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Offshore containers and associated lifting sets —

Part 3: Periodic inspection, examination and testing

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

Partie 3: Contrôle périodique, inspection et essais

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Contents

Page

Foreword ... **v**
Introduction ... **vi**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **2**
4 Symbols and abbreviated terms ... **2**
5 Container inspection plate ... **2**
5.1 General ... 2
5.2 Contents of inspection plate ... 3
6 Schedule of periodic inspection/examination and test — Containers ... **3**
7 Container lifting test ... **4**
7.1 General ... 4
7.2 Test equipment and calibration ... 5
8 Non-destructive examination (NDE) of welds ... **5**
8.1 General ... 5
8.2 NDE methods ... 5
8.3 Use of Eddy current testing at periodic inspections ... 5
8.4 NDE operators ... 6
9 Visual inspection ... **6**
9.1 General ... 6
9.2 Markings ... 6
9.3 Welds ... 6
9.4 Pad eyes and lashing points ... 6
9.5 Structure ... 6
9.6 Door closures ... 6
9.7 Floor ... 6
10 Marking of the inspection plate ... **7**
11 Inspection report ... **7**
12 Record keeping ... **7**
13 Damage and repair procedures ... **7**
14 Schedule of inspection/examination and test — Lifting sets ... **8**
15 Inspection of attachment of lifting set to an offshore container ... **11**
15.1 Attachment ... 11
15.2 Inspection report ... 11
15.3 Record keeping ... 11
16 Pre-trip inspections ... **11**
16.1 General ... 11
16.2 Pre-trip inspection ... 12
Annex A (informative) **Regulations for offshore containers** ... **13**
Annex B (informative) **Recommended knowledge and experience of staff responsible for inspection of offshore containers** ... **15**
Annex C (informative) **Recommended knowledge and experience of staff responsible for inspection of lifting sets intended for use with offshore containers** ... **16**
Annex D (informative) **Recommended inspection and acceptance criteria for offshore containers** ... **17**

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Annex E (informative) **Recommended inspection and acceptance criteria for lifting sets and lifting set components** **22**

Bibliography **25**

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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 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).

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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 10855-3:2018), which has been technically revised.

The main changes are as follows:

— recommended inspection and acceptance criteria for periodic inspection of offshore containers, lifting sets and lifting set components have been included.

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.

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Introduction

The ISO 10855 series meets the requirements of IMO MSC/Circular 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 and manufactured 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.

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Offshore containers and associated lifting sets —

Part 3:
Periodic inspection, examination and testing

1 Scope

This document specifies requirements for the periodic inspection, examination and testing of offshore containers, built in accordance with ISO 10855-1 and with a maximum gross mass not exceeding 25 000 kg, and their associated lifting sets, intended for repeated use to, from and between offshore installations and ships. Inspection requirements following damage and repair of offshore containers are also included.

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

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 10855-1, *Offshore containers and associated lifting sets — Part 1: Design, manufacture and marking of offshore containers*

ISO 10855-2, *Offshore containers and associated lifting sets — Part 2: Design, manufacture and marking of lifting sets*

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

ISO/IEC 17020, *Conformity assessment — Requirements for the operation of various types of bodies performing inspection*

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

ISO 17643, *Non-destructive testing of welds — Eddy current testing of welds by complex-plane analysis*

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

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

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

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

EN 818-4:1996, *Short link chain for lifting purposes — Safety — Part 4: Chain slings – Grade 8*

EN 818-6, *Short link chain for lifting purposes — Safety — Part 6: Chain slings — Specification for information for use and maintenance to be provided by the manufacturer*

EN 13414-2, *Steel wire rope slings — Safety — Part 2: Specification for information for use and maintenance to be provided by the manufacturer*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10855-1, ISO 10855-2 and the following 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
inspection body
body that performs periodic inspection or examination

4 Symbols and abbreviated terms

$m_{WLL,s}$	minimum working load limit of each shackle, in t
$m_{WLL,off}$	maximum lifting capacity of a lifting set to be used on an offshore container, in t
m_R	rating, i.e. the maximum gross mass, MGM, of the container including permanent equipment and its cargo, but excluding the lifting set, in kg
m_T	tare mass, i.e. the mass of an empty container including any permanent equipment 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.

5 Container inspection plate

5.1 General

Containers shall be fitted with a plate carrying the information specified in 5.2.

The plate shall be made of corrosion-resistant material securely attached externally in a manner designed to avoid unauthorized or accidental removal. The plates shall be fitted to a door, or on containers with no doors, in a prominent position.

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Aluminium rivets have been found to be unsuitable as a fixing method in the offshore environment and shall not be used. The information on the plate shall be in the English language.

NOTE Provision for an additional language can be made.

The text shall be permanently and legibly marked on the plates in characters not less than 4 mm high.

5.2 Contents of inspection plate

The plate shall be headed 'OFFSHORE CONTAINER INSPECTION PLATE - ISO 10855-3'.

The plate shall contain the following information:

a) owner's container number;

b) owner's name;

c) date of last inspection.

The date of last inspection shall be the date on which the most recent inspection was carried out to the satisfaction of the competent person.

To avoid confusion, the plate shall not carry the date of the next inspection. Provision shall be made on the plate to facilitate permanent marking to record a minimum of nine inspections.

NOTE 1 For marking of the inspection plate, see Clause 10.

NOTE 2 In some markets it is common practice to mark an initial inspection date on the inspection plate before the container is taken into use.

