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**SPECIAL GUIDELINES FOR CARBON
FOOTPRINT SURVEY OF MARINE
PRODUCTS**

MARINE PRESSURE VESSELS

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Foreword

The Special Guidelines for Survey of Carbon Footprint of Marine Products - Pressure Vessels by the China Classification Society (hereinafter referred to as "the Society") stipulate the applicable technical requirements for marine pressure vessels applying for the Society's green additional mark for the carbon footprint.

These Guidelines do not restrict users from adopting other requirements, provided that such requirements are not less stringent than those of these Guidelines.

These Guidelines are compiled and updated by the Society and are published at <http://www.ccs.org.cn>. Relevant stakeholders may send feedback on the Society's guidelines to service@ccs.org.cn.

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1 Purpose and Scope

1.1 Purpose

These Guidelines aim to specify the detailed requirements for the approval and survey of the green additional mark for carbon footprint of marine pressure vessels, and shall be used in conjunction with the Society's Guidelines for Survey of Carbon Footprint of Marine Products (No. Z-12).

1.2 Scope

These Guidelines apply to marine Class I, II and III pressure vessels as defined in Section 1, Chapter 6, Part 3 of CCS Rules for Classification of Sea-Going Steel Ships, including air receivers, liquefied gas storage tanks and pressure vessels for their treatment, for product carbon footprint approval and survey. For marine boilers, refer to the Guidelines for Survey of Carbon Footprint of Marine Products – Marine Boilers.

2 Normative References

2.1 ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification;

2.2 ISO 14064-3:2019 Specification with guidance for the verification and validation of greenhouse gas statements;

2.3 China Classification Society Guidelines for Survey of Carbon Footprint of Marine Products

Note: The contents of the above documents become indispensable provisions of these Guidelines through normative references in the text. For dated references, only the edition cited applies to these guidelines. For undated references, the latest edition (including all amendments) applies.

3 Terms and Definitions

3.1 Fossil Fuel Combustion Emissions

Greenhouse gas emissions generated from the use of fossil fuels as raw materials or fuels.

3.2 Process Emissions

Greenhouse gas emissions caused by physical or chemical changes other than fossil fuel combustion .

3.3 Declared unit

A reference unit used to quantify the partial carbon footprint of a product.

3.4 Primary data

Quantitative value of a process or activity obtained through direct measurement or calculation based on direct measurement.

Notes:

- ① Primary data is not necessarily derived from the system under study, as it may involve other systems comparable to the system under study.
- ② Primary data may include greenhouse gas emission factors or greenhouse gas activity data.

3.5 Secondary data

Data that do not meet the requirements of primary data.

Notes:

- ① Secondary data are verified and credible data from authoritative institutions, which can be sourced from databases, published literature, national emission factors, calculated or estimated data, or other representative data. The use of localized databases is recommended.
- ② Secondary data may include data obtained from substitute processes or estimates.

3.6 Activity data

A quantitative measure of a production or consumption activity that results in greenhouse gas emissions.

Note: For example, the consumption of various fossil fuels, carbon-containing raw materials, etc.

3.7 Greenhouse gas emission factor

A coefficient relating activity data to greenhouse gas emissions.

4 Division of Approval Units

4.1 For marine pressure vessels, approval units shall in principle be determined according to the structural type (non-insulated, insulated, etc.), manufacturing method (welded, spun, etc.) and material type (metallic, non-metallic) of the pressure vessels. The same manufacturing enterprise, same structural type, same manufacturing method and the same type of material constitute one approval unit. For the same manufacturing enterprise, same structural type, same manufacturing method and the same type of material but different production sites, they should be treated as different approval units. The detailed approval scope for each approval unit shall be defined in the approval certificate or the appendix.

4.2 Manufacturers of pressure vessels with complex processes and a wide range of product models may apply for approval for a representative product series first. After the initial approval is granted, the Society may apply simplified document review and on-site audit procedures for extension applications of other similar product series.

