific journal.

PCRs used to support methodological choices:

- Yachts (PCR 2015:06 - UN CPC 49311)
- Business jets (PCR 2018:09 - UN CPC 49623)
- Public and private buses and coaches (PCR 2016:04 - UN CPC 49112 & 49113)
- Rolling stock (PCR 2009:05 - UN CPC 495)
- Buildings (2.01) (PCR 2014:02)

PCR used as a benchmark for structural setting:

- Construction products (PCR 2019:14 - EN 15804:A2)

Supporting LCA-based studies (not public) performed in parallel to the PCR development:

- LCA for pre-certified EPD of 100 feet sailing yacht;
- LCA of optimist with innovation materials.

4 GOAL AND SCOPE, LIFE CYCLE INVENTORY AND LIFE CYCLE IMPACT ASSESSMENT

The goal of this section is to provide specific rules, requirements, and guidelines for developing an EPD for the product category as defined in Section 2.2.1.

4.1 FUNCTIONAL UNIT

Vessels can have different functions, from the commercial one to yachts used for pleasure or sporting competitions. Still, the main function of vessels is to sail and to float on the water following operating profiles. The operating profile is how the vessel is used on average in a year of life. In section 4.7.4.5 are presented the main operating profiles that shall be chosen during the use phase to perform the life cycle assessment of a vessel.

4.1.1 FUNCTIONAL UNIT FOR YACHTS, SMALL CRAFTS AND OTHER VESSELS

EPDs based on this PCR document without using a complementary PCR (c-PCR) shall use a functional unit, which shall be defined and relate to the typical applications of products.

The functional unit is defined as 1 ton of vessel for 1 year of use according to the selected main operating profile.

A 'year of use' shall be calculated from the weighted average of the values listed in the operation profile (see Table 7) or from primary data if the EPD is developed during the use phase of the vessel for one reference service life.

The mass is calculated for the light craft condition (m_{LC}) as defined by ISO 8666: 2020 for all vessels complying with the scope of the PCR, without any constraint on the size.

Since the usage of vessels may vary during their lifetime, environmental indicators of the life cycle can be presented with different operating profiles from the main one. The main operating profile is the one selected to calculate the environmental parameters of the EPD. The environmental parameters resulting from the life cycle with an operational profile different from the main one shall be entered in the additional information paragraph in the EPD (see Section 4.7.4.2).

Also, knowing that the use phase is the most critical life cycle stage for environmental assessments of vessels, the operating profile is considered in the functional unit, and comparability is guaranteed only between environmental assessments carried out with the same activity chosen as operating profile and functional unit.

For the EPDs developed during the vessels' use phase (see section 4.7.3) the real operational profile with primary data shall be chosen and the comparability between two EPDs is guaranteed for vessels within the same corresponding main activity (see section 4.7.4.5) selected for the product under study.

The functional unit shall be stated in the EPD. The environmental impact shall be given per functional unit. A description of the function of the product should be included in the EPD®, if relevant.

4.1.2 FUNCTIONAL UNIT FOR LARGE YACHT

The gross tonnage (GT) is preferable to the tons used for representing the functional unit of other vessels (see section 4.1) since the GT is the most used parameter for indicating the yacht size, by considering the measure of its internal volume (see section 6).

The functional unit of a large yacht, as described in the section above, shall be used to normalize the considered inputs, outputs and environmental impacts of the studied large yacht product system.

The main function of a large yacht is for leisure and sports purposes. The functional unit of a large yacht is 1 gross tonnage (GT) provided for 1 year of use according to the “Annual Leisure” operating profile.

One ‘year of use’ shall be calculated through the weighted average of the values listed for “Annual Leisure” in the operation profile (see Section 4.7.4.2).

This functional unit shall be applicable for large yachts, which are engaged in trade or in private use; they provide the service of leisure experience. There are two types of large yachts: sailing large yachts and motor large yachts, with a tonnage greater than 500 GT.

Large yachts that are built for immediate or future commercial use, also known as charter yachts, are subjected to specific regulations, e.g., the Red Ensign Group Yacht Code Part A+B (a Code of Practice that has been developed jointly by the United

Kingdom, its relevant overseas territories and crown dependencies, and international industry representatives), the Malta Yacht Code, or similar Codes.

These Codes prescribe standards of safety and pollution prevention which are appropriate to the size and type of yacht. The standards applied are either set by the relevant International Conventions or by equivalent standards where it is not reasonable or practicable for yachts to comply. This Code is an equivalence under the provisions of Article 8 of the International Convention on Load Lines, 1966, Regulation I-5 of the International Convention on Safety of Life at Sea, and Article 9 of the International Convention on Standards of Training Certification and Watchkeeping for Seafarers 1978 as amended.

For EPDs developed for large yachts, comparability is always guaranteed within this type of vessel.

The functional unit shall be stated in the EPD. The environmental impact shall be given per functional unit. A description of the function of the product should be included in the EPD®, if relevant.

4.1.3 DECLARED UNIT FOR VESSEL COMPONENTS

EPDs based on this PCR document without using a complementary PCR (c-PCR) shall use a declared unit, which shall be defined and specified in the International System of Units (SI units) and relate to the typical applications of products. EPDs based on this PCR document together with a c-PCR may use a functional unit if allowed by the c-PCR. For information about c-PCR, see Section 1.2 and Section 1.3.

4.2 TECHNICAL SPECIFICATION, LIFESPAN AND REFERENCE SERVICE LIFE (RSL)

The life of a vessel structures is usually really long, especially for larger size vessels. However, after several hours of use machineries, engines, and batteries may need major overhaul, furthermore also fittings and some structures need to be refurbished because they reach their end of life before the end of life of the entire vessel.

The reference service life shall be 20 years. Note that 20 yeas shall be used as the reference service life for the allocation of the impact of each lifecycle phase.

This happens about 20 years after the launch of the vessel: after this time frame the vessel is dismantled or subjected to a general refitting where the main structural elements on board are renewed and, sometimes, even the scope of the vessel is changed. Therefore, the reference service life of a vessel is defined as 20 years and, for example, if a vessel lasts 10 years, the potential impact of 2 vessels must be considered.

4.3 SYSTEM BOUNDARY

The scope of this PCR and EPDs based on it is cradle to grave for vessels and cradle to gate or cradle to gate with option for vessel components.

4.3.1 LIFE-CYCLE STAGES

For the purpose of different data quality rules and for the presentation of results, the life cycle of the product is divided into the following life cycle stages and life cycle modules:

Table 3 life cycle stages and life cycle modules

Life cycle stages	Life cycle modules
Upstream processes	A1) Raw material extraction, transport, and elaboration
	A2) Production of auxiliary products and components
	A3) Transport to the yard
Core processes	B1) Hull, structures, and superstructures manufacturing.
	B2) Hull and superstructures assembly, component installation and auxiliary processes.
	B3) Tests and sea trials before delivery to customer

Downstream processes	Usage stage	C1) Transport from the yard to the customer
		C2) Operational phase
		C3) Ordinary maintenance
	End of life	D1) Transport to the disposal site
		D2) Disassembly
		D3) End-of-life processes of any wasted part of the product

This PCR can be used for EPD with different scopes, based on the product category, as described in Table 5:

- For products that have most of the impacts during the use phase, i.e., the entire yacht or engines, a cradle to grave approach shall be used, thus modules from A1 to D3 shall be considered.
- For products not needed for navigation, a cradle to gate approach can be used.

Table 4 Mandatory life cycle module for different system product under life cycle assessment analysis

Life cycle modules	**Type of product in EPD**				
	Vessel	**Machinery & Propulsion**	**Naval system**	**Ship electrical system & electronics**	**Others (1)**
A1	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
A2					
B1	Mandatory	Optional	Optional	Optional	Optional
B2					
B3					
C1	Mandatory	Mandatory	Mandatory	Mandatory	Optional
C2					
C3					
D1	Mandatory	Optional	Optional	Optional	Optional
D2					
D3					
EPD scope:	Cradle to grave	Cradle to gate with option	Cradle to gate with option	Cradle to gate with option	Cradle to gate

Note 1: an EPD of a product belonging to the main product group “Hull and structures” shall not be allowed, because being the main construction part of a vessel, their environmental impact shall be integrated and evaluated within the complete life cycle assessment of the vessel

In the EPD, the environmental performance associated with each applicable life-cycle modules above shall be reported separately and in aggregated form. The processes included in the scope of the PCR and belonging to each life cycle stage are described in Sections 4.3.1.1–4.3.1.3.

4.3.1.1. Upstream processes

The following unit processes are part of the product system and shall be classified as upstream processes:

- A1 Raw material extraction, and elaboration:
  - Extraction and production of raw material for all main parts and components, thinners, and cleaning products,
  - Reuse processes of material from other product activities,
  - Recycling processes of secondary materials from other product life cycles,

- Production of semi-products used in the core processes, if applicable,
- Production of distribution and consumer packaging,
- Production of moulds, pads, and other auxiliary products,
- Production of all components, equipment and various products used on board generation of electricity and production of fuels, steam and other energy carriers used in upstream processes

- A2 Transport to the shipyard:
  - External transportation to the core processes.

Upstream processes not listed may also be included. All elementary flows at resource extraction shall be included, except for the flows that fall under the general cut-off rule in Section 4.5.

4.3.1.2. Core processes

The following unit processes are part of the product system and shall be classified as core processes:

- B1 Hull, structures and superstructures manufacturing:
  - Hull, deck and related structures production,
  - Superstructures and related structures production,
  - generation of electricity and production of fuels, steam and other energy carriers used in the B1 module.
- B2 Vessel assembly, component installation and internal transport:
  - Transport and movement of the moulds within the production site and between different production sites,
  - Transport of the product between workstations,
  - Transport of the product to the pier,
  - Hull and superstructure assembly processes,
  - Installation of all systems, components and equipment.
  - Surface treatments (e.g., fairing and painting),
  - Maintenance (e.g., of the machines),
  - Scrapping of moulds,
  - Waste treatment of waste generated during manufacturing,
  - generation of electricity and production of fuels, steam and other energy carriers used in the B2 module.
- B3 Tests and sea trials before delivery to the customer:
  - Activities carried out to verify the compliance of the product requirements before the yacht is delivered to the customer,
  - Impacts due to the production of electricity and fuels used in the core B3 module.

Core processes not listed may also be included. Manufacturing of a minimum of 99% of the total weight of the declared product including packaging shall be included.

The following processes shall not be included:

- manufacturing of production equipment, buildings and other capital goods,
- business travel of personnel,
- Waste generated by employees,
- travel to and from work by personnel, and
- research and development activities.

4.3.1.3. Downstream processes

Downstream processes are divided in a use phase (module C1-C3) and an end-of-life phase (module D1-D3)

The following unit processes are part of the product system and shall be classified as downstream processes:

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

- C1 Transport from the yard to the customer:
  - Transport of the yacht from the yard, or where it is assembled and launched, to the customer or retailer,
  - end-of-life treatment of transportation packaging, including transportation.
- C2 Operational phase:
  - Activities linked to the use of the vessel as described in Section 4.7.4.5, e.g., use of electricity or water, use activities causing direct emissions,
  - end-of-life treatment of consumable product and waste component linked to use of the vessel, including transportation,
  - generation of electricity and production of fuels, steam and other energy carriers used in C2 module.
- C3 Ordinary maintenance:
  - Set of scheduled routine maintenance activities,
  - production of material needed to perform maintenance activity,
  - end-of-life treatment of maintenance activity, including transportation,
  - generation of electricity and production of fuels, steam and other energy carriers used in C3 module.
- D1 Transport to the disposal site
  - Transport to the shipyard for the disposal
- D2 Disassembly
  - Landing and disassembling of the elements installed on board and disassembly of the hull and superstructure
- D3 End-of-life processes of any wasted part of the product
  - Disposal of the elements installed on board and of the materials used for the hull and superstructures construction.

