
**Offshore containers and associated
lifting sets —**

Part 1:
**Design, manufacture and marking of
offshore containers**

iTeh STANDARD PREVIEW
Containers offshore et dispositifs de levage associés —
(Partie 1: Conception, fabrication et marquage des containers offshore
(standards.iteh.ai))

[ISO 10855-1:2018](https://standards.iteh.ai/catalog/standards/sist/28d1fc98-5fcf-4875-a465-f6e892d85b67/iso-10855-1-2018)

<https://standards.iteh.ai/catalog/standards/sist/28d1fc98-5fcf-4875-a465-f6e892d85b67/iso-10855-1-2018>



iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 10855-1:2018

<https://standards.iteh.ai/catalog/standards/sist/28d1fc98-5fcf-4875-a465-f6e892d85b67/iso-10855-1-2018>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	3
4 Symbols	5
5 Design	5
5.1 General.....	5
5.2 Structural strength.....	6
5.2.1 General.....	6
5.2.2 Lifting loads.....	7
5.2.3 Impact loads.....	8
5.2.4 Internal forces on container walls.....	9
5.2.5 Minimum material thickness.....	9
5.3 Welding.....	9
5.4 Additional design details.....	9
5.4.1 Floor.....	9
5.4.2 Doors and hatches.....	10
5.4.3 Intermediate cargo decks.....	10
5.4.4 Driving ramps.....	10
5.4.5 Internal lashing points.....	10
5.4.6 Fork lift pockets.....	10
5.4.7 Top protection.....	11
5.4.8 Pad eyes.....	11
5.4.9 ISO-corner fittings.....	12
5.4.10 Equipment.....	12
5.4.11 Coating and corrosion protection.....	12
5.5 Tank containers.....	13
5.5.1 General.....	13
5.5.2 Frame.....	13
5.5.3 Tanks for fluids.....	13
5.5.4 Impact protection on tank containers for dangerous cargoes.....	13
5.6 Containers for bulk solids.....	13
6 Materials	14
6.1 Steel — General.....	14
6.2 Rolled and extruded steels in offshore container structures.....	15
6.2.1 General requirements.....	15
6.2.2 Groups of steels.....	15
6.2.3 Stainless steel.....	15
6.2.4 Steel forgings.....	15
6.2.5 Steel castings in ISO-corner fittings.....	16
6.3 Aluminium.....	16
6.4 Non-metallic materials.....	17
6.5 Material documents.....	18
7 Type testing	18
7.1 General.....	18
7.2 Test equipment and calibration.....	19
7.2.1 Test mass/test load.....	19
7.2.2 Calibration.....	19
7.3 Lifting test.....	19
7.3.1 General.....	19
7.3.2 All-point lifting.....	19

ISO 10855-1:2018(E)

7.3.3	Two-point lifting	20
7.3.4	Post-lifting test inspection and examination	20
7.4	Vertical impact test	20
7.5	Other tests	20
8	Production	21
8.1	General	21
8.2	Primary structure	21
8.2.1	General	21
8.2.2	Approved welders	21
8.2.3	Examination of welds	21
8.3	Secondary structure	23
8.4	Production testing	23
8.4.1	Lifting test	23
8.4.2	Weather proofness testing	23
8.5	Failure of production containers	24
9	Marking	24
9.1	Safety marking	24
9.2	Identification markings	24
9.3	Information markings	24
9.4	Other markings	25
10	Container data plate	25
10.1	General	25
10.2	Contents of data plate	25
11	Certificate of conformity	26
11.1	General	26
11.2	Documentation	26
11.3	Contents of the certificate of conformity	27
Annex A (informative)	Regulations for offshore containers	28
Bibliography		30

ITeH STANDARD PREVIEW

(standards.iteh.ai)

ISO 10855-1:2018

<https://standards.iteh.ai/catalog/standards/sist/28d1fc98-5fcf-4875-a465-f6e892d85b67/iso-10855-1-2018>

https://standards.iteh.ai/catalog/standards/sist/28d1fc98-5fcf-4875-a465-f6e892d85b67/iso-10855-1-2018

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 voluntary nature of standards, 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](#).

A list of all the parts of ISO 10855 can be found on the ISO website.

