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**GUIDELINE FOR DIGITAL
APPLICATION FOR MARINE
PRODUCT INSPECTION**

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Foreword

China Classification Society (hereinafter referred to as CCS) Product Inspection and Testing Guideline (hereinafter referred to as this Guideline) contains the technical requirements, inspection and testing criteria related to classification and statutory survey of marine products to be applied for CCS approval/inspection.

This Guideline frees the users to adopt other test methods and requirements which are equivalent to or are stricter than this Guideline.

This Guideline is published and updated by CCS, and is released at <http://www.ccs.org.cn>. Your comments or suggestions are welcomed and may be sent to our email addressed service@ccs.org.cn.

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GUIDELINE FOR DIGITAL APPLICATION FOR MARINE PRODUCT INSPECTION

1. Purpose

To adapt to the digital and intelligent development trends in marine product manufacturing, and to provide corresponding digital application services for product inspection, the Guideline is hereby formulated.

2. Scope of application

2.1 The Guideline applies to marine product manufacturers that voluntarily request China Classification Society (hereinafter referred to as "CCS") digital application approval for marine product inspection.

2.2 The data referred to in the Guideline include, but are not limited to, design, production, inspection and testing, product operation, and other related data.

2.3 If the manufacturers intend to adopt digital application model for marine product inspection during product inspection (single item or batch), CCS digital application approval for marine product inspection is required.

3. Terms and definitions

Unless otherwise specified, the definitions of relevant terms in the Guideline are as follows:

3.1 Digitalization: It refers to the acquisition of data and knowledge collected from inspected objects by using information systems, various sensors, machine vision and other technologies, by converting them into identifiable, storable, and processable data, thereby enabling the establishment of relevant data models. To facilitate the processing, analysis and application process.

3.2 Structured data: It refers to data organized and stored in a clearly defined and pre-specified format, usually in the form of tables with rows and columns, such as data in a relational database.

3.3 Unstructured data: It refers to data that do not have a defined data model or format, and usually exists in free form, such as documents, images, audio and video.

3.4 Information security management: Information security management in the Guideline covers data security, transmission security and information system security, as described below:

- (1) Data security: ensuring that data are protected from unauthorized access, modification, or disclosure during storage, processing and transmission.
- (2) Transmission security: ensuring the security of data during network transmission to prevent eavesdropping, tampering or man-in-the-middle attacks.

- (3) Information system security: protecting the entire information system (including hardware, software, and networks) from unauthorized access, damage, interference or disclosure.

4. Requirements

4.1 General

4.1.1 Basic requirements

- (1) Digital application for marine product inspection involves product design, production, inspection and testing, and product usage. Manufacturers may utilize information technologies such as the Internet, cloud computing, big data, Internet of Things (IoT), artificial intelligence, blockchain, and others to establish information infrastructure compatible with digital application for marine product inspection.
- (2) Both CCS and manufacturers shall meet the fundamental requirements of information security management, review and verify data, and comprehensively apply various technologies and strategies such as encryption, validation, backup, authentication and digital signatures to ensure data confidentiality, integrity and availability. Manufacturers shall independently determine their enterprise information security level.

4.1.2 Establishment of product data model

The product data model includes, but is not limited to:

- (1) CCS specifications and guidelines;
- (2) Relevant technical requirements from conventions, rules, regulations and CCS acceptance standards;
- (3) Technical requirements identified during CCS approval and review of drawings and technical documentation;
- (4) Other technical requirements confirmed by CCS.

4.2 Digital application levels for marine product inspection

Based on manufacturers' digital application capabilities in product design, production, inspection and testing, product usage, data interaction, and other aspects, the digital application level for marine product inspection is classified from L1 to L5, from lowest to highest.

Digital Application Levels for Inspection

Table 4.2

Level	Requirements
L1	① Inspection data structuring; ② Inspection data are collected through the CCS Customer Service System (CSM).
L2	① Inspection data structuring; ② Automatic interaction of inspection data is realized.

Level	Requirements
L3	① Inspection data structuring; ② Inspection data are automatically collected through the manufacturer's system, and test results can be automatically determined; ③ Automatic interaction of inspection data is realized.
L4	① Production and quality control data structuring; ② Production and quality control realize independent data collection, independent judgment and independent decision-making; ③ Automatic interaction of production and quality control data; ④ Production and quality control are automated and digitalized.
L5	① Intelligent product data; ② Data analysis and optimization decision-making throughout the product life cycle; ③ Realization of automatic data interaction throughout the product life cycle; ④ Realization of digitalization and intelligence throughout the product life cycle.

