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Part 218: Application protocol: Ship structures

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Partie 218: Protocole d'application: Structures de navires

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/ IEC Directives, Part 2.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 10303 may be the subject of patent rights. ISO is not to be held responsible for identifying any or all such patent rights.

ISO 10303-218 was prepared by Technical Committee ISO TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data*.

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ISO 10303 is organized as a series of parts, each published separately. The structure of ISO 10303 is described in ISO 10303-1.

Each part of ISO 10303 is a member of one of the following series: description methods, implementation methods, conformance testing methodology and framework, integrated generic resources, integrated application resources, application protocols, abstract test suites, application interpreted constructs, and application modules. This part is a member of the application protocol series.

A complete list of parts of ISO 10303 is available from the Internet:

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Introduction

ISO 10303 is an International Standard for the computer-interpretable representation of product information and for the exchange of product data. The objective is to provide a neutral mechanism capable of describing products throughout their life cycle. This mechanism is suitable not only for neutral file exchange, but also as a basis for implementing and sharing product databases, and as a basis for archiving.

This part of ISO 10303 is a member of the application protocol series. This part of ISO 10303 specifies an application protocol (AP) for the definition of ship structures and its related data.

This application protocol defines the context, scope and information requirements for the communication of ship structural data and specifies the integrated resources necessary to satisfy these requirements. This part of ISO 10303 is one of a series of ship building application protocols, that together aim to provide an integrated computer interpretable product model for ships.

The series of shipbuilding industry application protocols assumes that the ship product model can be divided into separate ship systems; each covering a key element of the ship for its whole life cycle. These key elements are:

— ship arrangements;

— ship moulded forms;

— ship distribution systems.

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NOTE 1 Distribution systems include piping, heating, ventilation and air conditioning, hydraulics, pneumatics, electrical, and cable way.

— ship structures;

— ship mechanical systems.

NOTE 2 Mechanical systems include cargo handling, machinery and propulsion.

— ship outfit and furnishings;

— combat systems;

— communication;

— navigation;

— operation.

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Each separate system is described by one or more different application protocols. The full series of shipbuilding application protocols is depicted in Figure 1. Those aspects of the ship product model that are common to each ship application protocol are described consistently and identically in each application protocol. Within the series of shipbuilding application protocols this part of ISO 10303 details the key element of ship structures.