The following processes shall not be included:

- manufacturing of production equipment, buildings and other capital goods,
- business travel of personnel,
- waste generated by crew and passenger,
- travel to and from work by personnel, and
- end-of-life processes of packaging waste.

4.3.2 OTHER BOUNDARY SETTING

4.3.2.1. Boundary towards nature

Boundaries to nature are defined as where the flows of material and energy resources leaves nature and enters the technical system (i.e., the product system). Emissions cross the system boundary to nature when they are emitted to air, soil or water.

4.3.2.2. Boundary towards other technical systems

Boundaries towards other technical systems define the flow of materials and components to/from the product system under study and from/to other product systems. If there is an inflow of recycled material to the product system in the production/manufacturing stage, the transport from the scrapyard/collection site to the recycling plant, the recycling process, and the transportation from the recycling plant to the site where the material is being used shall be included. If there is an outflow of material or component to recycling, the transportation of the material to the scrapyard/collection site shall be included. The material or component going to recycling is then an outflow from the product system.

See Section 4.6 for further guidance.

4.3.2.3. Temporal boundary

The temporal boundary defines the time period for which the life cycle inventory data is recorded, e.g., for how long emissions from waste deposits are accounted. As default, the time period over which inputs to and outputs from the product system is accounted for

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

shall be 100 years from the year that the LCA model best represents, considering the representativeness of the inventory data. This year shall, as far as possible, represent the year of the publication of the EPD.

4.3.2.4. Geographical boundary

The geographical boundary defines the geographical coverage of the LCA. This shall reflect the physical reality of the product under study, accounting for the representativeness of technology, input materials and input energy.

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

4.4 SYSTEM DIAGRAM

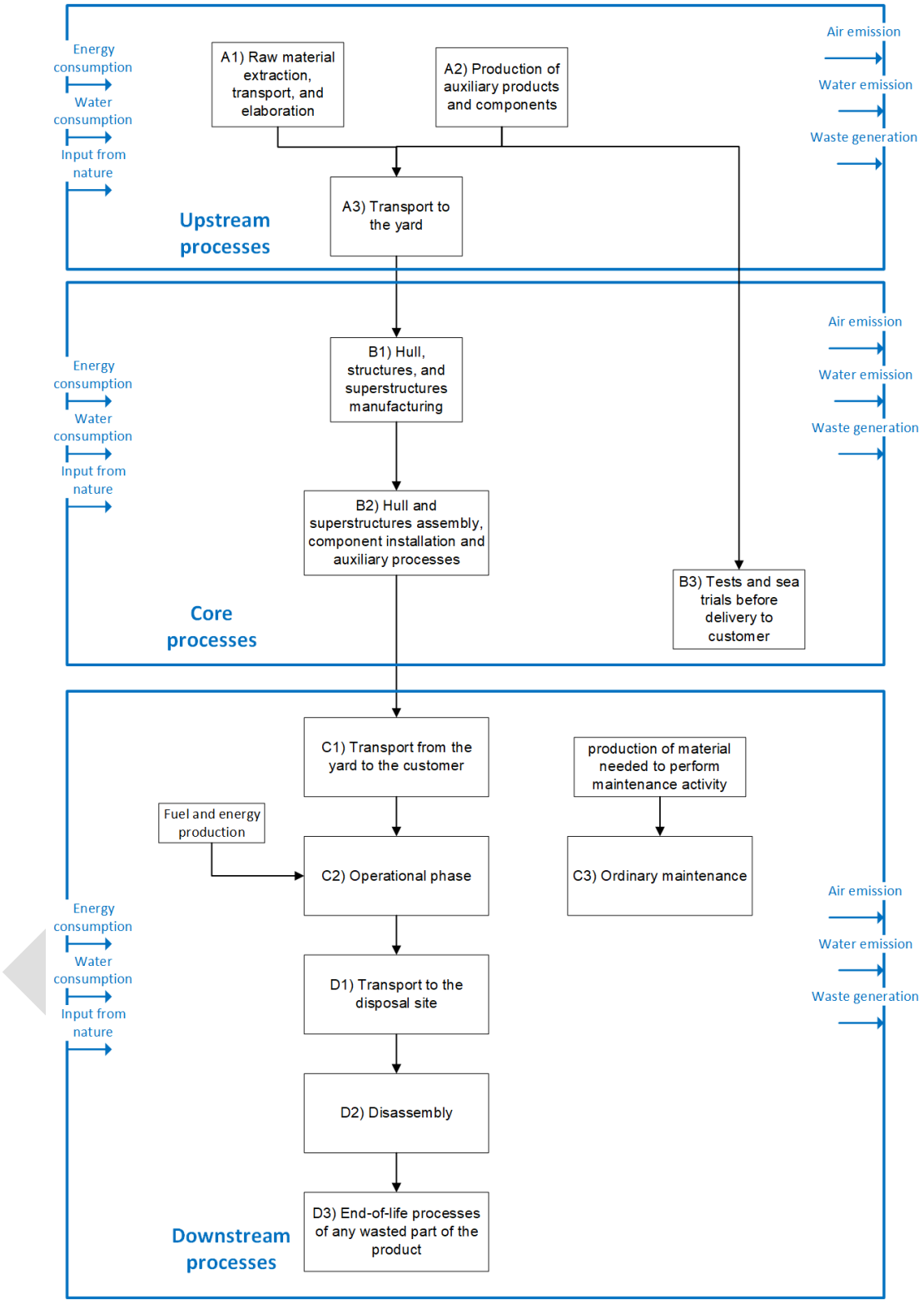

Figure 4 *System diagram illustrating the processes that shall be included in the product system, divided into upstream, core and downstream processes. The illustration of processes to include may not be exhaustive.*

4.5 CUT-OFF RULES

Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included, in other words, the included inventory data shall together give rise to at least 99% of the results of any of the environmental impact categories (not including inventory data of processes that are explicitly outside the system boundary described in Section 4.3).

Since vessels are usually fitted with a great number of different products produced by different suppliers, a different cut-off rule shall be applied only for the upstream phase to facilitate data collection.

For upstream phase (life cycle modules A1 - A3) the including inventory data shall together give rise to, at least, 99% of the total inflows in mass. For the main product groups (systems, naval characteristic systems, electrical system & electronics, naval characteristic electrical system & electronics, and deck machinery and equipment) the including inventory data shall together give rise to, at least, 95% of the total inflows in mass as described in Table 5 specific cut-off rules for upstream of main products group

It is important to emphasize that, in general, the cut-off of inventory data should be avoided, and all available inventory data shall be used. Using cut-off rules shall not give the impression of "hiding" information but rather facilitating the data collection for practitioners.

Exclusion of inventory data based on the cut-off rule shall be documented in the LCA report and Inflows not included in the LCA shall be documented in the EPD.

The cut-off of inventory data, based on the above cut-off rule, should be an output of a sensitivity analysis, alone or in combination with expert judgment based on experience of similar product systems. Further, the cut-off shall be possible to verify in the verification process, hence the exclusion of inventory data based on the cut-off rule shall be documented in the LCA report, and the EPD developer shall provide the information the verifier considers necessary to verify the cut-off.

Table 5 specific cut-off rules for upstream of main products group

Main products group	Cut-off criteria (see note 1)	Specific rules
Hull and structures	**1%**	/
Machinery & Propulsion	**1%**	/
Generic Systems	**5%**	Energy and water consumption, waste generation and treatment from tier-1 suppliers is not mandatory except if more than twenty percentage weight ratio (20% wt/wt) of the total mass of product group is outsourced and manufactured in one facility.
Ship systems	**5%**	Energy and water consumption, waste generation and treatment from tier-1 suppliers is not mandatory except if more than twenty percentage weight ratio (20% wt/wt) of the total mass of product group is outsourced and manufactured in one facility.
Generic electrical System & Electronics	**5%**	Energy and water consumption, waste generation and treatment from tier-1 suppliers is not mandatory except if more than twenty percentage weight ratio (20% wt/wt) of the total mass of product group is outsourced and manufactured in one facility.
Ship characteristic electrical system & electronics	**5%**	Energy and water consumption, waste generation and treatment from tier-1 suppliers is not mandatory except if more than twenty percentage weight ratio (20% wt/wt) of the total mass of product group is outsourced and manufactured in one facility.
Indulation and fitting structures	**1%**	/
Fittings	**5%**	Energy and water consumption, waste generation and treatment from tier-1 suppliers is not mandatory except if more than twenty percentage weight ratio (20% wt/wt) of the total mass of product group is outsourced and manufactured in one facility.
Deck machinery and equipment	**5%**	Energy and water consumption, waste generation and treatment from tier-1 suppliers is not mandatory except if more than twenty percentage weight ratio (20% wt/wt) of the total mass of product group is outsourced and manufactured in one facility.

Paintings	**1%**	/

Note 1: the cut-off rule shall be applied concerning to the total mass of each "Main products group". For example, if the input flows belonging to the "Systems" group weigh a total of 1000 kg, the included inventory data shall together give rise to at least 950 kg of the flows belonging to the "System" group, which matches to 95%.

4.6 ALLOCATION RULES

Allocation can be divided into allocation of co-products, i.e., allocation of unit processes that generate several products, and allocation of waste, i.e., allocation of unit processes that generate materials that are, for example, landfilled recovered, recycled or reused, and which require further processing to cease being waste and become products (see criteria for end-of-waste state in Section 4.6.2).

The principles for allocation of co-products and allocation of waste are described separately in the following subsections

4.6.1 CO-PRODUCT ALLOCATION

The following hierarchy of allocation methods shall be followed for co-product allocation:

1. Allocation shall be avoided, if possible, by dividing the process to be allocated into sub-processes and collecting the inventory data for each sub-process.
2. If allocation cannot be avoided, the inventory data should be partitioned between the different co-products in a way that reflects the underlying physical relationships between them, i.e., allocation should reflect the way in which the inventory data changes if the quantities of delivered co-products change.
3. If a physical relationship between the inventory data and the delivery of co-products cannot be established, the inventory data should be allocated between the co-products in a way that reflects other relationships between them. For example, inventory data might be allocated between co-products in proportion to their economic values. If economic allocation is used, a sensitivity analysis exploring the influence of the choice of the economic value shall be included in the LCA report.

4.6.2 ALLOCATION OF WASTE TREATMENT PROCESSES

Allocation of waste shall follow the polluter pays principle and its interpretation in EN 15804: “processes of waste processing shall be assigned to the product system that generates the waste until the end-of-waste state is reached.” The end-of-waste state is reached when all the following criteria for the end-of-waste state are fulfilled (adapted from EN 15804):

- the recovered material, component or product is commonly used for specific purposes;
- a market or demand, identified e.g., by a positive economic value, exists for such a recovered material, component or product;
- the recovered material, component or product fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and
- the use of the recovered material, product or construction element will not lead to overall adverse environmental or human health impacts.

The above outlined principle means that the generator of the waste shall carry the full environmental impact until the point in the product life cycle in which the end-of-waste criteria are fulfilled. Waste may have a negative economic market value, and then the end-of-waste stage is typically reached after (part of) the waste processing and further refinement, at the point at which the waste no longer has a negative market value. This allocation method is (in most cases) in line with a waste generator’s juridical and financial responsibilities. See the GPI for further information and examples.

4.6.3 VESSELS END-OF-LIFE, REFITTING AND MAINTENANCE

The object of the present PCR, i.e., the vessel, has a quite unique characteristic if compared to other products in terms of end of life.