[ISO 10855-1:2018](http://standards.iteh.ai/catalog/standards/sist/28d1fc98-5fcf-4875-a465-f6e892d85b67/iso-10855-1-2018)

<https://standards.iteh.ai/catalog/standards/sist/28d1fc98-5fcf-4875-a465-f6e892d85b67/iso-10855-1-2018>

Introduction

ISO 10855 (all parts) meets the requirements of IMO MSC/Circ.860 (1998) for the design, construction, inspection, testing and in-service examination of offshore containers and associated lifting sets which are handled in open seas.

This document does not specify certification requirements for offshore containers which are covered by the IMO Circular 860 and SOLAS. IMO MSC/Circ.860 requires certification of offshore containers “by national administrations or organizations duly authorized by the Administration”, which should take account of both the calculations and the testing, “taking into account the dynamic lifting and impact forces that can occur when handling such equipment in open seas”. The certificate of conformity described in [Clause 11](#) complies with IMO MSC/Circ.860. Further information about certification can be found in informative [Annex A](#) of this document.

ISO 10855 (all parts) does not cover operational use or maintenance, for which there are a number of industry guidelines which can be referred to. Some are listed in the Bibliography.

Under conditions in which offshore containers are often transported and handled, the 'normal' rate of wear and tear is high, and damage necessitating repair will occur. However, containers designed, manufactured and periodically inspected according to ISO 10855 (all parts) should have sufficient strength to withstand the normal forces encountered in offshore operations, and not suffer complete failure even if subject to more extreme loads.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 10855-1:2018](#)

<https://standards.iteh.ai/catalog/standards/sist/28d1fc98-5fcf-4875-a465-f6e892d85b67/iso-10855-1-2018>

Offshore containers and associated lifting sets —

Part 1:

Design, manufacture and marking of offshore containers

1 Scope

This document specifies requirements for the design, manufacture and marking of offshore containers with a maximum gross mass not exceeding 25 000 kg, intended for repeated use to, from and between offshore installations and ships.

This document specifies only transport-related requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

ISO 209, *Aluminium and aluminium alloys — Chemical composition*

ISO 668, *Series 1 freight containers — Classification, dimensions and ratings*

ISO 1161, *Series 1 freight containers — Corner and intermediate fittings — Specifications*

ISO 1496-1, *Series 1 freight containers — Specification and testing — Part 1: General cargo containers for general purposes*

ISO 1496-3, *Series 1 freight containers — Specification and testing — Part 3: Tank containers for liquids, gases and pressurized dry bulk*

ISO 1496-4, *Series 1 freight containers — Specification and testing — Part 4: Non-pressurized containers for dry bulk*

ISO 3452-1, *Non-destructive testing — Penetrant testing — Part 1: General principles*

ISO 5817, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines - Verification and calibration of the force-measuring system*

ISO 9606-2, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys*

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 10042, *Welding — Arc-welded joints in aluminium and its alloys — Quality levels for imperfections*

ISO 10474, *Steel and steel products — Inspection documents*

ISO 10675-1, *Non-destructive testing of welds — Acceptance levels for radiographic testing — Part 1: Steel, nickel, titanium and their alloys*

ISO 10855-1:2018(E)

ISO 10675-2, *Non-destructive testing of welds — Acceptance levels for radiographic testing — Part 2: Aluminium and its alloys*

ISO 11666, *Non-destructive testing of welds — Ultrasonic testing — Acceptance levels*

ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules*

ISO 15609-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding*

ISO 15614-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys*

ISO 15614-2, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 2: Arc welding of aluminium and its alloys*

ISO 17637, *Non-destructive testing of welds — Visual testing of fusion-welded joints*

ISO 17638, *Non-destructive testing of welds — Magnetic particle testing*

ISO 23277, *Non-destructive testing of welds — Penetrant testing — Acceptance levels*

ISO 23278, *Non-destructive testing of welds — Magnetic particle testing — Acceptance levels*

ISO 17636-1, *Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film*

ISO 17636-2, *Non-destructive testing of welds — Radiographic testing — Part 2: X- and gamma-ray techniques with digital detectors*

ISO 17640, *Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment*

ITeH STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/28d1fc98-5fcf-4875-a465-10c892d85007/iso-10855-1-2018>
ISO 10855-1:2018

