
**Ships and marine technology —
Specific requirements for offshore
wind farm components — Supply
chain information flow**

*Navires et technologie maritime — Exigences spécifiques pour les
composants de fermes éoliennes offshore — Flux d'informations dans
la chaîne d'approvisionnement*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword Supplementary information](#)

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*.

This International Standard is part of a series for offshore structures of the offshore wind industry. The full series consists of the following:

- ISO 29400, *Ships and marine technology* — *Offshore wind energy* — *Port and marine operations*
- ISO 29404, *Ships and marine technology* — *Specific requirements for offshore wind farm components* — *Supply chain information flow*

Introduction

The complexity and the number of parties involved in the offshore wind farm (OWF) supply chains, both during the construction and the operational phase with their repair and maintenance requirements, depend on IT applications to facilitate planning and control of all physical processes.

In order to minimize frictions in data communication between different business parties, content and format of data need to be standardized.

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Ships and marine technology — Specific requirements for offshore wind farm components — Supply chain information flow

1 Scope

This International Standard specifies content and format of the messages initiating and controlling the physical movement of wind turbine generator (WTG) components from suppliers to the construction site during the construction phase as well as for repair and maintenance purposes.

This International Standard is applicable to all organizations involved in the production, transportation, storage and installation of WTG parts and related components. This International Standard is not intended to be applied to substations.

Messages described in this International Standard covers only the operational aspects of logistics and therefore this International Standard will represent only one aspect of the entire information flow.

This International Standard does not specify the technical implementation of appropriate IT products. It rather provides an approach based on the EPC Information System (EPCIS) standard and describes the usage of extension mechanisms provided by the EPCIS standard for the exchange of information in the offshore wind supply chain. It aims at standardizing the exchange of essential logistic information. This International Standard specifies elementary informational needs of involved parties in the offshore supply chain and defines mechanisms for the exchange of this information via the EPCIS. Due to the high degree of specialization along different offshore supply chains, partners exchanging information might require mechanisms for personalizing according to their individual demands. The underlying extendable EPCIS concept allows end users and industry consortiums to extend and to refine the information exchange. These extensions might go far beyond the basic information exchange described in this International Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 29400, *Ships and marine technology — Offshore wind energy — Port and marine operations*

EPC Information Services (EPCIS) Version 1.1 Specification

Core Business Vocabulary (CBV) GS1 Standard Version 1.1

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 29400 and the following apply.

3.1

automatic identification data capturing

AIDC

methods of automatically identifying objects, collecting data about them, and entering that data directly into computer systems

3.2

bar code

linear array of rectangular marks of (possibly) varying width, height and vertical alignment, separated by spaces of (possibly) varying width, in which the positioning and size of marks and spaces are used to encode information

Note 1 to entry: Bar code may be 1D bar code or 2D bar code, also called Aztec code.

3.3

component

arbitrarily parts of a WTG, comprising foundations and all parts of a wind turbine generator as well as elements of a wind turbine generator tower

EXAMPLE Tripods, jackets, monopoles and other foundation types and blades and hubs.

3.4

container owner code

BIC code

coding scheme used for coding, identification and marking of containers used within containerized intermodal freight transport

Note 1 to entry: For detailed information, see Reference [1].

3.5

coordinate

one of a sequence of n numbers designating the position of a point in n -dimensional space

Note 1 to entry: In a coordinate reference system, the coordinate numbers are qualified by units.

[SOURCE: ISO 19111:2007, 4.5]

3.6

coordinate tuple

tuple composed of a sequence of coordinates

Note 1 to entry: The number of coordinate tuple equals the dimension of the coordinate system; the order of coordinates in the coordinate tuple is identical to the order of axes of the coordinate system.

[SOURCE: ISO 19111:2007, 4.12 — modified]

3.7

IMO number

unique identifiers for ships governed by IMO

Note 1 to entry: For more information, see IMO Resolution A.600(15).

Note 2 to entry: The issuing agency for IMO numbers is IHS Fairplay.

