FINAL DRAFT International Standard

ISO/FDIS 10855-1

ISO/TC **67**/SC **7**

Secretariat: **BSI**

Voting begins on:
2024-08-22

Voting terminates on:
2024-10-17

Offshore containers and associated lifting sets —

Part 1: Design, manufacture and marking of offshore containers

Conteneurs pour une utilisation en mer et dispositifs de levage associés —

Partie 1: Conception, fabrication et marquage des conteneurs pour une utilisation en mer

ISO/CEN PARALLEL PROCESSING

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

Reference number
ISO/FDIS 10855-1:2024(en)

© ISO 2024

Documents
Document Sharing Hub

Full document details: ISO_FDIS 10855 Final Draft - 1_2024

COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

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
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

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 ... 6
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 ... 9
5.4.3 Intermediate cargo decks ... 9
5.4.4 Driving ramps ... 10
5.4.5 Internal lashing points ... 10
5.4.6 Forklift pockets ... 10
5.4.7 Top protection ... 10
5.4.8 Pad eyes ... 11
5.4.9 Corner fittings ... 11
5.4.10 Equipment supports and protection ... 12
5.4.11 Coating and corrosion protection ... 12
5.5 Tank containers ... 12
5.5.1 General ... 12
5.5.2 Frame ... 12
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 ... **13**
6.1 Steel — General ... 13
6.2 Rolled and extruded steels in offshore container structures ... 14
6.2.1 General requirements ... 14
6.2.2 Groups of steels ... 14
6.2.3 Stainless steel ... 15
6.2.4 Steel forgings ... 15
6.2.5 Steel castings in corner fittings ... 15
6.3 Aluminium ... 16
6.4 Non-metallic materials ... 17
6.5 Material documents ... 17
7 Type testing ... **17**
7.1 General ... 17
7.2 Test equipment and calibration ... 18
7.2.1 Test mass or test load ... 18
7.2.2 Calibration ... 18
7.3 Lifting test ... 18
7.3.1 General ... 18
7.3.2 All-point lifting ... 18

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

7.3.3 Two-point lifting ... 18
7.3.4 Post-lifting test inspection and examination ... 19
7.4 Vertical impact test ... 19
7.5 Other tests ... 19

8 Production ... 20
8.1 General ... 20
8.2 Primary structure ... 20
8.2.1 General ... 20
8.2.2 Approved welders ... 20
8.2.3 Examination of welds ... 20
8.3 Secondary structure ... 21
8.4 Production testing ... 22
8.4.1 Lifting test ... 22
8.4.2 Weather proofness testing ... 22
8.5 Failure of production containers ... 22

9 Marking ... 23
9.1 Safety marking ... 23
9.2 Identification markings ... 23
9.3 Information markings ... 23
9.4 Other markings ... 24

10 Container data plate ... 24
10.1 General ... 24
10.2 Contents of data plate ... 24

11 Certificate of conformity ... 25
11.1 General ... 25
11.2 Documentation ... 25
11.3 Contents of the certificate of conformity ... 26

Annex A (informative) **Regulations for offshore containers ... 27**

Bibliography ... 29

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of 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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 67, *Oil and gas industries including lower carbon energy*, Subcommittee SC 7, *Offshore structures,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 12, *Oil and gas industries including lower carbon energy,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 10855-1:2018), which has been technically revised.

The main changes are as follows:

— definitions have been updated.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

Introduction

The ISO 10855 series 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.

The ISO 10855 series does not cover operational use or maintenance.

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

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

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 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 1496-3:2019, *Series 1 freight containers — Specification and testing — Part 3: Tank containers for liquids, gases and pressurized dry bulk*

ISO 1496-4:2023, *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 — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

ISO 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels*

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 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

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

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

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

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

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

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

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*

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
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

EXAMPLE

— 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;

— service container: built and equipped for a special service task, usually as a temporary installation e.g. laboratories, workshops, stores, power plants, control stations, accommodation, engine, compressor, generator;

— special container: frame or skid for the transport of special cargo e.g. garbage containers, equipment boxes, gas cylinder racks, IBC (intermediate bulk container) frame.

— offshore waste skip: open or closed offshore container used for the storage and removal of waste.

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 waste skips 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* (3.7), 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* (3.7), refrigeration units, shelves, lashing points, garbage compactors.

3.3
primary structure
load-carrying and supporting frames and load-carrying panels

Note 1 to entry: Primary structure is divided into two subgroups (see 3.3.1 and 3.3.2).

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

3.3.1
essential primary structure
structural elements which transfer the cargo load to the crane hook, forming the load path from the payload to the lifting set and is non-redundant

EXAMPLE

— top and bottom side rails;

— top and bottom end rails;

— corner posts;

— pad eyes;

— fork pockets.

3.3.2
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* (3.3).

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* (3.1) or the delegated nominee of that body

3.7
lifting set
items of integrated lifting equipment used to connect the *offshore container* (3.1) to the lifting appliance

3.8
sling
one leg of a lifting set

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

3.9
visual examination
examination which uses the human eye as a detector

Note 1 to entry: For the purposes of this document, visual examination shall be in accordance with ISO 17637.

[SOURCE: ISO 9022-1:2016, 2.9.1, modified — Note 1 to entry has been added.]

3.10
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

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

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

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

NOTE 1 $m_P = m_R - m_T$.

NOTE 2 m_R, m_T and m_P are expressed in kg. Where design requirements are based on the gravitational forces derived from these values, those forces are indicated thus as $m_R g$ $m_T g$ and $m_P g$, expressed in N.

m_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 °C

σ_e von Mises equivalent stress, expressed in MPa or N/mm^2

R_e specified minimum yield stress, expressed in MPa or N/mm^2

5 Design

5.1 General

5.1.1 An offshore container shall be designed to allow loading and unloading from supply vessels operating offshore in a sea state with wave heights of 6 m.

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.

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024

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. They shall 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 shall not be higher than −20 °C.

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

When preparing the specification for a service container, a rating higher than the estimated fitted out mass should be chosen. This allows 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 For containers with special features, additional regulatory design requirements can apply; see Annex A.

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.

5.2.2 Lifting loads

5.2.2.1 Allowable stresses

For design loads defined in 5.2.2.2 and 5.2.2.3, the equivalent stress level, σ_e, shall not exceed the figure calculated as:

$$\sigma_e = 0{,}85C$$

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_FDIS 10855 Final Draft - 1_2024