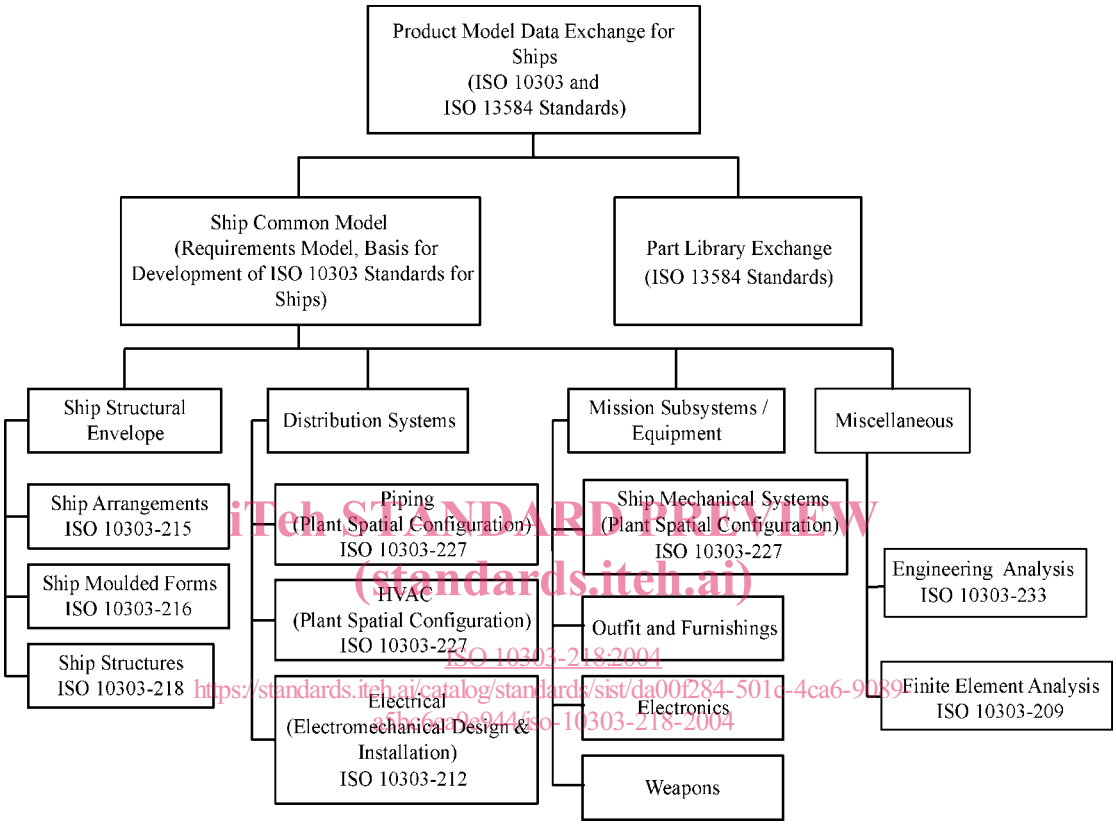

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Figure 1 — Shipbuilding application protocols

This part of ISO 10303 specifies an application protocol for the exchange of product data representing a ship structures information. These data may needed to be exchanged or shared between different organizations. Such organizations include ship owners, ship classification societies, design agencies and fabricators. This AP has been developed to support the shipbuilding activities and computer applications associated with the pre-design, the main design, the manufacturing, the maintenance (repair), and the inspection and survey during operation life cycle phases for commercial or naval ships.

Figure 2 illustrates how the ship structures information may be grouped under the following:

— ship common model;

— ship common utilities;

— ship structures;

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— manufacturing of ship structures;

— class approvals;

— shape representations.

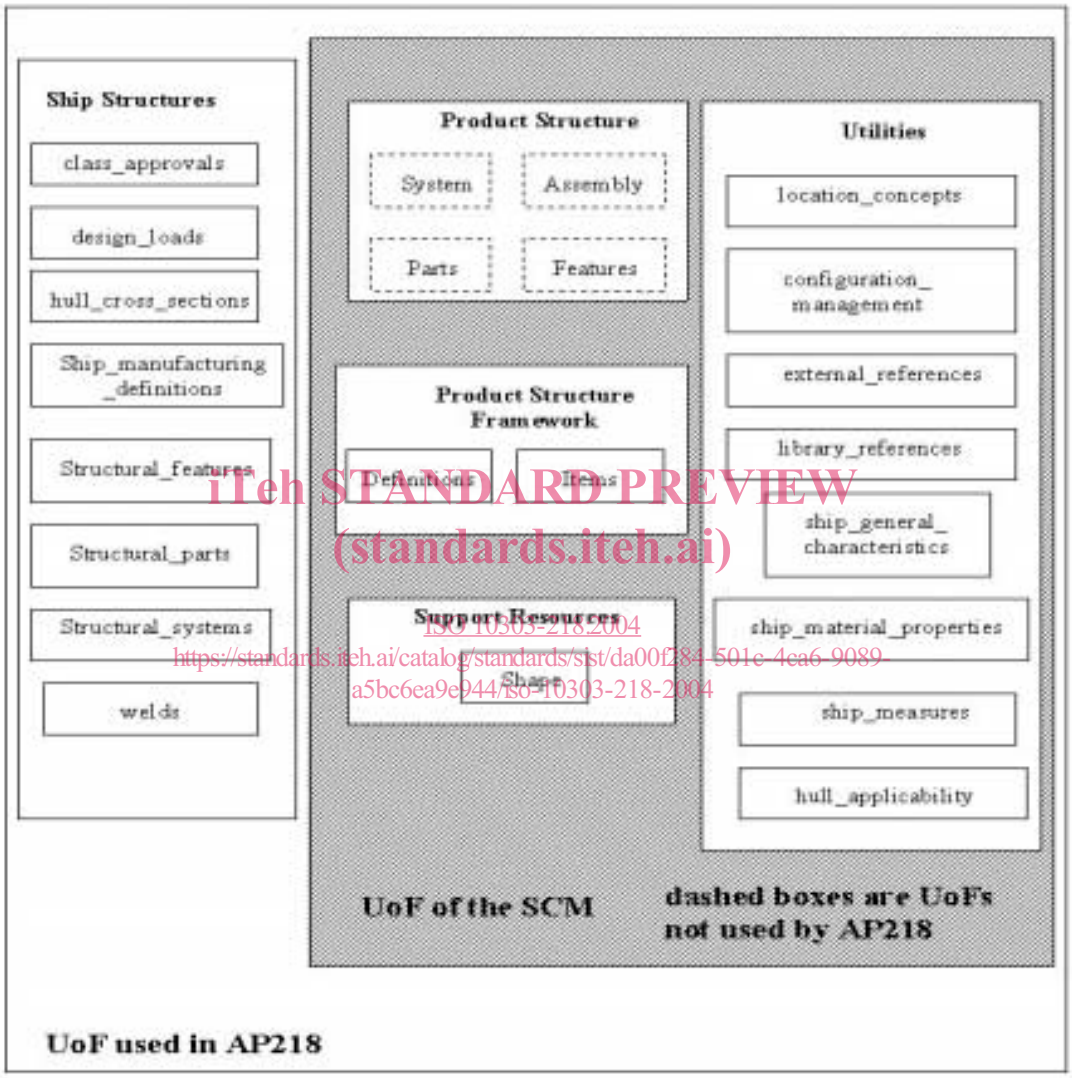

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Figure 2 — Data planning model