3.8

installation site

offshore location where WTGs are installed in an offshore wind farm

3.9

inland transport

transport of components which does not operate in offshore or coastal areas

EXAMPLE Via roads, via rail, via inland vessel and via plane.

3.10

issuing agency

agency that defines and governs unique numbering schemes

Note 1 to entry: For more information, see ISO/IEC 15459-2.

3.11**location**

uniquely identifiable physical point or area

Note 1 to entry: The location can be characterized by coordinates.

3.12**logistics hub**

location where flows of components are consolidated, stored or transhipped

Note 1 to entry: Logistic hubs are usually located in the inland or the coastal area.

Note 2 to entry: Supply chains may comprise multiple logistics hubs.

3.13**logistic service provider**

role in the offshore supply chain which is responsible for the organization of parts or of the entire logistics chain

3.14**manufacturer**

organization that produces one or more components for offshore wind turbines

3.15**n-tier**

organization that supplies one or more manufacturer with raw material and semi-finished products

3.16**nearshore transport**

water-based transport operated next to the coast or in mouths of rivers

3.17**offshore transport**

transportation of components from designated marshalling port or another fabrication yard to the offshore installation site in the offshore wind farm

3.18**sea fastening**

temporary fastening items which keep movable items in position during sea and waterways transport

3.19**sending party**

legal entity that sends components to a receiving party

3.20**storage frames**

structure to support storing of the WTG components

3.21**supplier**

company which produces semi-finished products for the assembly of components of a WTG

3.22**radio-frequency identification****RFID**

wireless non-contact use of radio-frequency electromagnetic fields to transfer data

3.23**telemetry**

automated collection of operational data and its transfer via an information and communication infrastructure

3.24

trailer

system of steerable wheels, connected to a central spine beam by hydraulic suspension that can be raised or lowered

3.25

transport media

all kinds of vehicle that may be used to transport components, bundles of component, load carriers, lifting equipment and other related objects

3.26

unique identifier

identifier which is guaranteed to be unique among all identifiers used for those objects and for a specific purpose

Note 1 to entry: For more information, see ISO/IEC 15459-1.

3.27

process state

state of a process that describes the disposition and the current business step of a process

3.28

extensible markup language

XML

schema that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable

3.29

xml scheme

abstract collection of metadata, consisting of a set of schema components with element and attribute declarations and complex and simple type definitions

Note 1 to entry: For more information, see References [18] and [21].

4 Abbreviated terms

AIS	Automatic Identification System
CBV	Core Business Vocabulary
EPC	Electronic Product Code
EPCIS	EPC Information Services
IMO	International Maritime Organization
GIAI	Global Individual Asset Identifier
GLN	Global Location Number
GTIN	Global Trade Item Number
GPS	Global Positioning System
GRAI	Global Returnable Asset Identifier
OWF	Offshore Wind Farm
SGLN	Global Location Number With or Without Extensions
SGTIN	Serialised Global Trade Item Number
SSCC	Serial Shipping Container Code
SPMT	Self-Propelled Modular Transporter
URIs	Uniform Resource Identifiers
URL	Uniform Resource Locator

5 Supply chain processes: Planning, ordering and monitoring

5.1 General

This Clause describes the data communications needs arising through the different stages of production, transport and maintenance. Planning and control of activities along the offshore supply chain requires reliable information about states of processes, locations of components, availability of resources. Especially, the exchange of planning information and order information, such as estimated arrival times of components or vessels, allows harmonizing the material flow along the whole offshore logistics supply chain. Due to the different roles in the offshore supply chain, the involved parties have different information needs. In particular, this International Standard addresses the different stages of the offshore logistic supply chain and the following informational needs:

- production of parts and components by manufacturers;
- transport to marshalling ports;
- intermediate storage;
- transport to installation site;
- installation of WTG components;
- maintenance and repair;

- decommissioning.