5 Implementation

5.1 General Requirements

5.1.1 Manufacturers applying for the green additional marks GPC0 and GPC1 for marine product carbon footprint shall, in addition to meeting the requirements of these Guidelines, comply with the relevant requirements of the Guidelines for Survey of Carbon Footprint of Marine Products;

5.1.2 The applicant shall use the CCS platform for data and document exchange.

5.2 Application for approval

5.2.1 The applicant shall submit an application for the green additional mark for carbon footprint of marine products, specifying the products covered by the approval, the scope of production sites, and boundary conditions (system boundary, time boundary). In principle, the scope of products covered by the approval shall be consistent with the scope of the works approval. Meanwhile, manufacturers applying for the green additional marks GPC0 and GPC1 for carbon footprint of marine products shall submit at least the following documents and materials for review:

- (1) Relevant information about the manufacturer and products, including: company profile, organizational chart, product name, product category, model/type, applicable standards, main purpose, scope of production sites, boundary conditions (system boundary, time boundary), functions, etc.;
- (2) Production process (flow);
- (3) List of major energy-consuming equipment, list of measuring equipment, list of testing equipment, and production capacity information corresponding to the approval period. Separate explanation shall be provided for multi-site production;
- (4) Basic Information Form of Products in Approval Units and Filing Form of Key Raw and Auxiliary Materials;
- (5) Measured data of net calorific value of fossil fuels, carbon content per unit calorific value, and measured carbon content of carbon-containing materials (where applicable);
- (6) Quantitative Evaluation Report on Carbon Footprint of Products in Approval Units;
- (7) Other documents stipulated in 5.2.1 of the Guidelines for Survey of Carbon Footprint of Marine Products.

If the approval unit already holds a Carbon Footprint Assessment Report that meets the requirements of Clause 5.2.1 of the Guidelines for Survey of Carbon Footprint of Marine Products, and the issuing organization is confirmed by the Society to have the qualification for product carbon footprint certification, it does not need to be provided again.

5.2.2 For manufacturers applying for the green additional mark GPC1 for marine product carbon footprint, they shall also submit other documents specified in Clause 5.2.2 of the Guidelines for Survey of Carbon Footprint of Marine Products.

5.3 Acceptance of approval application

After reviewing the approval application and related documents submitted by the manufacturer, the China Classification Society will decide whether to accept the application. The approval application will be rejected or its acceptance suspended if any of the following situations occur:

- (1) Failure to meet the requirements stipulated in 5.2 of the Guidelines for Survey of Carbon Footprint of Marine Products;
- (2) The provided relevant documents contain falsifications;
- (3) Circumstances where applications cannot be accepted in accordance with laws, regulations or other administrative provisions, etc.

5.4 Document review

5.4.1 The content of the document review includes the relevant data and supporting materials from the approval applicant, with a focus on:

- (1) The legality of the organization, including the existence and legality of the qualifications of relevant entities such as the certification client, producer (manufacturer), and manufacturing enterprise;
- (2) Confirming the declared unit: 1 ton (1000kg) of marine pressure vessels that have completed manufacturing and been transported out of the manufacturer's gate;
- (3) Confirmation of time boundary: It shall cover a complete manufacturing cycle of the product, generally referring to the most recent consecutive calendar year;
- (4) Confirmation of system boundary: Including the production and transportation of raw and auxiliary materials, the manufacturing and testing stages of pressure vessel products, excluding downstream use, transportation and equipment recycling processes. It shall at least include:
 - ① Production and transportation of raw materials (e.g., plates, pipes and fittings, heads, welding materials, valves, coatings, thermal insulation materials, etc.), auxiliary materials (e.g., cutting gases, welding shielding gases, water, etc.), and energy (e.g., natural gas, electricity, etc.);
 - ② Production and transportation of semi-finished products/components in the production and manufacturing process;
 - ③ Manufacturing and testing of pressure vessel products (cutting and blanking process, welding or spinning forming process, heat treatment process (where applicable), sandblasting (where applicable), pickling and passivation (where applicable), material and welding test plate testing, non-destructive testing process, pressure/tightness test process,

thermal insulation layer laying (where applicable), vacuum process, De-rusting and packaging process, etc.);