A vessel is in an *end-of-waste sta*te when:

- Case 1: vessel has completely lost its two main functions of floating and moving on water and is supposed to be recycled.
- Case 2: a refitting is carried out to implement improvements or a change of function of the vessel by creating a new vessel

Case 1 is applied to those parts of the vessel that belongs to the main product groups hull and superstructure. This principle is placed in the PCR to encourage the recovery of hulls and structural parts of vessels that are abandoned in the environment because they are economically and technically complicated to recover. Vessels recovered, in accordance with GPI shall be considered as secondary

material. The application of this rule shall be detailed and justified in the LCA report, where it shall be clearly indicated which parts of the vessel are considered secondary material.

Case 2: In many cases, at the end of the vessel's lifespan (20 years), the main structural entity of the vessel is not dismantled, but it is reused for starting a new vessel; this is the example of large yachts and minor size yachts. The reused part is primarily referring to the following elements:

- Hull
- Decks
- Superstructures
- Structures

If this represents the case, the end of life's potential impacts shall not be part of the vessel's assessment and shall be included in the analysis of the refitting process of the new vessel based on the reused hull, superstructure and foundations.

If this feature is not representative of the industrial sector of reference, all elements' end of life shall be taken into account in the analysis, including the main structural elements (hull, decks, superstructures, structures).

In case of not explicit knowledge about the final disposal of the main structural elements, their eventual cutting shall be considered as the criterion for allocating their impact to the current analysis or not. If the cutting of the structural elements is propaedeutically to the refitting of the new vessel (e.g., fibreglass vessels), the impact of the end of life shall be allocated to the current analysis.

For reused components, the allocation rule with respect to life cycle number shall be applied. The reuse component in input to the products system shall be justified and listed in the LCA report.

All input and output streams related to this extraordinary maintenance activity shall be allocated to the number of years, calculated as the difference between 20 years of life and the age of the vessel in the study period. For other detail see section 4.7.4.6.

4.7 DATA QUALITY REQUIREMENTS AND SELECTION OF DATA

Life cycle inventory data are classified into specific data and generic data, where the latter can be selected generic data or proxy data. The data categories are defined as follows:

- specific data (also referred to as "primary data" or "site-specific data"):
  - data gathered from the actual manufacturing plant where product-specific processes are carried out;
  - actual data from other parts of the life cycle traced to the product under study, for example site-specific data on the production of materials or generation of electricity provided by contracted suppliers, and transportation data on distances, means of transportation, load factor, fuel consumption, etc., of contracted transportation providers; and
  - LCI data from databases on transportation and energy ware that is combined with actual transportation and energy parameters as listed above.
- generic data (sometimes referred to as "secondary data"), divided into:
  - selected generic data: data (e.g. commercial databases and free databases) that fulfil prescribed data quality requirements for precision, completeness, and representativeness (see below Section 4.7.1),
  - proxy data: data (e.g. commercial databases and free databases) that do not fulfil all of the data quality requirements of "selected generic data".

Specific data shall be used for the core processes. Specific data shall be used for upstream and downstream processes, when available, otherwise generic data may be used. Generic data should be used in cases in which they are representative for the purpose of the EPD, e.g. for bulk and raw materials on a spot market, if there is a lack of specific data on the final product or if a product consists of many components.

4.7.1 RULES FOR USING GENERIC DATA

For generic data to be classified as "selected generic data", the following requirements apply:

- datasets shall be based on attributional LCA modelling (e.g., not be based on marginal data and not include credits from system expansion),
- the reference year shall be as current as possible and should be representative for the validity period of the EPD,
- the cut-off rule (as described in Section 4.6) shall be met on the level of the product system,

- datasets shall represent average values for a specific reference year; however, how data are generated could vary, e.g. over time, and then they should have the form of a representative annual average value for a specified reference period (such deviations shall be justified and declared in the EPD), and
- the representativeness of the data shall be assessed to be better than ±5%, in terms of the environmental impact calculated on the basis of the data, of data that is fully representative for the given temporal, technological and geographical context.

If selected generic data that meets the above data quality requirements are not available, proxy data may be used. The environmental impacts associated with proxy data shall not exceed 10% of the overall environmental impact of the product system.

The EPD may include a data quality declaration to demonstrate the share of specific data, selected generic data and proxy data contributing to the results of the environmental impact indicators.

4.7.2 EXAMPLES OF DATABASES FOR GENERIC DATA

For full life cycle modelling, it is recommended to use generic data belonging to the data and databases within the Global LCA Data Access - GLAD (https://www.globallcadataaccess.org/). Please note that a data quality assessment shall be performed also for data listed in the table, and that other data that fulfil the data quality requirements may also be used.

4.7.3 DATA QUALITY FOR EPD DEVELOPMENT DURING VESSEL LIFE CYCLE

Vessels are durable goods, and their life cycle is very complex. In order to promote fruitful actions to reduce the environmental impacts, this document aims to enable the certification of the environmental footprint of the product system in every phase of its lifespan, from early-design to the use phase. In addition, the aim is to encourage designers, manufacturers, and users to monitor environmental impacts through EPDs at every stage of production and use of vessels. This section defines the data categories shall be used for the development of EPDs in the three main phases of a vessel's life cycle:

- Concept and detailed design (type of EPD developed: Project EPD),
- Construction (type of EPD developed: Product EPD), and
- Usage stage (type of EPD developed: use phase EPD).

Table 6: Type of data for each life cycle stages

Preferred data	**Point of the time of the assessment**		
Life cycle stages	**Concept and detailed design (1)**	**Construction**	**Use stage**
Type of EPD	**Project EPD**	**Product EPD**	**Use phase EPD**
Upstream processes	Selected generic data and proxy	Specific data, Selected generic data and proxy	Specific data, Selected generic data and proxy
Core processes	Selected generic data and proxy	Specific data	Specific data, Selected generic data
Usage stage	Selected generic data and proxy	Selected generic data and proxy	Specific data
End of life	Selected generic data and proxy	Selected generic data and proxy	Selected generic data and proxy

Note 1 specific data shall be used for quantification of the gross amounts

Any data used should preferably represent average values for a specific year. However, the way these data are being generated could vary e.g. over time, and in such cases they should have the form of a representative annual average value for a specified reference period.

4.7.4 DATA QUALITY REQUIREMENTS AND OTHER MODELLING GUIDANCE PER LIFE-CYCLE STAGE

Below are further data quality requirement per life-cycle stage. Exceptions to the requirements may be accepted, if justified in the EPD; such exceptions are subject to the approval by the verifier on a case-to-case basis.

4.7.4.1. Upstream processes

- Data referring to processes and activities upstream in a supply chain over which the EPD owner direct management control shall be specific and collected on site.
- Data referring to contractors that supply main parts, packaging, or main auxiliaries should be requested from the contractor as specific data, as well as infrastructure, where relevant.
- Data on transport of main parts and components along the supply chain to a distribution point (e.g. a stockroom or warehouse) where the final delivery to the manufacturer can take place, should be specific and based on the actual transportation mode, distance from the supplier, and vehicle load.
- In case specific data is lacking, selected generic data may be used. If this is also lacking, proxy data may be used (see Section 4.7).
- For upstream processes modelled with specific data, generation of electricity used shall be accounted for in this priority:
    1. Specific electricity mix as generated, or purchased from an electricity supplier, demonstrated by a Guarantee of Origin or similar as provided by the electricity supplier.
    2. Residual electricity mix of the electricity supplier on the market.
    3. Residual electricity mix on the market.
    4. Electricity consumption mix on the market.

  The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total consumption mix.

  “The market” in the above hierarchy may correspond a national electricity market, if this can be justified.

  The mix of electricity used in upstream processes shall be documented in the EPD, where relevant.
- Packaging: specific data shall be used for the consumer packaging production if it is under the direct control of the organization or if the environmental impact related to the consumer packaging production is more than 10% of the total product environmental indicators. In other cases, generic data may be used. When consumer packaging shows the organization's logo, the LCA report should report the exerted/non-exerted direct control on the production of consumer packaging by the organization.

4.7.4.2. Core processes

- Transport from the final delivery point of raw materials, chemicals, main parts, and components (see above regarding upstream processes) to the manufacturing plant/place of service provision should be based on the actual transportation mode, distance from the supplier, and vehicle load, if available.
- Goods: Specific data shall be used for the assembly of the product and for the manufacture of main parts as well as for on-site generation of steam, heat, electricity, etc., where relevant.
- Services: Specific data shall be used for the consumption of materials, chemicals, steam, heat, electricity, etc., necessary for execution of the service
- For electricity used in the core processes, generation of electricity used shall be accounted for in this priority:
    1. Specific electricity mix as generated, or purchased from an electricity supplier, demonstrated by a Guarantee of Origin or similar as provided by the electricity supplier.
    2. Residual electricity mix of the electricity supplier on the market.
    3. Residual electricity mix on the market.

4. Electricity consumption mix on the market. This option shall not be used for electricity used in processes over which the manufacturer (EPD owner) has direct control[2].

The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total consumption mix.

"The market" in the above hierarchy may correspond a national electricity market, if this can be justified.

The mix of electricity used in the core processes shall be documented in the EPD, where relevant.

- Waste treatment processes of manufacturing waste should be based on specific data, if available.

4.7.4.3. Downstream processes

This section set the general rule for all downstream life cycle modules.

- Data for the use stage are usually based on scenarios, but specific data should be used when available and relevant.
- Data on the emissions from the use stage should be based on documented tests, verified studies in conjunction with average or typical product use, or recommendations concerning suitable product use. Whenever applicable, test methods shall be internationally recognised.
- The use of electricity in the region/country where the product is used (as specified in the geographical scope of the EPD) shall be accounted for in the following priority:

    1. Residual electricity mix on the market.
    2. Electricity consumption mix on the market.

    The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix.

    "The market" in the above hierarchy may correspond a national electricity market, if this can be justified.

    The mix of electricity used in the downstream processes shall be documented in the EPD, where relevant.

- The transport of the product to the customer shall be described in the EPD, where relevant, and be accounted for in this priority:

    1. Actual transportation modes and distances to specific a customer or market, representing the geographical scope of the EPD.
    2. A weighted average of transportation modes and distances, based on transportation to several customers or markets, representing the geographical scope of the EPD.
    3. Calculated as a fixed long transport, such as 1000 km transport by lorry or 10 000 km by ship, according to product type.

4.7.4.4. MODULE C1 - TRANSPORT FROM SHIPYARD TO CUSTOMER

The transport of the product to the customer shall be described in the reference PCR, which should reflect the actual situation to the best extent possible. The priority in section 4.7.4.3 should be used.

The final transport phase should include delivery handling, such as:

- vessel shifting,
- barge usage,
- dry dock operations, and
- launch operations.

4.7.4.5. Module C2 – Operational phase

The following operation processes shall be included:

- Fuel production for the activities of the vessel

[2] For electricity markets without trade of Guarantees of Origin (or similar), the residual mix will, however, be identical to the consumption mix.

- Overall emissions related to annual operating activities of the vessel calculated as the sum of two main contributions:
  - emissions related to average annual fuel consumption ($FC_{y,ave}$ $[kg/yr]$) as calculated using Eq.(1), and
  - emissions related to average annual electricity consumption ($EC_{y,ave}$ $[kWh/yr]$), as calculated using Eq.(12).

The annual average fuel consumption does not apply to engines different than internal combustion engines, e.g., electric motors.