EN 287-1, *Qualification test of welders — Fusion welding — Part 1: Steels*

EN 10025-1, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*

EN 10025-2, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10025-3, *Hot rolled products of structural steels — Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*

EN 10025-4, *Hot rolled products of structural steels — Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels*

EN 10088-2, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

EN 10164, *Steel products with improved deformation properties perpendicular to the surface of the product — Technical delivery conditions*

EN 10210-1, *Hot finished structural hollow sections of non-alloy and fine grain structural steels — Part 1: Technical delivery requirements*

EN 10219-1, *Cold formed welded structural hollow sections of non-alloy and fine grain steels — Part 1: Technical delivery requirements*

EN 10250-2, *Open die steel forgings for general engineering purposes — Part 2: Non-alloy quality and special steels*

EN 10250-3, *Open die steel forgings for general engineering purposes — Part 3: Alloy special steels*

ASME Boiler and Pressure Vessel Code, Section IX, *Welding and Brazing Qualifications*, 2015

AWS D1.1 Structural Welding Code - Steel

International Maritime Dangerous Goods Code (IMDG Code)

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1 Offshore containers

3.1.1

offshore container

portable unit for repeated use in the transport of goods or equipment handled in open seas to, from and between fixed and/or floating installations and ships

Note 1 to entry: For the purposes of this document the maximum gross mass of offshore containers shall not exceed 25 000 kg.

Note 2 to entry: The unit incorporates permanently installed equipment for lifting and handling and can include equipment for filling, emptying, cooling, heating, etc.

Note 3 to entry: Offshore containers are subdivided into three categories (see 3.1.2, 3.1.3 and 3.1.4).

3.1.2

offshore freight container

offshore container built for the transport of goods

EXAMPLE Examples of offshore freight containers are:

- general cargo container: closed container with doors;
- cargo basket: open top container for general or special cargo;
- tank container: container for the transport of dangerous or non-dangerous fluids (other types of tanks, e.g. processing plants, storage tanks, that are empty during transport, are considered to be service equipment, and are not covered by this document);
- bulk container: container for the transport of solids in bulk;
- special container: container for the transport of special cargo e.g. garbage containers, equipment;
- boxes, gas cylinder racks.

3.1.3

offshore service container

offshore container built and equipped for a special service task, usually as a temporary installation

EXAMPLE Laboratories, workshops, stores, power plants, control stations.

3.1.4

offshore waste skip

open or closed offshore container used for the storage and removal of waste

Note 1 to entry: These are normally constructed from flat steel plates forming the load bearing sections of the container, with bracing in the form of steel profiles e.g. channel or hollow section, being fitted horizontally and/or vertically around sides and ends. In addition to the pad eyes for the lifting set, these containers can have side-mounted lugs suitable for use with the lifting equipment mounted on a skip lift vehicle.

3.2 permanent equipment

equipment that is permanently attached to the container and which is not cargo

EXAMPLE Lifting sets, refrigeration units, shelves, lashing points, garbage compactors.

3.3 Primary structure

3.3.1 primary structure

load-carrying and supporting frames and load-carrying panels

Note 1 to entry: Primary structure is divided into two subgroups (see [3.3.2](#) and [3.3.3](#)).

3.3.2 essential/non-redundant primary structure

structural elements which transfer the cargo load to the crane hook, forming the load path from the payload to the lifting sling

EXAMPLE

- top and bottom side rails;
- top and bottom end rails;
- corner posts;
- pad eyes;
- fork pockets.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Note 1 to entry: Other primary structures can also be considered as essential/non-redundant.

3.3.3 non-essential primary structure

structural elements whose main function is not essential and can be redundant

EXAMPLE Floor plates and protective frame members.

Note 1 to entry: Side and roof panels, including corrugated panels, are not considered to be part of the primary structure.

3.4 secondary structure

parts which are not considered as load carrying for the purposes of the design calculations, including at least the following components:

- doors, wall and roof panels;
- panel stiffeners and corrugations;
- structural components used for tank protection only;
- internal lashing points

Note 1 to entry: Not all container walls are corrugated.

3.5 prototype

equipment item, used for type testing, considered to be representative of the product for which conformity is being assessed

Note 1 to entry: It may be either fabricated especially for type testing or selected at random from a production series.