- ④ Treatment of processing scraps such as plates and pipes;
 - ⑤ Treatment of waste (wastewater, exhaust gas, solid waste) from the production process.
- (5) Data selection and cut-off: There are many types of unit process data. Primary data should be appropriately selected and cut off according to internationally recognized or equivalent standards, or according to the principles stipulated below. Omitted greenhouse gas emissions and removals shall be documented in writing:
- ① General solid waste accounting for less than 1% of the total solid waste generated may be ignored;
 - ② Greenhouse gas emissions account for less than 1% of the total emissions;
 - ③ The sum of the omitted mass or greenhouse gas emissions shall not exceed 5% of the total raw material mass or total greenhouse gas emissions;
 - ④ Consumption and emissions from infrastructure such as roads and workshops, process equipment, as well as personnel and living facilities within the plant area shall be ignored;
- (6) Primary data and secondary data related to product carbon footprint shall at least include:
- ① Emissions during the production and transportation of raw materials (e.g., steel plates, steel pipes and fittings, heads, welding materials, valves, coatings, thermal insulation materials, etc.), auxiliary materials (e.g., cutting gases, welding shielding gases, water, etc.), and energy (e.g., natural gas, electricity, etc.).

Note: The carbon emissions of raw and auxiliary materials shall be supported by corresponding documents provided by upstream suppliers, or indirectly obtained based on the consumption of raw and auxiliary materials and relevant greenhouse gas emission factors.

- ② Fuel combustion emissions: Greenhouse gas emissions from the net consumption of fossil fuels, including oxyacetylene cutting and blanking, pre-weld flame preheating, post-weld local flame insulation, heat treatment in natural gas furnaces, etc., as well as emissions from mobile sources used for production (such as transportation vehicles and in-plant handling equipment, etc.).
- ③ Emissions from manufacturing and testing processes: Greenhouse gas emissions generated by the manufacturer from other purchased carbon-containing raw materials (e.g., welding materials, shielding gases, testing reagents, water for hydraulic tests, etc.) in processes such as welding, thermal insulation layer spraying (if any), flaw detection, and testing.

- (7) The results are verified by the Society or an organization qualified for product carbon footprint certification, ensuring the data is credible and the conclusions are accurate.

5.4.2 The Carbon Footprint Assessment Report shall be verified and validated for the primary and secondary data related to product carbon footprint. Data from different sources shall be cross-checked with supporting evidence, and discrepancies between data sources shall be reasonably explained to ensure that the quantified carbon footprint values are reasonable, accurate and traceable.

5.4.3 If the Society determines that the Carbon Footprint Assessment Report does not comply with the requirements of these Guidelines, the manufacturer shall clarify the relevant issues, or conduct a new carbon footprint assessment and submit the corresponding results until the conclusions are accepted by the Society.

5.5 On-site audit

5.5.1 The on-site audit includes an audit of the relevant management assurance capability and product consistency of the enterprise applying for the carbon footprint green additional mark for marine pressure vessel products. The on-site audit team shall properly record the audit process for future reference, including but not limited to:

- (1) On-site verification of operational activities to confirm the consistency of carbon footprint data and information for applicable aspects — such as the name, grade, manufacturer, boundaries and key components, energy and resources (including scrap steel, etc.), and production process of the approved product—with the application documents;
- (2) On-site confirmation of the source and consumption of energy such as electricity and heat;
- (3) On-site confirmation of the power and operating time of major energy-consuming equipment, and verification of the consistency and validity of measuring instruments with the application documents;
- (4) Focus on verifying the relevant documents, records and vouchers for core unit processes, and sampling raw data and information to verify the traceability of the data, such as cutting and blanking process, welding and assembly process, stress relief heat treatment process (where applicable), non-destructive testing process, hydraulic strength test process, De-rusting and packaging of thermal insulation materials process, etc.;
- (5) On-site confirmation of the treatment process of waste (wastewater, exhaust gas, solid waste) from the production process, auxiliary production processes, in-plant transportation processes, and carbon capture, utilization and storage processes (if any);
- (6) Conduct interviews and discussions with personnel involved in relevant systems, procedures and operational control.

5.5.2 For manufacturers applying for GPC 1, if the Society determines that the relevant on-site management systems are not effectively implemented, and the sampled documents, records and

vouchers are inconsistent with the declared documents, the Society may require the manufacturer to clarify the relevant issues or resubmit the relevant materials.