The annual average fuel consumption ($FC_{y,ave}$ $[kg/yr]$) for the product system shall be calculated dividing the total fuel consumption (FC_{tot} $[kg]$) by the product system reference lifetime of 20 years, following Eq. (1):

$$FC_{y,ave} = \frac{FC_{tot}}{20} \quad (1)$$

If more than one vessel is required to guarantee the service reference lifetime of 20 years, the total fuel consumption (FC_{tot} $[kg]$) shall be obtained as the sum of the vessel total fuel consumption ($FC_{v,tot}$ $[kg]$) using Eq. (2)

$$FC_{tot} = \sum_{v=1}^{t} FC_{v,tot} \quad (2)$$

where:

$FC_{v,tot}$ $[kg]$: total fuel consumption for vessel v

t: vessels required to guarantee the reference service lifetime of 20 years

The vessel overall fuel consumption ($FC_{v,tot}$ $[kg/lifetime]$) for the entire lifetime of the vessel v shall be calculated as the sum of the annual vessel fuel consumption specific for each year (FC_y $[kg/yr]$), following Eq. (3). The equation embeds a correction factor for taking into consideration the increment of fuel consumption due to performance depletion of the vessel during its lifetime.

$$FC_{v,tot} = \sum_{y=0}^{p} FC_y = \sum_{y=0}^{p} FC_{opt} * 1.005^y \quad (3)$$

where:

FC_y $[kg/yr]$: annual fuel consumption for year y

FC_{opt} $[kg/yr]$: annual fuel consumption calculated at the beginning of the lifecycle

p: the total lifetime of the vessel

Since the operational phase is strongly user-dependent, a set of relevant scenarios is provided for the sake of harmonization. The operational phase shall be based on one of the available annual scenarios, selecting the operational profile that best represents the expected usage from Table 7. For use phase EPD specific data for the chosen operational profile is available, in terms of fuel consumption or real duration of each specific activity, such information shall be used instead of generic annual scenarios.

Table 7: Operating profiles

Activity	Fast Cruise	Slow Transit	Sailing	Manoeuvring	At Anchor	At Port	Dry Dock, At Port (w/o cons)	Total
Classification [i]	1	2	3	4	5	6	7	
Load	0.85	0.35	0.10*	0.10	0.10*	0.10**	0	
u.o.m.	[hours]	[hours]	[hours]	[hours]	[hours]	[hours]	[hours]	[hours]
Warm Season Leisure	40	330		70	1500	520	6300	8760
Annual Leisure	80	660		130	3000	4400	490	8760
Warm Season Excursions	600	360		400	800	2200	4400	8760

Annual Transfer	3000	960		400		900	3500	8760
Annual Professional	2400	860		400	200	900	4000	8760
Warm Season Optional Sailing	120		360	80	1400	500	6300	8760
Warm Season Integral Sailing			260				8500	8760

*This load shall be used only if the vessel is not equipped with auxiliary generators and/or other source of power.
**This load shall be used only if the vessel is not equipped with a connection to shore power, nor with auxiliary generators and/or other source of power.

Each provided scenario refers to a peculiar combination of operational activities, which are briefly described underneath. The descriptions are intended to provide guidance for a correct selection among the available scenarios. The selection of the scenario that best represents the expected operational activities shall be based on customer experiences, surveys, market analysis, documented practices, or expert judgements.

Warm Season Leisure: the vessel usage occurs predominantly during warm seasons for recreational activities of passengers. The vessel can not move without the propulsion provided by the engine (e.g., small vessels).

Annual Leisure: The vessel is used for leisure purposes by passengers all year long. The vessel can not move without the propulsion provided by the engine (e.g., large yachts).

Warm Season Excursions: the vessel usage occurs predominantly during warm seasons for recreational activities of passengers (e.g., organized excursions to specific locations for tourists). The vessel can not move without the propulsion provided by the engine

Annual Transfer: the vessel usage occurs all year long for the transfer of passengers (e.g., passenger ferries). The vessel can not move without the propulsion provided by the engine.

Annual Professional: the vessel usage occurs all year long for professional purposes and services to other vessels (e.g., tugboats). The vessel can not move without the propulsion provided by the engine.

Warm Season Optional Sailing: the vessel usage occurs predominantly during warm seasons for recreational activities of passengers. The vessel is equipped with sail and can move without the propulsion provided by the engine (e.g., sailboats). The engine is mainly used for maneuvering and transfer in the absence of wind.

Warm Season Integral Sailing: the vessel usage occurs predominantly during warm seasons for recreational activities of passengers. The vessel is not equipped with engines for propulsion (e.g., kayaks, windsurfs, dinghies)

A description of each operational activity is provided underneath:

Activity 1 – Fast Cruise*:* main propulsion system running at 85% MCR (maximum continuous rating) and the vessel is electrically powered by generators and/or other source of power (e.g., storage batteries), if present.

Activity 2 – Slow Transit*:* main propulsion system running at 35% MCR and the vessel is electrically powered by generator and/or other sources of power (e.g., storage batteries), if present.

Activity 3 – Sailing: the vessel is electrically powered by generators and/or other sources of power (e.g., storage batteries) if present. If the vessel is not equipped with auxiliary generators, the fuel consumption of the main engine shall be calculated, considering the system running at 10% MCR.

Activity 4 – Maneuvering: main propulsion system running at 10% MCR, all thrusters running. The vessel is electrically powered by generators and/or other source of power (e.g., storage batteries), if present.

Activity 5 – At Anchor*:* the vessel is electrically powered by main engines or generators and/or other source of power (e.g., storage batteries), if present. If the vessel is not equipped with auxiliary generators and/or other source of power, the fuel consumption of the main engine shall be calculated, considering the system running at 10% MCR.

Activity 6 – At Port: the vessel is docked in port and electrically powered by the energy coming from shore, from the main engines or from the generators and/or other source of power (e.g. storage batteries), if present. If the vessel is equipped with a connection to shore power, the electricity consumed from the grid shall be calculated considering the electrical power required by the vessel systems, according to the specific electricity mix, national residual mix or national production mix, using this order of priority. If the vessel is not equipped with a connection to shore power and generators and/or other source of onboard power are present, the fuel consumption and/or the energy consumption shall be calculated considering the electrical power required by the vessel systems. If the vessel is not equipped with a connection to shore power nor with auxiliary generators and/or other source of power, the fuel consumption of the main engine shall be calculated, considering the system running at 10% MCR.

Activity 7 – Dry Dock, At Port (w/o cons): Main engines and generators system are switched off. The vessel is towed to a dry dock for maintenance or docked at a port without any energy consumption.

The annual fuel consumption ($FC_y\ [kg/yr]$) shall be calculated as the sum of the annual fuel consumption specific for each activity, following Eq. (4):

$$FC_y = \sum_{i=1}^{7} FC_i \quad (4)$$

where:

FC_i: annual activity fuel consumption for the activity i

i: classification of each activity following Table 7

The annual activity fuel consumption for activity i ($FC_i\ [kg/yr]$) shall be calculated as the product of the specific activity fuel consumption ($SFC_i\ [kg/h]$) and the hours of activity i defined for the selected scenario ($H_i\ [h/yr]$) as reported in Table 7, following Eq. (5)

$$FC_i = SFC_i * H_i \quad (5)$$

The sources of information used for the calculation of the specific activity fuel consumption ($SFC_i\ [kg/h]$) for each activity i shall be accounted for in the following priority:

- fuel consumption primary data
- the methodology published by IMO on the Fourth IMO GHG Study 2020[3].
- Retrieved on the manufacturer's documentation

The specific activity fuel consumption ($SFC_i\ [kg/h]$) is calculated as the sum of the engines specific fuel consumption considering both the propulsion engines ($SFC_E\ [kg/h]$) and the auxiliary engines/boilers ($SFC_{A|B}\ [kg/h]$), following Eq.(6).

$$SFC_i = SFC_E + SFC_{A|B} = \sum_{j=1}^{m} SFC_{E,j} + \sum_{k=1}^{l} SFC_{A|B,k} \quad (6)$$

where:

$SFC_E\ [kg/h]$ is the specific fuel consumption of propulsion engines

$SFC_{A|B}\ [kg/h]$ is the specific fuel consumption of auxiliary engines and internal combustion boilers

$SFC_{E,j}\ [kg/h]$ is the specific fuel consumption of propulsion engine j at different loads

m is the number of internal combustion engines for propulsion

$SFC_{A|B,k}\ [kg/h]$ is the specific fuel consumption of auxiliary engine or internal combustion boiler k

l is the number of internal combustion engines installed for auxiliary services and internal combustion boilers

To calculate the specific engine j fuel consumption for propulsion ($SFC_{E,j}\ [kg/h]$), the following priority shall be used:

1. Specific fuel consumption certified by a third-party certification body
2. Specific fuel consumption self-declared by manufacturer
3. Specific fuel consumption as calculated by Fourth IMO GHG Study 2020[3], as reported below.

The engine specific fuel consumption ($SFC_{E,j}\ [kg/h]$) is assumed to vary as a function of its load following Eq.(7):

$$SFC_{E,j} = SFC_{E,j,base} * (0.455 * Load_i^2 - 0.71 * Load_i + 1.280) * Power_j \quad (7)$$

[3] IMO, 2021. Fourth IMO GHG Study 2020: Safe, secure and efficient shipping on clean ocean, London: International Maritime Organization (IMO).

where:

$Load_i$ [unitless] varies from 0 to 1 and indicates the engine load with respect to MCR (from 0 to 100% MCR). The $Load_i$ coefficient to be applied for each activity i is reported in Table 7.

$Power_j$ [kW] is the power of internal combustion engine j installed for propulsion of the vessel

The baseline fuel consumption ($SFC_{E,j,base}$ $[kg/kWh]$) related to the internal combustion engine j shall be identified. The baseline fuel consumption is the propulsion engine, auxiliary engine and auxiliary boiler lowest specific fuel consumption identified in their loading curve – in other words, the most fuel-efficient point. The selection of the correct baseline fuel consumption ($SFC_{E,j,base}$ $[kg/kWh]$) shall follow this priority:

1. Retrieved on the engine manufacturer's documentation
2. Self-declared baseline specific fuel consumption
3. Selected from Table 8, which comprehends a wide range of combinations between engines and fuels types, based on IMO information[4].

Table 8: Baseline specific fuel consumption for typical marine engines

Internal Combustion Engine Type	Fuel Type	$SFC_{E,j,base}$ $[kg/kWh]$
Slow-Speed Diesel (SSD)	HFO	0.175
	MDO	0.165
	MeOH	0.350
Medium-Speed Diesel (MSD)	HFO	0.185
	MDO	0.175
	MeOH	0.370
High-Speed Diesel (HSD)	HFO	0.195
	MDO	0.185
LNG-Otto SS (dual-fuel, slow-speed)	LNG + MDO	0.148 LNG + 0.0008 MDO (pilot)
LNG-Otto MS (dual-fuel, medium-speed)	LNG	0.156
LNG-Diesel (dual-fuel)	LNG + MDO	0.135 LNG + 0.006 MDO (pilot)
Lean Burk Spark-Ignited (LBSI)	LNG	0.156
Gas Turbines	HFO	0.305
	MDO	0.300
	LNG	0.203

The description of each internal combustion engine is provided underneath:

Slow-Speed Diesel (SSD): All main engines where the main propulsion type description contains "Oil" are assumed to be two-stroke engines with an engine speed lower than or equal to 300 RPM.

Medium-Speed Diesel (MSD): All engines where the main propulsion type contains "Oil" with an engine speed ranging from 300 to 900 RPM.

High-Speed Diesel (HSD): All engines for which the main propulsion type contains "Oil" with an engine speed above 900 RPM

LNG-Otto SS: Two-stroke, slow-speed, dual-fuel engines that operate similar to the Otto cycle.

LNG-Otto MS: Four-stroke, medium-speed, dual-fuel engines that operate on the Otto cycle. These engines were identified as any four-stroke LNG engine with an engine speed above 300 RPM, except those engines identified as LBSI (see below). Also, this category includes LNG engines not otherwise classified under any other LNG category.

[4] IMO, 2021. Fourth IMO GHG Study 2020: Safe, secure and efficient shipping on clean ocean, London: International Maritime Organization (IMO).

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

LNG-Diesel: Two-stroke, slow-speed, dual-fuel engines that operate on the Diesel cycle.