The unit of functionality (UoF) for ship common model (SCM) specifies the shipbuilding common model which is used for all ship building APs (currently for AP215, AP216, and AP218). The SCM is considered to present the framework of Shipbuilding application protocols. The ship common model UoFs are the basis for the design and manufacturing of ship structures.

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The group of UoFs labeled utilities provides the information for configuration management, location concepts, basic geometry and others, which is used by all shipbuilding application protocols.

The group of UoFs labeled ship structures describes the design definition of ship structures during the pre-design and design phase of a ship, the manufacturing definitions of ship structures during the manufacturing phase of a ship, and approvals of the structural parts and hull cross-sections of the ship.

The group of UoFs labeled product definition framework provides the key part of the Ship Common Model and provides general concepts of how to relate things, how to define their properties and how to represent them.

The group of UoFs labeled product structure provides different levels of structuring a product mainly by space, by assembly or by system in a general manner.

The group of UoFs labeled support resources provides all the STEP integrated resources (ISO 10303-41, 42, 43, 44, and 45) used in shipbuilding APs.

Application protocols provide the basis for developing implementations of ISO 10303 and abstract test suites for the conformance testing of AP implementations.

Clause 1 defines the scope of the application protocol and summarizes the functionality and data covered by the AP. Clause 3 lists the words defined in this part of ISO 10303 and gives pointers to words defined elsewhere. An application activity model that is the basis for the definition of the scope is provided in annex F. The information requirements of the application are specified in clause 4 using terminology appropriate to the application. A graphical representation of the information requirements, referred to as the application reference model, is given in annex G. The detailed technical discussion in annex L provides details that define the basis for the definition of the scope of this part of ISO 10303 and details that define the basis of harmonization with other parts of ISO 10303 for product exchange of data for ships.

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Resource constructs are interpreted to meet the information requirements. This interpretation produces the application interpreted model (AIM). This interpretation, given in clause 5.1, shows the correspondence between the information requirements and the AIM. The short listing of the AIM specifies the interface to the integrated resources and is given in clause 5.2. Note that the definitions and EXPRESS provided in the integrated resources for constructs used in the AIM may include select list items and subtypes which are not imported into the AIM. The expanded listing given in annex A contains the complete EXPRESS for the AIM without annotation. A graphical representation of the AIM is given in annex H. Additional requirements for specific implementation methods are given in annex C.

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Industrial automation systems and integration — Product data representation and exchange — Part 218: Application protocol: Ship structures

1 Scope

This part of ISO 10303 specifies the use of the integrated resources necessary for the scope and information requirements for the exchange of product definition data and its configuration and approval status information for ship structural systems. Configuration in this context pertains to data specific to revision tracking and change history of selected ship structural entities within the product model. Approval pertains to the company internal approval and the classification society approval. This Application Protocol supports the shipbuilding activities and applications associated with the design phase and the manufacturing phase.

NOTE 1 The application activity model in annex F provides a graphical representation of the processes and information flows that are the basis for the definition of the scope of this part of ISO 10303.

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NOTE 2 The detailed technical discussion in annex L provides details that define the basis for the definition of the scope of this part of ISO 10303 and details that define the basis of harmonization with other parts of ISO 10303 for product exchange of data for ships.

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The following are within the scope of this part of ISO 10303:

— product definition data pertaining to the ship structure which includes hull structure, superstructure and all other internal structures of commercial and naval ships;

— product definition data pertaining to the ship structure;

— product definition data pertaining to the pre-design phase of the ship structure;

— product definition data pertaining to the main design phase of the ship structure;

— product definition data pertaining to the manufacturing phase of the ship structure;

— product definition data pertaining to the product structuring of ships, including the structuring by system and by assemblies within the ship;

— product definition data identifying the ship general characteristics which are relevant to the design of the ship structure.

NOTE The general characteristics include ship main dimensions, designations and principle characteristics, as well as the rules, regulations and standards applicable to the ship. It also includes lightships weight distribution and free-board characteristics for the purpose of design and design approvals.

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