The format in Figure 1 should be followed.

OFFSHORE CONTAINER INSPECTION PLATE - ISO 10855-3		
Container no.: Owner: Inspections:		
1		
2		
3		
4		
10		

Figure 1 — Example of inspection plate

The inspection plate may be combined with the data plate by including the additional information specified in ISO 10855-1:—, 10.2.

6 Schedule of periodic inspection/examination and test — Containers

Containers shall be periodically inspected, examined and, if necessary, tested in accordance with the schedule listed in Table 1.

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Inspection bodies performing such inspections should ensure the quality of the inspection work through meeting the requirements for type A or B inspection bodies in ISO/IEC 17020.

NOTE 1 It is not necessary for inspection bodies to obtain accreditation in accordance with ISO/IEC 17020 from an accreditation body.

NOTE 2 Guidance as to the recommended knowledge and experience of staff responsible for inspections for the purposes of ISO/IEC 17020 is given in Annexes B and C. Guidance for inspection and acceptance criteria for offshore containers, lifting sets and lifting set components is given in Annexes D and E.

When the schedule includes a lifting test, the non-destructive examination and visual inspection shall both be carried out after the lifting test.

Table 1 — Schedule of periodic inspection, examination and testing of containers

Time or interval	Inspection/examination/test			
	Lifting test	**Non-destructive examination (NDE)**	**Visual inspection**	**Suffix to be marked on plate** See Clause 10
Initial certification	As required by ISO 10855-1			
At intervals not exceeding 12 months	Not applicable[b]	Not applicable[b]	Yes	V
At intervals not exceeding 48 months	Not applicable[b]	Yes	Yes	VN
After substantial repair or alteration[a]	Yes	Yes	Yes	T

[a] A substantial repair or alteration means any repair and/or alteration carried out, which can, in the opinion of an inspection body, affect the primary elements of the offshore container, or elements which contribute directly to its structural integrity.
[b] The inspection body may require other or additional inspections, examinations and or tests.

7 Container lifting test

7.1 General

The container shall be loaded to give a total mass of 2,5 *R* and lifted using all the pad eyes.

NOTE This total mass can be obtained by putting in an internal test mass of 2,5 *R*–*T*.

The test masses/test load should normally be evenly distributed inside the container. If it is not possible to place all the test mass inside the container, the remaining mass shall be placed outside or under the container, provided that this gives a loading on the structure similar to the distribution of the container loading in operating condition.

If the container has an additional cargo deck, the test mass or test load shall be evenly divided between the floor and the additional deck. If the additional deck is removable, the test shall be performed with the test mass or test load divided between the additional deck and the floor, as well as with the whole test mass or test load on the floor.

The container shall be lifted by a lifting set with an angle to the vertical equal to the design angle and shall be held, clear of the ground, throughout the test.

Where the lifting set, intended for use with the container, is used for the lifting test, care should be taken to ensure that no overloading, deformation or distortion is induced in the lifting set. Should the lifting set normally fitted to the container be used for the lifting test, it shall be visually examined after the load test by an inspection body as per the requirements of this document.

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The container shall be lifted in such a way that no significant acceleration forces occur. It shall be held for 5 min before measurements are taken.

No deflections during testing shall be greater than $\frac{1}{300}$ of the span of the member. The offshore container shall show no permanent deformation or other damage after testing.

7.2 Test equipment and calibration

The force shall be applied using calibrated weights and lifting the container by a lifting appliance or by means of a suitable test rig (see ISO 10855-1:—, 7.3.2). The pressure gauge or loadcells used shall be in calibration.

8 Non-destructive examination (NDE) of welds

8.1 General

The NDE of welds on pad eyes and adjoining structures shall be carried out in accordance with the schedule of examination and tests specified in Table 1.

8.2 NDE methods

NDE methods in accordance with Table 2 shall be chosen with due regard to the conditions influencing the sensitivity of the methods. Structural welds shall be examined as stipulated in columns I to IV of ISO 10855-1:—, Table 7 with the method in columns III or IV being employed in the event that such is relevant.

Table 2 — Standards relevant to NDE methods

Visual	Magnetic particle	Dye penetrant	Ultrasonic	Radiography	Eddy current[b]
ISO 17637	ISO 17638	ISO 3452-1	ISO 17640	ISO 17636-1 and ISO 17636-2[a]	ISO 17643

[a] Class B Improved radiographic techniques shall be used.

[b] Eddy Current testing may only be used for periodic inspections

Table 3 — NDE acceptance criteria

Visual	Magnetic particle	Dye penetrant	Ultrasonic	Radiography
ISO 5817[a]	ISO 23278	ISO 23277	ISO 11666	ISO 10675-1[b]
Level B	Level 1	Level 1	Level 2	Level 1

[a] For aluminium ISO 10042.

[b] For aluminium ISO 10675-2.

8.3 Use of Eddy current testing at periodic inspections

For periodic inspections, Eddy current testing (ET) can be accepted. ET can only be used on painted surfaces provided the surface to be investigated is free from damage. Structures with very rough and/or damaged surfaces shall not be inspected by ET.

ET is a recognized NDE method that has the advantage that it can be performed without stripping off the paint on a welded connection. Since no acceptance criteria are specified for ET, only experienced and competent operators should perform such inspections.

If indications are found in the ET inspection, the paint shall be removed and the weld shall be inspected by means of the relevant NDE techniques in Table 2 and acceptance criteria in Table 3.

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