Lean Burk Spark-Ignited (LBSI): Four-stroke, medium-speed, mono-fuel engines that are low-pressure-injection and ignite the gas/air mixture in the cylinder using a spark.

Gas turbine: Vessels whose propulsion type is specified as “Gas Turbine”, or vessels previously classified as Oil Engines (SSD or MSD) but with the fuel type classified as “Gas”.

Steam Turbine and boiler: Vessels whose propulsion type classification contains “Steam Turbine”. This includes ships fueled by oil-based fuels and those powered by LNG or boil-off gas.

As reported by IMO [1], auxiliary engines and boilers are not dependent on their load. Hence, the specific fuel consumption of auxiliary engine or internal combustion boiler k ($SFC_{A|B,k}$ $[kg/h]$) is governed solely on the power demand ($Power_k$ $[kW]$) and its baseline fuel consumption ($SFC_{A|B,k,base}[kg/h]$) as shown in Eq.(8):

$$SFC_{A|B,k} = SFC_{A|B,k,base} * Power_k \quad (8)$$

The selection of the correct baseline fuel consumption ($SFC_{A|E,k,base}$ $[kg/h]$) should follow this priority:

1. Retrieved on the engine manufacturer’s documentation
2. Self-declared baseline specific fuel consumption
3. Selected from Table 9, which comprehends a wide range of combinations between engines and fuels types, based on IMO information[5].

Table 9: Baseline specific fuel consumption for typical auxiliary engines and/or boilers

Internal Combustion Engine Type	Fuel Type	$SFC_{A\|E,base} - [kg/kWh]$
Boilers	HFO	0.340
	MDO	0.320
	LNG	0.285
Auxiliary engines	HFO	0.195
	MDO	0.185
	LNG	0.156

Data on the pollutant emissions from the operational stage shall be based on fuel specific emission factors, which have been published on the Fourth IMO GHG Study 2020, Appendix M [1].

The annual emissions from the operational phase shall be accounted for in the following priority:

1. Calculated using the methodology described in MEPC 75/7/15 - Reduction of GHG emissions from ships. Fourth IMO GHG Study 2020, Appendix N[5],
2. Calculated based on available database information that satisfies the minimum requirements for data quality reported in Section 4.7,
3. Calculated based on documented experimental data, e.g., manufacturer declarations.

If engines different from internal combustion engines contribute to propulsion and/or auxiliary services supply, the emissions related to the generation of the energy carrier (e.g., electricity stored in batteries, hydrogen, etc.) shall be included in the operational phase total emissions.

The annual average electricity consumption ($EC_{y,ave}$ $[kWh/yr]$) for the product system shall be calculated dividing the total electricity consumption (EC_{tot} $[kWh]$) by the product system reference lifetime of 20 years, following Eq. (9).

$$EC_{y,ave} = \frac{EC_{tot}}{20} \quad (9)$$

[5] IMO, 2021. Fourth IMO GHG Study 2020: Safe, secure and efficient shipping on clean ocean, London: International Maritime Organization (IMO).

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

If more than one vessel is required to guarantee the service reference lifetime of 20 years, the total fuel consumption (EC_{tot} $[kg]$) shall be obtained as the sum of the vessel total electricity consumption ($EC_{v,tot}$ $[kg]$) using Eq. (10)

$$EC_{tot} = \sum_{v=1}^{t} EC_{v,tot} \quad (10)$$

where:

$EC_{v,tot}$ $[kWh]$: total electricity consumption for vessel v

t: vessels required to guarantee the reference service lifetime of 20 years

The vessel overall electricity consumption ($EC_{v,tot}$ $[kWh/lifetime]$) for the entire lifetime of the vessel v shall be calculated as the sum of the annual vessel electricity consumption specific for each year (EC_y $[kWh/yr]$), following Eq. (11). The equation embeds a correction factor for taking into consideration the increment of fuel consumption due to performance depletion of the vessel during its lifetime.

$$EC_{v,tot} = \sum_{y=1}^{p} EC_y * 1.005^y \quad (11)$$

where:

EC_i: annual activity electricity consumption for the activity i

i: classification of each activity following Table 7

The operational phase shall be based on one of the available annual scenarios, selecting the operational profile that best represents the expected usage from Table 7. If specific data on the operational profile is available, an additional scenario may be included in the additional information. The same operational profile shall be used for fuel and electricity consumptions.

The annual electricity consumption (EC_y $[kWh/yr]$) shall be calculated as the sum of the annual electricity consumption specific for each activity of Table 7, following Eq. (12):

$$EC_y = \sum_{i=1}^{7} EC_i \quad (12)$$

where:

EC_i: annual activity electricity consumption for the activity i

i: classification of each activity following Table 7

The annual activity electricity consumption for activity i (EC_i $[kWh/yr]$) shall be calculated as the electrical engine k installed power ($Power_k$ $[kW]$) times the load ($Load_i$ [unitless]) and the hours (H_i $[h/yr]$) of activity i defined for the selected scenario as reported in Table 7, following Eq. (13)

$$EC_i = Power_k * Load_i * H_i + EC_g \quad (13)$$

EC_g $[kWh/yr]$ is the electricity consumption of the onboard generators for providing the electrical power required by the vessel systems and shall be calculated following Eq. (14):

$$EC_g = \sum_{i=1}^{6} H_i * SEC_g \quad (14)$$

Where $SEC_g[kW]$ is the power required by the vessel systems.

4.7.4.6. Module C3 – Maintenance

It includes the activities and materials related to the ordinary and scheduled maintenance for the entire vessel lifetime of 20 years.

Maintenance includes activities of vessel's painting and replacement of a component, or set of components, with a total weight not greater than 80% of the weight of the relative main product group as defined in Table 2. If the weight is greater than 80% the activity is defined as refitting, as described in Section 4.6.3.

The extraction and production of replacements/spare parts for maintenance shall be included, as well as the energy required for the replacement procedure.

The frequency of ordinary and scheduled maintenance activities shall be accounted in the following priority:

1. Requirement by the regulation that addresses the specific type of vessel (e.g. classification society, standards);
2. Requirement by the equipment suppliers;
3. Based on available datasets from other vessel, with same main operating profile and similar overall length, that satisfies the minimum requirements for data quality reported in Section 4.7.

Besides the frequency, the average of the potential maintenance activities done during these fixed appointments shall be defined. For example, the averaged maintenance activities are: cleaning the hull, painting the vessel, replacing sacrificial anodes, change of oil and filters of machinery and equipment.

Extraordinary maintenance are those activities aimed at making changes or improvements to the vessel that are not carried out every year. All input and output flows related to this activity must be allocated with respect to the number of years, calculated as the difference between 20 years of life and the age of the vessel in the reference period of the study. For construction EPD and project EPD the extraordinary maintenance shall be related to the activities scheduled by the supplier of the vessel components. For Use phase EPD the extraordinary maintenance activities shall also include all processing and activities involving a change of less than 20% in mass of each main product group, during the EPD reference period or annual EPD update.

4.7.4.7. Module D1 – Transport to end-of-life facility

Since the end-of-life of the vessel depends on its usage and the owner's will, a reasonable scenario shall be considered for the treatment of the vessel. The proposed scenario shall include the transports of the vessel from the customer to the end-of-life facility, reflecting the actual situation to the best extent possible. The priority in section 4.7.4.3 should be used.

4.7.4.8. Module D2 – Disassembly

It includes the activities and materials related to the disassembly of the installed elements and the cutting of the hull, if applicable.

4.7.4.9. Module D3 – End-of-life processes of any wasted part of the product

This module shall include the activities and materials related to the treatment processes of the installed components and the hull materials.

Scenarios for the end-of-life stage shall be technically and economically practicable and compliant with current regulations in the relevant geographical region based on the geographical scope of the EPD. Key assumptions regarding the end-of-life stage scenario shall be documented in the LCA report.

The following guidelines have been developed and adopted to assist States in the early implementation of the IMO Convention's technical standards:

2011 Guidelines for the Development of the Inventory of Hazardous Materials, adopted by resolution MEPC.197(62)

2011 Guidelines for the Development of the Ship Recycling Plan, adopted by resolution MEPC.196(62)

2012 Guidelines for Safe and Environmentally Sound Ship Recycling, adopted by resolution MEPC.210(63)

2012 Guidelines for the Authorization of Ship Recycling Facilities, adopted by resolution MEPC.211(63)

2012 Guidelines for the survey and certification of ships under the Hong Kong Convention, adopted by resolution MEPC.222(64)

2012 Guidelines for the inspection of ships under the Hong Kong Convention, adopted by resolution MEPC.223(64).

4.7.5 DATA QUALITY DECLARATION

EPDs may include a declaration of the quality of data used in the LCA calculations.

4.8 ENVIRONMENTAL PERFORMANCE INDICATORS

The EPD shall declare the default environmental performance indicators and their methods as described at the website (www.environdec.com/indicators), which includes both inventory indicators and indicators of potential environmental impact. The source and version of the impact assessment methods and characterisations factors used shall be reported in the EPD. Alternative regional impact assessment methods and characterisation factors may be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

If the default list of environmental performance indicators and methods at the website is updated, the previous version of the list is valid in parallel to the new version during a transition period of 90 days, as described at the website.

Apart from the required inventory indicators, other inventory data may also be declared in the EPD, if relevant and useful for EPD users. Such data shall not be declared in the main body of the EPD, but in an annex.

The following impact category shall be added:

Particulate matter (PM) adopted from EF 3.0 Method, with model from Fantke et al. (2016) in UNEP (2016), and Disease incidences as indicator.

4.9 INCLUDING MULTIPLE PRODUCTS IN THE SAME EPD

4.9.1 PRODUCTS FROM THE SAME COMPANY

Similar products from a single or several manufacturing sites covered by the same PCR and manufactured by the same company with the same major steps in the core processes may be included in the same EPD if none of the declared environmental performance indicators differ by more than 10% between any of the included products. The results for the environmental performance indicators of one representative product shall be declared according to Section 5.4.6. The choice of representative product shall be justified in the EPD, using, where applicable, statistical parameters.

4.9.2 SECTOR EPDS

The International EPD® System allows for an industry association to develop an EPD in the form of a Sector EPD. A Sector EPD declares the average product of multiple companies in a clearly defined sector in a clearly defined geographical area. Products covered in a sector EPD shall follow the same PCR and the same declared/functional unit shall be applied.

Any communication of the results from a Sector EPD should contain the information that the results are based on averages obtained from the sector as defined in the EPD. The communication shall not claim that the sector EPD results are representative for a certain manufacturer or its product.

The following information shall also be included a Sector EPD:

- a list of the contributing manufacturers that the Sector EPD covers,
- a description of how the selection of the sites/products has been done and how the average has been determined, and
- a statement that the document covers average values for an entire or partial product category (specifying the percentage of representativeness) and, hence, the declared product is an average that is not available for purchase on the market.

5 CONTENT AND FORMAT OF EPD

EPDs based on this PCR shall contain the information described in this section. Flexibility is allowed in the formatting and layout provided that the EPD still includes the prescribed information. A generic template for EPDs is available at www.environdec.com.

The EPD content shall:

- be in line with the requirements and guidelines in ISO 14020 (Environmental labels and declarations – General principles),
- be verifiable, accurate, relevant and not misleading, and
- not include rating, judgements or direct comparison with other products[6].

An EPD should be made with a reasonable number of pages for the intended audience and use.

The content of EPDs published in machine-readable format shall correspond with the content of the underlying EPD.

5.1 EPD LANGUAGES

EPDs should be published in English but may also be published in additional languages. If the EPD is not available in English, it shall contain an executive summary in English including the main content of the EPD. This summary is part of the EPD and, thus, also subject to the verification process.