3.6**owner**

legal owner of the offshore container or the delegated nominee of that body

3.7**lifting set**

items of integrated lifting equipment used to connect the offshore container to the lifting appliance

3.8**visual examination**

testing performed in accordance with ISO 17637

3.9**non-combustible material**

material that does not burn or give off flammable vapours in sufficient quantity for self-ignition when heated to 750 °C

4 Symbols

R rating, i.e. the maximum gross mass of the container including permanent equipment and its cargo, in kg, but excluding the lifting set

T tare mass, i.e. the mass of an empty container including any permanent equipment but excluding cargo and lifting set, in kg

P payload, i.e. the maximum permissible mass of cargo which may be safely transported by the container, in kg

NOTE 1 $P = R - T$.

NOTE 2 *R*, *T* and *P* are, by definition in units of mass, kilograms (kg). Where design requirements are based on the gravitational forces derived from these values, those forces are indicated thus: *R_g*, *T_g* and *P_g*, the units of which are in Newtons (N) or multiples thereof.

S mass of the lifting set, in kg

T_D design air temperature, i.e. a minimum reference temperature used for the selection of steel grades used in offshore containers and equipment, expressed in degree centigrade (°C)

σ_e von Mises equivalent stress, expressed in MPa or N/mm²

R_e specified minimum yield stress, expressed in MPa or N/mm²

5 Design**5.1 General**

5.1.1 An offshore container shall have sufficient strength to allow loading and unloading from supply vessels operating offshore in a sea state with significant wave heights of 6 m and to withstand impact from heavy seas.

NOTE Local impacts, e.g. from hitting other deck cargo or rigid parts of the ship structure, can cause extreme loads in such conditions.

5.1.2 To prevent the containers from overturning (tipping) on a moving deck, they shall be designed to withstand tilting at 30° in any direction, without overturning when loaded at their maximum gross mass,

in empty condition or any intermediate condition, and with the centre of gravity considered to be at the half height of the container. For dedicated purpose containers (e.g. bottle racks and tank containers) the actual centre of gravity shall be used.

5.1.3 Protruding parts on the outside of the offshore container that can snag on other containers or structures shall be avoided. Protruding parts (e.g. doors handles, hatch cleats) shall be so placed or so protected that they do not catch the lifting set.

5.1.4 Stacking fittings and guides and other structures that protrude above the top of the container frame shall be designed and located to minimize the potential to catch on structures on the ship or on other deck cargoes during lifting operations, and be designed such that the risk of damage to other containers or cargoes from these is minimized. They shall also be designed such that damage to the stacking fittings does not cause damage to the pad eyes.

Particular attention should be given to avoiding the risk of catching. Protrusions such as stacking guides can catch in openings in the bulwarks of supply vessels.

Such risks can be reduced by suitable designs.

5.1.5 If containers are designed for stacking, the corners or stacking fittings shall be sufficiently raised above the frame and roof to prevent damage to the lifting set.

NOTE Parts of the permanently attached lifting sets often hang over the side of the top frame.

5.1.6 Containers shall be designed as structural frames (primary structure), with non-load bearing cladding where necessary (secondary structure). Only the primary structure shall be considered in the design calculations; however, on certain types of containers, with only a non-stressed cover above the bracing where the pad eyes are attached, the whole structure may be considered as a primary structure, and the design calculations may treat such a container as a monocoque construction.

EXAMPLE Waste skips with trapezium shaped sides are examples of containers with only a non-stressed cover over the bracing where the pad eyes are attached.

5.1.7 T_D shall not be higher than the (statistically) lowest daily mean temperature for the area where the offshore container is to operate and in no case shall be higher than $-20\text{ }^{\circ}\text{C}$.

For containers with exposed aluminium, the danger of sparks caused by the impact of aluminium against corroded steel (the thermite reaction) shall be taken into account.

NOTE 1 When preparing the specification for a service container, it is advised that the rating is chosen higher than the estimated fitted out mass, i.e. to specify a certain payload even if the container is not intended to carry cargo. This will allow for changes in the amount and mass of equipment fitted in a container during its operational life, and it can also be useful to be able to carry a certain amount of non-permanent equipment.

NOTE 2 For containers with special features, additional regulatory design requirements can apply; see informative [Annex A](#) for guidance.

5.2 Structural strength

5.2.1 General

The required strength of a container shall be determined by calculation and verified by type tests, as specified in [Clause 7](#).