5.6 Maintenance of Approval

5.6.1 When the manufacturer's CCS Works Approval certificate becomes invalid, suspended, revoked or canceled, the green additional mark for marine products will automatically become invalid.

5.6.2 The manufacturer shall periodically confirm the carbon footprint quantification and product conformity, and take necessary measures to prevent the unintended use or delivery of approved products. In case of non-conformity in the carbon footprint quantification or product conformity of approved products, the manufacturer shall promptly feed back information such as cause analysis, disposal and corrective measures to the Society. If necessary, an application for an additional audit shall be submitted to the Society to re-determine the manufacturer's green additional mark for marine products.

5.6.3 The manufacturer shall apply for a periodical audit for the green additional mark for marine products every year to maintain the validity of the approval certificate. The audit shall be conducted within three months before or after the anniversary date of the Works Approval certificate, or in conjunction with the periodical audit for the works approval.

5.6.4 When necessary, a CCS surveyor may conduct an additional audit on the manufacturer to verify that the production and inspection of products are consistent with the control requirements confirmed at the time of approval, and the manufacturer shall cooperate.

5.6.5 The manufacturer shall take measures to ensure that all data collected during the design, procurement, production, inspection and quality control processes are reliable, complete, consistent and representative.

5.6.6 The manufacturer shall identify and retain important documents and information related to product carbon footprint labeling certification, such as carbon verification reports, product carbon footprint reports, third-party environmental monitoring reports, enterprise production statements, material balance sheets, lists of inspection and monitoring instruments and equipment, invoices and vouchers for purchased key components, energy and resources, statistical reports, status information of product carbon footprint labeling certification certificates (valid, suspended, revoked, canceled, etc.), information on the approval of certification changes, product quality, environmental complaints and their handling results, and other documents and information related to product carbon footprint labeling certification.

5.7 Certificate and Additional Mark

5.7.1 For manufacturers that have completed the approval for the green additional mark for marine product carbon footprint, the Society shall either issue a separate Approval Certificate for Carbon Footprint of Marine Products with a validity period of 5 years or add the green additional mark for marine product carbon footprint to the original approval certificate, with the validity period consistent with the original certificate.

5.7.2 For manufacturers that have completed the approval for the green additional mark for marine product carbon footprint, the approved carbon footprint value per unit product shall be specified in the details of the approval certificate.

5.8 Periodical and Additional Audits, Changes to Approval

5.8.1 After the approval of the green marine product, a periodical audit shall be conducted at least once a year. For specific requirements, refer to the requirements for periodical audits for approvals in Part 1, Chapter 3 of CCS Rules for Classification of Sea-Going Steel Ships, and special attention shall be paid to carbon footprint-related content, such as verifying whether the approved emission reduction technologies and measures are continuously implemented and effectively operated.

5.8.2 When the Society deems it necessary, it may conduct an additional audit on the manufacturer approved for the green marine product through prior agreement or its own decision.

5.8.3 If a planned change results in an increase of more than 5% in the quantified product carbon footprint and the situation persists for more than three months, or an unplanned change results in an increase of more than 10% in the quantified product carbon footprint and the situation persists for more than three months, an additional audit shall be required, and a change to the approval may be necessary if applicable.

5.9 Survey of Carbon Footprint of Marine Pressure Vessels

5.9.1 The product survey (individual/batch survey) after the approval of the green additional mark for marine product carbon footprint shall include the following specific items to ensure the stability and traceability of the product carbon footprint:

- (1) Production process conformity check: Confirm that the actual production process is consistent with the process approved at the time of the approval for the green additional mark for marine product carbon footprint;
- (2) Key raw material supply conformity assessment: Verify the changes of suppliers of raw materials that have a major impact on carbon emissions;
- (3) Carbon footprint data conformity confirmation: After the on-site audit by the surveyor is passed, the approved carbon footprint value per unit product is permitted to be noted on the product certificate.

5.9.2 If a product requires the survey for the green additional mark for marine product carbon footprint but has not obtained the approval described in these Guidelines, the survey shall be conducted in accordance with the relevant requirements of Section 5 of these Guidelines.

Appendix: Manufacturing Process Flow of Marine Pressure Vessels