5.2 UNITS AND QUANTITIES

The following requirements apply for units and quantities:

- The International System of Units (SI units) shall be used where available, e.g., kilograms (kg), Joules (J) and metres (m). Reasonable multiples of SI units may be decided in the PCR to improve readability, e.g., grams (g) or megajoules (MJ). The following exceptions apply:
  - Resources used for energy input (primary energy) should be expressed as kilowatt-hours (kWh) or megajoules (MJ), including renewable energy sources, e.g., hydropower, wind power and geothermal power.
  - Water use should be expressed in cubic metres (m^3)
  - Temperature should be expressed in degrees Celsius (°C),
  - Time should be expressed in the units most practical, e.g., seconds, minutes, hours, days or years.
  - Results of the environmental performance indicators shall be expressed in the units prescribed by the impact assessment methods, e.g. kg CO_2 equivalents.
- Three significant figures[7] should be adopted for all results. The number of significant digits shall be appropriate and consistent.
- Scientific notation may be used, e.g. 1.2E+2 for 120, or 1.2E-2 for 0.012.
- The thousand separator and decimal mark in the EPD shall follow one of the following styles (a number with six significant figures shown for illustration):
  - SI style (French version): 1 234,56
  - SI style (English version): 1 234.56

  In case of potential confusion or intended use of the EPD in markets where different symbols are used, the EPD shall state what symbols are used for thousand separator and decimal mark.
- Dates and times presented in the EPD should follow the format in ISO 8601. For years, the prescribed format is YYYY-MM-DD, e.g., 2017-03-26 for March 26th, 2017.
- The result tables shall:

[6] Therefore, results of normalization are not allowed to be reported in the EPD.

[7] Significant figures are those digits that carry meaning contributing to its precision. For example with two significant digits, the result of 123.45 shall be displayed as 120, and 0.12345 shall be displayed as 0.12. In scientific notation, these two examples would be displayed as $1.2*10^2$ and $1.2*10^{-2}$.

- Only contain values or the letters “ND” (Not Declared). It is not possible to specify ND for mandatory indicators. ND shall only be used for voluntary parameters that are not quantified because no data is available.[8]
- Contain no blank cells, hyphens, less than or greater than signs or letters (except “ND”).
- Use the value “0” only for parameters that have been calculated to be zero.
- Footnotes shall be used to explain any limitation to the result value.

5.3 USE OF IMAGES IN EPD

Images used in the EPD, especially pictures featured on the cover page, may in themselves be interpreted as an environmental claim. Images such as trees, mountains, wildlife that are not related to the declared product shall therefore be used with caution and in compliance with national legislation and best available practices in the markets in which the EPD is intended to be used.

5.4 EPD REPORTING FORMAT

The reporting format of the EPD shall include the following sections:

- Cover page (see Section 5.4.1)
- Programme information (see Section 5.4.2)
- Product information (see Section 5.4.3)
- Content declaration (see Section □)
- Environmental performance (see Section 5.4.6)
- Additional environmental information (see Section 5.4.7)
- Additional social and economic information (see Section 5.4.8)
- References (see Section 5.4.10)

The following sections shall be included, if relevant:

- Differences versus previous versions (see Section 5.4.9)
- Executive summary in English (see Section 5.4.11)

5.4.1 COVER PAGE

The cover page shall include:

- Product name and image
- Name and logotype of EPD owner
- The text “Environmental Product Declaration” and/or “EPD”
- Programme: The International EPD® System, www.environdec.com
- Programme operator: EPD International AB
- Logotype of the International EPD® System
- EPD registration number as issued by the programme operator[9]
- Date of publication (issue): 20XX-YY-ZZ
- Date of revision: 20XX-YY-ZZ, when applicable
- Date of validity; 20XX-YY-ZZ

[8] This requirement does not intend to give guidance on what indicators are mandated (“shall”) or voluntary.

[9] The EPD shall not include a “registration number” if such is provided by the certification body, as this may be confused with the registration number issued by the programme operator.

- A note that *"An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com."*
- A statement of conformity with ISO 14025.
- For EPDs covering multiple products: a statement that the EPD covers multiple products and a list of all products covered by the EPD.
- Type of EPD: Project EPD, Product EPD, use phase EPD as defined in section 4.7.3.
- For Sector EPDs: a statement that the EPD is a Sector EPD.

In the case of EPDs registered through a regional hub (a regional or national programme based on and fully aligned with the International EPD® System through an agreement with the programme operator), "Programme", "Programme operator", and "Logotype" shall be expanded to include a reference to the regional programme and the organisation responsible for it.

Where applicable, the cover page shall also include the following information:

- Information about dual registration of EPD in another programme, such as registration number and logotype.
- A statement of conformity with other standards and methodological guides.

5.4.2 PROGRAMME INFORMATION

The programme information section of the EPD shall include:

- Address of programme operator: *EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com*
- The following statement on the requirements for comparability of EPDs, adapted from ISO 14025: *"EPDs within the same product category but from different programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison."*
- A statement that the EPD owner has the sole ownership, liability and responsibility of the EPD
- Information about verification[10] and the PCR in a table with the following format and contents:

Product category rules (PCR): *<registration number, name, version number)>* *<name and version of c-PCR, if applicable>*
PCR review was conducted by: *<name and organisation of the review chair, and information on how to contact the chair through the programme operator>*
Independent third-party EPD verification of the declaration and data, according to ISO 14025:2006: ☐ Process certification ☐ Individual verification
In case of certification bodies: Accredited by: *<name of the accreditation body and accreditation number, if applicable>.* *In case of individual verifiers:* *<Name, and organisation of the individual verifier. The signature may also be included>* Approved by: The International EPD® System
The procedure for follow-up during EPD validity, as defined in the GPI, involves third-party verifier: ☐ Yes ☐ No

[10] If the EPD has been verified by an approved individual verifier who has received contractual assistance from a certification body that is not accredited, this certification body shall not be included in this table.

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

5.4.3 PRODUCT INFORMATION

The product information section of the EPD shall include:

- address and contact information to EPD owner,
- description of the organisation. This may include information on products- or management system-related certifications (e.g. ISO 14024 Type I environmental labels, ISO 9001- and 14001-certificates and EMAS-registrations) and other relevant work the organisation wants to communicate (e.g. SA 8000, supply-chain management and social responsibility),
- name and location of production site,
- product identification by name, and an unambiguous identification of the product by standards, concessions or other means,
- identification of the product according to the UN CPC scheme system. Other relevant codes for product classification may also be included, e.g.
  - Common Procurement Vocabulary (CPV),
  - United Nations Standard Products and Services Code® (UNSPSC),
  - Classification of Products by Activity (NACE/CPA),
  - Australian and New Zealand Standard Industrial Classification (ANZSIC), or
  - Global Trade Item Number (GTIN).
- a description of the product,
- a description of the technical purpose of the product, including its application/intended use,
- a description of the background system, including the main technological aspects,
- for EPDs covering multiple products: a description of the selection of products/sites, a list of contributing manufacturers (if Sector EPD), etc. (see Section 4.9),
- geographical scope of the EPD, i.e., for which geographical location(s) of use and end-of-life the product's performance has been calculated,
- declared/functional unit (description of functional unit shall include reference to the selected main operating profile),
- reference service life (RSL) and/or technical/actual lifespan,
- For use phase EPD, description of operating profile with primary data used to calculate the environmental parameters,
- declaration of the year(s) covered by the data used for the LCA calculation and other relevant reference years,
- reference to the main database(s) for generic data and LCA software used, if relevant,
- system diagram of the processes included in the LCA, divided into the life cycle stages,
- Description if the EPD system boundary is "cradle-to-gate" (Life cycle modules evaluated are from A1 to B3), "cradle-to-gate with options" (Life cycle modules evaluated are from A1 to C3) or "cradle-to-grave" (Life cycle modules evaluated are from A1 to D3),
- information on which life-cycle stages are not considered (if any), with a justification of the omission, and
- references to any relevant websites for more information or explanatory materials.

This section may also include:

- name and contact information of organisation carrying out the underlying LCA study,
- any additional information about the underlying LCA-based information, such as cut-off rules, data quality, allocation methods, and other methodological choices and assumptions,
- a description of the material properties of the product with a declaration of relevant physical or chemical product properties, such as density, etc., and
- if end-of-life treatment is not included, the EPD shall contain a statement that it shall not be used for communicating environmental information to consumers/end users of the product.

5.4.4 SPECIFICATION OF PRODUCT

The type of vessel shall be declared in the EPD, according to the specification reported in Table 8.

Table 8 Vessel main specifications

MANDATORY INFORMATION	EXPLANATION
Vessel Type	Passenger vessel, fishing vessel, inflatable boat, motor yacht, sailing yacht, etc.
Length Over All	m *[meters]*
Beam	m *[meters]*
Draft	m *[meters]*
Gross Tonnage	GT *[gross tonnes]*
Displacement (Light Ship)	T *[tonnes]*
Propulsion Power	kW *[kilowatt]*
Total installed power	kW *[kilowatt]*
VOLUNTARY INFORMATION	**EXPLANATION**
Vessel Name	*[name]*
Hull Material	Steel, Aluminum, Fiberglass, Carbon, Wood, etc.
Vessel Delivery	*[date]*
Propulsion System	Conventional, Hybrid, Diesel Electric, etc.
Cruise Speed, Max Speed	kn *[knots]*
N° Passengers	*[numerical]*
N° Crew	*[numerical]*
Classification Society	RINA, LR, ABS, BV, GL, DNV, etc.
Additional Class Notations	*[as per classification society]*
Code/Flag State	LY3 or PYC or other safety code
Vessel Keel Lay	*[date]*

If some mandatory information is not applicable for the vessel under study, the motivation shall be given in the LCA report.

5.4.5 CONTENT DECLARATION

The content declaration section shall declare the weight of one unit of product, as purchased, and contain information about the content of the product in the form of a list of materials and chemical substances including information on their environmental and hazardous properties. The gross weight of each material/substance shall be declared, including a minimum of 99% of the materials/substances in one unit of product.

The content declaration does not apply to proprietary materials and substances covered by exclusive legal rights including patent and trademarks. In general, an indication that a product is “free” of a specific hazardous material or substance should be done with caution and only when relevant, following the rules in ISO 14021 on self-declared environmental claims.

Information on the hazardous properties of materials and chemical substances should follow the requirements given in the latest revision of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS),[11] issued by the United Nations or national or regional applications of the GHS. As an example, the following regulations should be used for EPDs intended to be used in the European Union:

- Regulation (EC) No 1907/2006 of the European parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH); and
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling, and packaging of substances and mixtures.

5.4.5.1. Information about recycled materials

When a product is made in whole or in part with recycled materials, the provenience of the materials (pre-consumer or post-consumer) shall be presented in the EPD as part of the content declaration.

[11] The GHS document is available at www.unece.org.

To avoid any misunderstanding about which material that may be considered "recycled material", the guidance given in ISO 14021 shall be considered. In brief, the standard states that:

- only pre-consumer or post-consumer materials (scraps) shall be considered in the accounting of the recycled materials, and
- materials coming from scrap reutilisation (such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it) shall not be considered as recycled content.

5.4.5.2. Information about packaging

As packaging is strongly connected with the product, the producer shall provide information about packaging in the EPD, when applicable. Packaging may be classified as:

- Distribution Packaging: packaging designed to contain one or more articles or packages, or bulk materials, for the purposes of transport, handling and/or distribution (ISO 21067-1:2016, Section 2.2.6)
- Consumer Packaging: packaging constituting, with its content, a sales unit for the final user or consumer at the point of retail (ISO 21067-1:2016, Section 2.2.7).

Consumer packaging is generally the outcome of eco-design processes, or other activities, under direct control of the organisation. Many critical categories with strict legal requirements belong to consumer packaging category like food contact packaging and pharmaceutical packaging.

The weight of the packaging per product, and the type and function of the packaging, shall be reported in the EPD.