The information flow, which is necessary to initiate the physical material flow, is organized by the exchange of information between the participants of the supply chain. In general, three different types of information have to be exchanged between involved parties. These messages are characterized as follows:

- Planning data — contains information about initial plans for component or for transport media. It comprises information about planned arrival dates of transport units at the transport origin and at the transport destination.
- Order data — contains information about short-term planning data (e.g. the estimated time of arrival of a vessel in a port). The physical information flow is initiated by this information. This order message comprises announcements for any kind of transport initiation or other related actions.
- Material flow event data — events that occur after the completion of planning or ordering processes. Events represent the actual status of particular processes in the supply chain (e.g. the arrival of a component at a marshalling port or another logistics hub).

The basic information requirements of each step of the offshore supply chain mentioned above are described hereafter. [Figure 1](#) depicts a general supply chain for the installation of offshore wind turbines. The description of tasks, processes and related informational demands are based on [Figure 1](#).

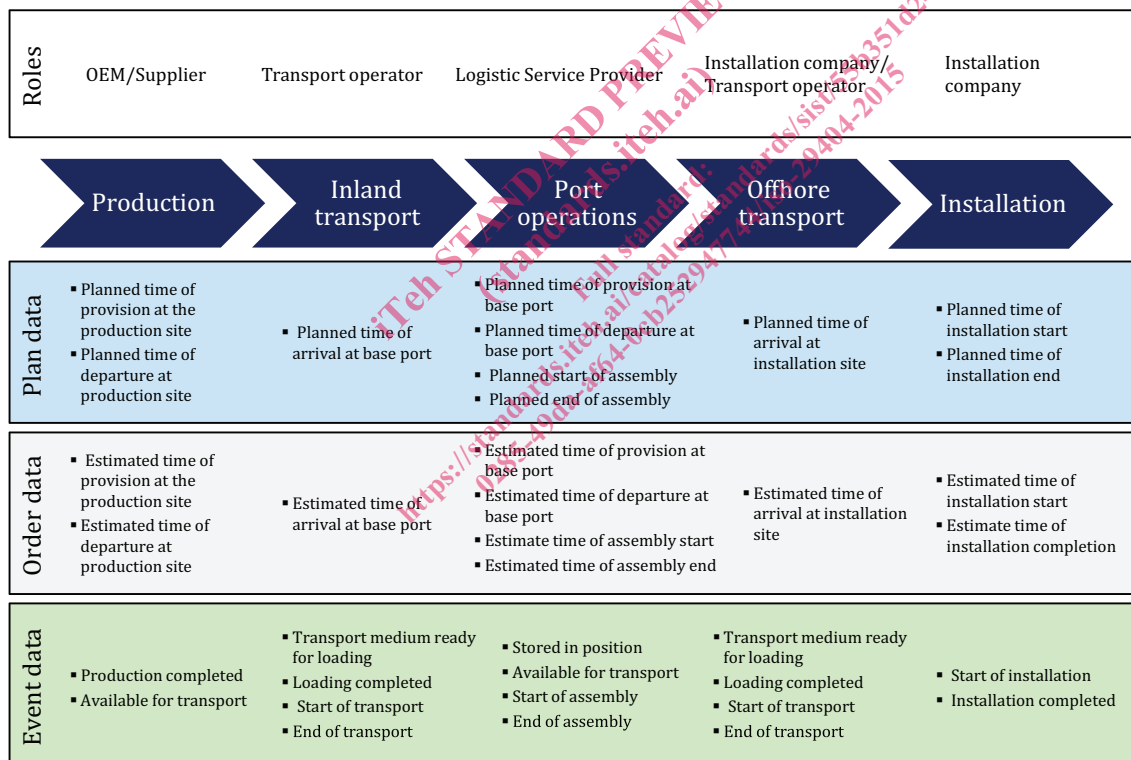


Figure 1 — General offshore wind energy installation supply chain

Relevant data for maintenance and repair operations as well as relevant data for the decommissioning is not depicted in [Figure 1](#). Informational needs therefore are described in [5.6](#) and [5.8](#). The process-related tasks shown in [Figure 1](#) are as follows.

- Production of parts and components: production of WTG components.
- Inland and nearshore transport: transport of WTG components from manufacturers or logistic hubs to the marshalling port. Inland transport can be organized via roads, via railways, via aircraft, via inland and nearshore waterways.