5. Implementation

The implementation process of digital application for marine product inspection is as follows:

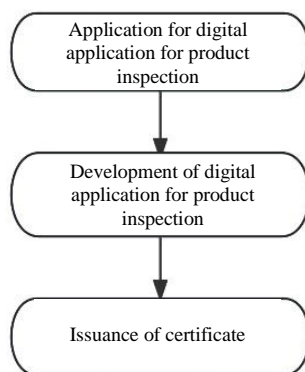


Figure 5 Implementation Flow Chart of Digital Application for Product Inspection

5.1 Digital application levels for marine product inspection

When manufacturers intend to carry out digital application for CCS marine product inspection, an approval application shall be submitted to CCS.

5.2 Development of digital application for marine product inspection

The marine product manufacturers shall generally develop digital application functions according to the corresponding level. For specific implementation requirements, please refer to the CCS White Paper on Digital Service Interfaces for Marine Products, which typically includes but is not limited to:

5.2.1 On-site audit

The on-site audit conducted by CCS on manufacturers usually covers the following aspects:

- (1) Objectives, functions and application scenarios of the digital application;
- (2) Progress and objectives of factory digitalization and intelligent construction, IT

development capabilities;

(3) Review of information security management, which shall comply with CCS relevant requirements;

(4) Determination of the digital application level.

5.2.2 Product dictionary

The marine product manufacturers shall establish a product dictionary based on existing products within the CCS Customer Service System (CSM). The product dictionary shall be confirmed by CCS before use, and any modifications shall be approved by CCS.

5.2.3 Data collection

The manufacturers shall submit the structured data corresponding to the applicable digital application level, including at a minimum data related to product inspection requirements.

5.2.4 Judgment conditions

The manufacturers shall determine judgment conditions based on the actual conditions of the marine product. The judgment conditions shall be confirmed by CCS, and any changes shall be approved by CCS.

5.2.5 Raw materials and parts and components

The raw materials and parts and components purchased by the manufacturers shall be controlled in accordance with the relevant requirements of CCS specifications and guidelines, with the parts and components related information presented as structured data.

5.2.6 Data acquisition

The manufacturers shall be able to obtain data such as product dictionaries, certificates and documentation.

5.3 Maintenance of Approval Certificate for digital application for marine product inspection

5.3.1 When the CCS product approval certificate held by the manufacturers becomes invalid, suspended, revoked, or canceled, the implementation of the digital application for marine product inspection shall be automatically suspended.

5.3.2 The marine product manufacturers shall regularly evaluate and optimize the digital inspection process of product inspection, continuously improving inspection methods and techniques based on feedback, and apply to CCS for additional audits when necessary to re-confirm the digital application level of the marine product manufacturer for marine product inspection.

5.3.3 The manufacturers shall apply annually for a periodic audit of the digital application for marine product inspection to maintain the validity of the approval certificate. The audit shall be conducted within three months before or after the certificate's anniversary date, or concurrently with the periodic audit of the relevant marine product approval.

5.3.4 When necessary, CCS surveyors may conduct additional audits on the digitalization of the product manufacturing and inspection processes at the marine product manufacturers to verify that production and inspection comply with the digital production and quality control requirements established during CCS approval. The marine product manufacturers shall cooperate fully.

5.3.5 The manufacturers shall take measures to ensure the integrity and authenticity of all data collected during design, production, inspection, and quality control management, including product manufacturing records, inspection and test records, as well as defect and non-conformance control process records etc.

5.4 Certificates and additional markings

For the manufacturers that have completed the development of digital application for marine product inspection, CCS will issue an independent Approval Certificate for Digital Application for Marine Product Inspection with long-term validity, or grant the manufacturers an additional digital application notation (Digital L1, L2, L3, L4, or L5) added to the original approval certificate.

5.5 Periodic and additional audits, approval of changes

5.5.1 After the implementation of the digital application for marine product inspection, a periodic audit shall be conducted at least once a year. Specific requirements refer to the provisions for periodic audit in Chapter 3, Part 1 of the CCS Rules for Classification of Sea-going Steel Ships, with special attention to digitalization-related aspects.

5.5.2 When deemed necessary, CCS may agree in advance or decide independently to conduct additional audits of the manufacturers approved for digital application for marine product inspection.

5.5.3 In case of principle changes in product data types, interface types, or implemented functions, an additional audit shall be performed, and approval changes shall be processed if necessary.