A statement of the source of the materials (pre-consumer or post-consumer) shall be presented in the EPD when the packaging is made in whole or in part by recycled materials.

5.4.6 ENVIRONMENTAL PERFORMANCE

5.4.6.1. Environmental impacts

The EPD shall declare the environmental impact indicators, per declared/functional unit, per life-cycle modules and in aggregated form, using the default impact categories, impact assessments methods and characterisation factors available at www.environdec.com/indicators. The source and version of the impact assessment methods and characterisation factors used shall be reported in the EPD.

The following impact indicator shall be declared in addition to the default impact indicators: Particulate matter (PM) adopted from EF 3.0 Method, with model from Fantke et al. (2016) in UNEP (2016), and Disease incidences as indicator.

Alternative regional life cycle impact assessment methods and characterisation factors may be calculated and displayed in addition to the default list and the additionally mandatory indicator above. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

5.4.6.2. Use of resources

The EPD shall declare the indicators for resource use listed at www.environdec.com/indicators per declared/functional unit, per life-cycle modules and in aggregated form.

5.4.6.3. Waste production and output flows

Waste generated along the whole life cycle production chains shall be treated following the technical specifications described in the GPI. The EPD shall declare the indicators for waste production and output flows as listed at www.environdec.com/indicators per declared/functional unit, per life-cycle modules and in aggregated form.

5.4.7 ADDITIONAL ENVIRONMENTAL INFORMATION

An EPD may declare additional environmentally relevant information not derived from the LCA-based calculations, such as:

- the release of dangerous substances into indoor air, soil, and water during the use stage,
- instructions for proper use of the product, e.g. to minimise energy or water consumption or to improve the durability of the product,

- instructions for proper maintenance and service of the product, e.g. to minimise energy or water consumption or to improve the durability of the product,
- information on key parts of the product that determine its durability,
- information on recycling including, e.g. suitable procedures for recycling the entire product or selected parts and the potential environmental benefits gained,
- information on a suitable method of reuse of the product (or parts of the products) and procedures for disposal as waste at the end of its life cycle,
- information regarding disposal of the product, or inherent materials, and any other information considered necessary to minimise the product's end-of-life impacts, and
- a more detailed description of an organisation's overall environmental work, in addition to the information listed under Section 5.4.3, such as:
  - the existence of any type of organised environmental activity, and
  - information on where interested parties may find more details about the organisation's environmental work.

Any additional environmental information declared shall be substantiated and verifiable, and be derived using appropriate methods and be specific, accurate, not misleading, and relevant to the specific product. Quantitative information is preferred over qualitative information.

In addition to the above information, the following information LCA based calculation or not are important environmental aspect of the vessel and it shall be addressed in the EPD, such as:

Mandatory elements:

- Attained EEDI of the large yacht (above 500 gross tonnage) To all vessel over 500 gross tonnage and above the MARPOL Annex VI Chapter 4 entitled "Regulations on energy efficiency for ships", shall be considered, making mandatory the Energy Efficiency Design Index (EEDI) for new ships and the Ship Energy Efficiency Plan (SEEMP) for all ships. IMO has introduced The Energy Efficiency Design Index (EEDI) as the index for evaluating the technical measures aim to enhance the energy efficiency by hardware (equipment) improvements of the ship. EEDI relates to efforts by IMO to limit global warming through pollution of the environment by marine engines, allowing a specific figure for an individual ship design to be calculated by means of a formula. It is expressed in grams of CO2 per ship's capacity mile, and a smaller EEDI value indicates a more energy-efficient ship design.

Voluntary elements:

- Water Footprint according to ISO 14046 Environmental management -- Water footprint -- Principles, requirements and guidelines
- Carbon Footprint according to ISO 14067 Environmental management – Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification and Communication
- Instruction for a proper use of the product, e.g., to minimize the energy or water consumption or to improve the durability of the product.
- Instruction for a proper maintenance and service of the vessel.
- Application of the eco-design practice for the studied ship, also assessed in terms of the avoided environmental impact, evaluated by means of LCA calculation applying the rules foreseen by this PCR in coherence with the LCA study on which the EPD under development is based. The impact categories used for this analysis shall be declared in the EPD (e.g., durability, materials, ...)
- Information about special system and/or feature that are aimed to reduce any kind of environmental impact (i.e., heat recovery system, filters, solar panels, wind turbines, etc.)
- Information on recycling including, e.g., suitable procedures for recycling the entire product or selected parts and the potential environmental benefits gained
- Information on a suitable method of reuse of the product (or parts of the products) and procedures for disposal as waste at the end of its life cycle and
- Information regarding disposal of the product or inherent materials, and any other information considered necessary to minimize the product's end-of-life impacts.
- Noise emissions: The noise emission of the vessel shell include, but is not limited to, outside noise measured during:
  - "Anchor" condition sound pressure level

- "Underway" condition sound pressure level
- "Harbor" (moored) condition sound pressure level

The measurements shell be in accordance with the standard "ISO 2923:1996 Acoustics — Measurement of noise on board vessels", together with the specification as per IMO Resolution 468[12] "Code on noise levels on board ships".

- Other standard and rules used to perform the measurements shall be declared in the EPD.
- Environmental performances can be declared using the following additional functional unit: one vessel or small crafts for one year of use according to the selected main operating profile.
- The total emissions, indirect and especially indirect, should be declared for vessel in the EPD. The values should be those of the actual measurements during vessel test and trials The standard used for type testing shall also be declared in the EPD. References to MARPOL Annex VI shall be made.

5.4.8 ADDITIONAL SOCIAL AND ECONOMIC INFORMATION

The EPD may also include other relevant social and economic information as additional and voluntary information. This may be product information or a description of an organisation's overall work on social or economic sustainability, such as activities related to supply chain management or social responsibility.

Any additional social and economic information declared shall be substantiated and verifiable, and be derived using appropriate methods and be specific, accurate, not misleading, and relevant to the specific product. Quantitative information is preferred over qualitative information.

5.4.9 DIFFERENCES VERSUS PREVIOUS VERSIONS

For EPDs that have been updated, the following information shall be included:

- a description of the differences versus previously published versions, and
- a revision date on the cover page.

5.4.10 REFERENCES

A reference section shall be included, including a list of all sources referred to in the EPD, including the GPI (including version number), and PCR (registration number, name, and version) used to develop the EPD.

5.4.11 EXECUTIVE SUMMARY IN ENGLISH

The executive summary, if included (see Section 5.1), shall contain relevant summarised information related to the programme, product, environmental performance, information related to pre-certified EPDs, and information related to sector EPDs. Besides this, further information may be added such as additional environmental, social or economic information, references as well as differences versus previous EPD versions.

6 LIST OF ABBREVIATIONS AND DEFINITIONS

ANZSIC	Australian and New Zealand Standard Industrial Classification
CPC	Central product classification
CPV	Common procurement vocabulary
EPD	Environmental product declaration
GPI	General Programme Instructions
GTIN	Global trade item number
ISO	International Organization for Standardization
LCA	Life cycle assessment
LCI	Life cycle inventory
NACE/CPA	Classification of products by activity
ND	Not declared
PCR	Product category rules
REACH	Restriction of chemicals
RSL	Reference service life
SI	The International System of Units
UN	United Nations
UNSPSC	United Nations standard products and services code

Vessel: a floating object able to move autonomously on the water surface with a propulsion and manoeuvring system;

Yacht: a vessel that is in private or commercial use for sport or leisure;

Small crafts: Yacht with a displacement in light craft condition, calculated as described in the ISO 8666:2020, not greater than 1000 kg;

Work boats: Vessels used for commercial, scientific research and rescue activities;

Propulsion system: set of elements needed to provide thrust to the vessel;

Manoeuvring system: set of elements needed to control the vessel direction and position;

Total installed power: sum of the power that can be generated ore stored on board, for example by main engines, generators, solar panels, batteries etc...

Propulsion power: portion of the total installed power that can be transmitted to the elements that provide the thrust to the vessels

DP – Dynamic Positioning System: is a computerized control system allowing a vessel to automatically maintains its position and heading (fixed location or predetermined track) by means of thrusters and/or propulsion forces.

EEDI - Energy Efficiency Design Index: Mandatory measure to reduce emissions of greenhouse gases (GHGs) adopted by Parties to MARPOL Annex VI represented in the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO). The amendments to MARPOL Annex VI Regulations for the prevention of air pollution from ships, add a new chapter 4 to Annex VI on Regulations on energy efficiency for ships to make mandatory the Energy Efficiency Design Index (EEDI), for new ships, and the Ship Energy Efficiency Management Plan (SEEMP) for all ships. The regulations apply to all ships of 400 gross tonnage and above and entered into force on 2013. The EEDI is a non-prescriptive, performance-based mechanism that leaves the choice of technologies to use in a specific ship design to the industry. As long as the required energy-efficiency level is attained, ship designers and builders would be free to use the most cost-efficient solutions for the ship to comply with the regulations.

The SEEMP establishes a mechanism for operators to improve the energy efficiency of ships. Ships are required to keep on board a ship specific Ship Energy Efficiency Management Plan (SEEMP).

GT - GROSS TONNAGE: is the total volume of a vessel, expressed in units of 100 cubic feet (gross ton), with certain open structures, deckhouses, tanks, etc., exempted. It is an index related to a ship's overall internal volume and it is not a measure of the ship's displacement (mass). See ”IMO - International Convention on Tonnage Measurement of Ships”.

IMO - International Maritime Organization: as a specialized agency of the United Nations, IMO is the global standard-setting authority for the safety, security and environmental performance of international shipping. Its main role is to create a regulatory framework for the shipping industry that is fair and effective, universally adopted and universally implemented. IMO measures cover all aspects of international shipping – including ship design, construction, equipment, manning, operation and disposal – to ensure that this vital sector for remains safe, environmentally sound, energy efficient and secure.

LIGHT SHIP DISPLACEMENT: the displacement of a ship in tonnes without, fuel, lubricating oil, ballast water, fresh water and feed water in tanks, consumable stores, and passengers and crew and their effects.

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

LY3 – Large Yacht Code version 3: developed by the Red Ensign Group, it is a Code of Practice which applies to yachts which are 24 meters and over in load line length, are in commercial use for sport or pleasure, do not carry cargo and do not carry more than 12 passengers.

MARPOL: The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.

It was developed through the International Maritime Organization (IMO), a United Nations agency that deals with maritime safety and security, as well as the prevention of marine pollution from ships. MARPOL is the main international agreement covering all types of pollution from ships.

Air pollution from ships is specifically addressed in Annex VI of the MARPOL treaty. Annex VI includes requirements applicable to the manufacture, certification, and operation of vessels and engines, as well as fuel quality used in vessels in the waters of the United States.

The Convention includes regulations aimed at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations - and currently includes six technical Annexes. Special Areas with strict controls on operational discharges are included in most Annexes.

MCR – Maximum Continuous Rating: is defined as the maximum output that a propulsion system is capable of producing continuously under normal conditions over a year.

MEPC - The Marine Environment Protection Committee of the IMO (International Maritime Organization)

PYC – Passenger Yacht Code: developed by the Red Ensign Group, it is a Code of Practice, which applies to pleasure yachts of any size, in private use or engaged in trade, which carry more than 12 but no more than 36 passengers and which do not carry cargo.

SEEMP - Ship Energy Efficiency Management Plan: see EEDI – Energy Efficiency Design Index (above).

SOLAS: International Convention for the Safety of Life at Sea, 1974 as amended by the IMO.

7 REFERENCES

CEN (2013), EN 15804:2012+A1:2013, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

EPD International (2021) General Programme Instructions for the International EPD® System. Version 4.0, dated 2021-03-29. www.environdec.com.

ISO (2000) ISO 14020:2000, Environmental labels and declarations – General principles.

ISO (2004) ISO 8601:2004 Data elements and interchange formats – Information interchange – Representation of dates and times.

ISO (2006a) ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO (2006b) ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework.

ISO (2006c) ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines.

ISO (2013) ISO/TS 14067:2013, Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification and communication.

ISO (2014) ISO 14046:2014, Environmental management – Water footprint – Principles, requirements and guidelines.

ISO (2015a) ISO 14001:2015, Environmental management systems – Requirements with guidance for use.

ISO (2015b) ISO 9001:2015, Quality management systems – Requirements.

ISO (2016a) ISO 21067-1:2016, Packaging – Vocabulary – Part 1: General terms.

ISO (2016b) ISO 14021:2016, Environmental labels and declarations - Self-declared environmental claim (Type II environmental labelling).

ISO (2017) ISO 21930:2017, Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.

ISO (2018) ISO 14024:2018, Environmental labels and declaration – Type I environmental labelling – Principles and procedures.

EC Regulation No. 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), 2006

EC Regulation 1272/2008/EC on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006, 2008

GPI 2013 General Programme Instructions for the International EPD® System, version 2.01 dated 2013-09-18, 2013

IMO SR/CONF/45 Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009

IMO SOLAS International Convention for the Safety of Life at Sea, 1974

IMO MARPOL 73/78

Annex I Regulations for the Prevention of Pollution by Oil

Annex II Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk

Annex III Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form

Annex IV Prevention of Pollution by Sewage from Ships

Annex V Prevention of Pollution by Garbage from Ships

Annex VI Regulations for the Prevention of Air Pollution from Ships

IMO Resolution MEPC.197(62) Guidelines for the Development of the Inventory of Hazardous Materials, 2011

IMO Resolution MEPC.196(62) Guidelines for the Development of the Ship Recycling Plan, 2011

IMO Resolution MEPC.203(62) Inclusion of Regulation on Energy Efficiency for Ships in MARPOL Annex VI

IMO Resolution MEPC.210(63) Guidelines for Safe and Environmentally Sound Ship Recycling, 2012

IMO Resolution MEPC.211(63) Guidelines for the Authorization of Ship Recycling Facilities, 2012

IMO Resolution MEPC.222(64) Guidelines for the Survey and Certification of Ships under the Hong Kong Convention, 2012

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

IMO MEPC.1/Circ.815 Guidance on treatment of innovative energy efficiency technologies for calculation and verification of attained EEDI, 2013

IMO Resolution MEPC.223(64) Guidelines for the inspection of ships under the Hong Kong Convention, 2012

IMO Resolution MEPC.212(63) Guidelines On The Method Of Calculation Of The Attained Energy Efficiency Design Index (EEDI) For New Ships, 2012

IMO Resolution MEPC.214(63) Guidelines On Survey And Certification Of The Energy Efficiency Design Index (EEDI), 2012

IMO Resolution MEPC.254(67) Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI), 2014

IMO Resolution MEPC.245(66) Guidelines on the method of calculation of the attained Energy Efficiency Design Index for new ships, 2014

IMO Resolution MEPC.231(65) Guidelines for calculation of reference lines for use with the Energy Efficiency Design Index (EEDI), 2013

ISO 22628 Road vehicles-Recyclability and recoverability –Calculation method, 2002

ISO 2923 Acoustics — Measurement of noise on board vessels", together with the specification as per IMO Resolution 468[12] "Code on noise levels on board ships, 1996

www.imo.org (accessed on April 2015)

http://ec.europa.eu/environment/index_en.htm (accessed on April 2015)

8 VERSION HISTORY OF PCR

VERSION 2.0, 2022-XX-YY

- The PCR has been updated to comply with the latest version of the GPI (version 4.0).
- The PCR has been upgraded into a main PCR, enabling the development of c-PCRs for more specific product categories (vessels with specific functions and components) to be used together with the main PCR.
- The title of PCR is changed,
- the scope of the PCR has been changed by adding additional CPC codes to the PCR,
- the functional unit has changed and been divided into main functional unit for all vessels, functional unit for large yachts only and declared unit for vessel components,
- the system boundaries were changed to include a subdivision into life cycle modules, and the flowchart was updated,
- the cut-off rules have been modified to facilitate data collection by EPD implementers,
- the allocation rules were modified, the changes involved: the definition of end-of-life state of vessel, the allocation of reusable components, the definition and allocation of refitting and maintenance activities.
- in the data quality section, the possibility of making EPDs in three different phases of the vessel's life, i.e. in the design, construction and use phase, has been added,
- the section DATA QUALITY REQUIREMENTS AND OTHER MODELLING GUIDANCE FOR LIFE-CYCLE STAGE has been updated, with the inclusion of the main assumptions and modelling rules for the main life cycle modules,
- the section on product information and additional environmental information has been updated, providing the contents that must be presented in EPDs.

VERSION 1.01, 2019-09-06

- Clarified terms of use
- Editorial changes

VERSION 1.0, 2015-11-18

Original version

YACHTS, SMALL CRAFTS, OTHER VESSELS AND PARTS THEREOF

PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

Annex A

Group	Class	Subclass	Description	Name	Additional description	Included /Excluded	Why	note
493			Ships					
	4931		Commercial Ships					
		49311	Cruise Ships, excursion boats and similar vessels, principally designed for the transport of persons; ferry boats of all kinds	Cruise Ship	Large ship designed to carry passengers traveling for pleasure and stopping at different locations and arranged to have accommodation for more than 12 passengers.	Excluded	For cruise ships the power necessary for equipments and systems for passengers accomodation is greater than that required for navigation.	
				Ferry boats	Vessel for the transport of both persons and goods from point A to point B; arranged to have accommodation for more than 12 passengers.	Excluded	The main purpose of this type of ship is the transport of goods from one location to another.	
				Passenger vessel	Vessel designed for the transport of more than 12 passengers without arrangement for accommodations	Included	The main function of this type of ship is navigation from one point to another.	80:20 rule applied
		49312	Tankers	Tankers	Vessel for the transport of goods in liquid or gaseous form.	Excluded	The main purpose of this type of ship is the transport of goods from one location to another.	
		49313	Refrigerator vessels (ships), except tankers	Refrigerator vessel	Vessel for the transport of goods at low temperature.	Excluded	The main purpose of this type of ship is the transport of goods from one location to another.	
		49314	Other vessels for the transport of goods and other vessels for the transport of both persons and goods	Cargo vessel	Vessel for the transport of goods in bulk or containers.	Excluded	The main purpose of this type of ship is the transport of goods from one location to another.	

				Ro-Ro Ship	Vessel for the transport of cars, trucks or trains.	Excluded	The main purpose of this type of ship is the transport of goods from one location to another.	
		49315	Fishing vessels; factory ships and other vessels for processing or preserving fishery products	Fishing vessel	Vessel designed for fishing and preserving the catch	Included	The equipments for fishing and preserving the catch for a small period of time are negligible compared to the propulsion and navigation systems	80:20 rule applied
				Fishing factory	Vessel for fishing, processing and preserving fishery products.	Excluded	For this type of ship the equipments and systems for fishing, processing and preserving fishery products are predominant and this elements are peculiar of the food industry.	
		49316	Tugs and pusher craft	Tugs and pusher craft	Vessel designed for pushing or towing other vessels or barges.	Included	The main function of this type of ship is navigation while pushing or towing other vessels or barges.	80:20 rule applied
		49319	Other vessels(including light-vessels, fire-float, dredgers, floating cranes, floating docks, warships and lifeboats other than rowing boats); except floating or submersible drilling or production platform	Fire-float	Vessel designed with a fire fighting purpose.	Excluded	The main function of this type of vessel is, in case of emergency, to exitinguish fires. The equipments and systems for this function predominate over navigation systems.	
				Dredger	Vessel designed for dredging harbors, inland waterways, rivers or lakes.	Excluded	The main function of this type of vessel is not navigation and the equipments for dragging have an greater impact than the other sistems on board.	
				Floating crane	Crane installed on a barge.	Excluded	Barges not having its own propulsion system are not included in the definition of vessel.	
				Floating dock	Floating platform anchored to the seabed that allows the passage of people.	Excluded	Floating docks not having its own propulsion system are not included in the definition of vessel.	
				Warship	Ship that belong to the armed force of a state.	Excluded	Defence and attack armaments are commonly excluded from international environmental legislation.	

				Lifeboat	Small boat or raft kept in another vessel that people can use to leave the vessel in case of emergency.	Included	This type of vessel can be used, as well as in an emergency, to reach the harbour when the vessel remains at anchor	80:20 rule applied
				Research vessel	Vessel designed for conducting scientific research	Included	The main function of this type of ship is navigation while conducting scientific research	80:20 rule applied
				Supply vessel	Vessel designed to operate in the offshore industry with oil and gas platforms or with offshore wind turbines.	Included	The main function of this type of vessel is navigation to give support to oil & gas platforms or offshore wind turbines	80:20 rule applied
	4932		Floating or submersible drilling or production platforms					
		49320	Floating or submersible drilling or production platforms	Oil & Gas offshore platform	Floating or submersible platform with facilities for drilling to explore, extract, store and process petroleum or natural gas.	Excluded	Platforms not having its own propulsion system are not included in the definition of vessel.	
	4939		Other floating structures					
		49390	Other floating structures	Floating structures	Floating structures anchored to the seabed, without a propulsion system, like: floating piers and docks, storage facilities, wind and solar power plants, bridges, houses…	Excluded	Floating structures are not included in the definition of vessel.	
494			Pleasure and sporting boats	Inflatable boat	Inflatable boat and rigid inflatable boat as defined by the standard ISO 6185.	Included	All recreational vessels are included in the scope of this PCR	

YACHTS, SMALL CRAFTS AND OTHER VESSELS
PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494

				Motor craft	Small vessel with a length up to 6 meters, measured in accordance with ISO 8666, which has a sole means of propulsion by either one or more power units and is in commercial or private use for sport or pleasure.	Included		
				Motor yacht	Vessel with a length up to 24 meters, measured in accordance with ISO 8666, which has a sole means of propulsion by either one or more power units and is in commercial or private use for sport or pleasure.	Included		
				Motor large-yacht	Vessel with a length greather than 24 meters, measured in accordance with ISO 8666, carrying not more than 12 passengers, which has a sole means of propulsion by either one or more power units and is in commercial or private use for sport or pleasure.	Included		
				Personal watercraft	Vessel as defined in ISO 13590.	Included		
	4941		Sailboats (excpet inflatable), with or without auxilary motor			Included		
		49410	Sailboats (excpet inflatable), with or without auxilary motor	Sailing craft	Small vessel with a length up to 6 meters, measured in accordance with ISO 8666, defined as "sailing boat" in accordance with ISO 8666 and is in commercial or	Included		

					private use for sport or pleasure.			
				Sailing yacht	Vessel with a length up to 24 meters, measured in accordance with ISO 8666, defined "sailing boat" in accordance to ISO 8666 and is in commercial or private use for sport or pleasure.	Included		
				Sailing large-yacht	Vessel with a length greather than 24 meters, measured in accordance with ISO 8666, carrying not more than 12 passengers, for witch the value of the nominal sail area As, in m^2, as defined in the ISO 8666,satisfy the following relation: As ≥ 7(Dmax)^2/3 (where Dmax is the maximum displacement in metric ton). And is in commercial or private use for sport or pleasure.	Included		
	4949		Other vessels for pleasure or sports; rowing boats and canoes			Included		
		49490	Other vessels for pleasure or sports; rowing boats and canoes	canoes and rowing boats	Vessel which use oars or paddles as sole means of propulsion.	Included		

YACHTS, SMALL CRAFTS, OTHER VESSELS AND PARTS THEREOF

PRODUCT CATEGORY CLASSIFICATION: UN CPC 49311, 49315, 49316, 49319, 494