AECCA 2012.1

Offshore Cargo Container Design, Manufacturing & Inspection

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Revision 1 – January 29th, 2012

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1 SCOPE

1.1 General

For the purpose of these guidelines "offshore containers or cargo carrying units (CCU's)" should be taken to mean portable units specifically designed for repeated use in the transport of goods or equipment to, from or between fixed and/or floating offshore installations and ships.

Over a period of time service companies and rental companies have had to contend with several conflicting sets of lifting requirements set forth by operators and regulatory bodies. These sets of guidelines have been developed to help clarify the minimum requirements for Cargo Carrying Unit's and related equipment.

The various regulatory, international codes and operator guidelines set forth are addressed in the following Recommended Practices & Requirements.

These recommended practices have been developed to help bring forth a comprehensive set of guidelines that can be utilized by all to produce and maintain the safe operation of CCU's in worldwide offshore operations.

1.2 Commentary

This document covers design of CCU's to include dry goods boxes, baskets and other skids designed to move equipment offshore. CCU's and equipment already regulated by governing bodies, (e.g., DOT, IMDG & Coast Guard are not covered in this document.)

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2 REFERENCES

2.1 Standards for CCU'S

2.1.1 prEN 12079-1 – Offshore containers and associated lifting sets Part 1: Offshore container – Design, manufacture and marking.
2.1.2 prEN 12079-2 – Offshore containers and associated lifting sets Part 2: Lifting sets – Design, manufacture and marking.
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2.5.3 EN 1011-1 – Welding – Recommendations for welding of metallic materials – Part 1: General guidance for arc welding
2.5.4 EN 1011-2 – Recommendations

2.6 Standards for Lifting Sets

2.6.1 ASME B30.9

2.7 Standards for Recalibration

2.7.2 ASME E-4
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2.8 Other References

2.8.1 ASTM E8/E8M-09 – Tension Testing of Metallic Materials

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3 DEFINITIONS, ABBREVIATIONS AND UNITS

3.1 Definitions

CCU's: Cargo Carrying Units: Any item that carries cargo that is dynamically lifted from a vessel to a rig or a platform. (Basket, Bottle Racks, Pallet Boxes)
EW or Empty Weight: Weight of unit without cargo.
TW or Tare Weight: Weight of unit without cargo.
NW or Net Weight: Weight of cargo (WLL/SWL)
SWL or Safe Working Load: MGW – Tare Weight = SWL
WLL or Working Load Limit: MGW – Tare Weight = WLL
MGW or Max Gross Weight: Tare Weight + WLL/SWL = MGW
NDT: Non Destructive Testing
MPI: Magnetic Particle Inspection
MT: Magnetic Testing
DPI: Dye Penetrate Inspection
PT: Penetrate Testing
VT: Visual Testing
UT: Ultra Sonic Testing
T: Proof Testing
V: Visual Inspection
N: Non Destructive Test (i.e. MPI, MT, PT, UT)
Dead Weight Test: Utilizing certified weights to proof test equipment.
Dynamic Load Test: Proof testing equipment with the use of mechanical means.
Sling Set: Wire rope sling configured to fit and lift CCU.
Shackles: Anchor Bolt consisting of a bow, pin and a nut.
Critical Load Path Areas: Areas that the load is transferred through the unit from the padeyes.
Data Plate: Information plate containing Owner, unit number, periodic inspection dates and other crucial information.
Inspection Cycle: Time in between Non-Destructive testing including proof testing.
ASNT: American Society of Non-Destructive Testing
ANSI: American National Standards Institute
ASTM: American Society for Testing and Materials
ASME: American Society of Mechanical Engineers
AWS: American Welding Society
AECCA: American Energy Cargo Container Association
Existing CCU's: Any CCU built prior to the implementation date of AECCA 2012.1
GOM: Gulf Of Mexico
AECCA Approved Inspector: An inspector that has met the requirements of AECCA 2012.1
OSV: Offshore Supply Vessel
ASD: Allowable Stress Design
LRFD: Load Resistance Factor Design
AISC: American Institute for Steel Construction
IMDG: International Maritime Dangerous Goods
Design Temperature: the (statistically) lowest daily mean temperature for the area where the offshore container is to operate**.**
l_n**:** Nominal Length

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4 ALLOWABLE STRESSES

4.1 General

When designing and building CCU's in the United States the engineer shall provide calculations based upon ASD (9th Edition or newer) or LRFD method as dictated by AISC.

In addition to using these methods, include an additional "check" calculation showing that the actual load (not factored load) provides for a factor of safety of 2.5 of the yielding strength of the material.

All CCU's shall have sufficient strength to allow loading and unloading from supply vessels offshore operating in dynamic sea conditions.

Extreme - CCU's designed using a TD greater than -4° F/-20° C

Harsh - TD 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 -4° F/-20° C

Temperate - Between 36° North and 36° South and in Australian Waters and CCU's designed using a TD of -18° F/0° C

Where containers are designed for stacking, and the lifting set hangs over the side of the top frame they shall be fitted with a method of protection for those exposed parts, e.g. corners raised to sufficient height above the frame and roof to prevent unintentional contact, with and damage to, the lifting set.

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.

4.2 Structural Strength

4.2.1 General

The required strength of a container shall be determined by calculation and verified by type tests. Design safety factor shall not be less than 2.5 times unfactored Max Gross Weight. All calculations are assumed to be temperate climates.

4.2.2 Lifting loads

4.2.2.1

For design loads defined in **4.2.2.2** and **4.2.2.3,** no equivalent stress level, σ_e , shall exceed the figure as calculated as $\sigma_e = 0.85\ C$ or, where:

for Steel: $C = R_e$

for Aluminum: Base material $C = R_{0.2}$
Heat affected zone $C = 0.7\ \beta\ R_m$

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where: R_m is the tensile strength of aluminum

β is 0.8 for ISO AlMg4,5Mn-HAR/AA5083

or is 0.7 for all other aluminum alloys and tempers

4.2.2.2 Lifting with lifting set

The design force on the primary structure shall be calculated as 2.5 *Rg.*

To achieve this the internal load shall be taken as (2.5 *R - T)g* evenly distributed over the container floor.

Pad eyes shall be designed for a total vertical force of 3 *Rg.*

The force shall be considered to be evenly distributed between *(n* - 1) pad eyes where *n* is the actual number of pad eyes.

To determine the resulting sling force on the pad eyes, the sling angle shall be taken into account, so that the resulting sling force on each pad eye is calculated as follows:

$$F = \frac{3\,Rg}{(n-1)\cos\,v}$$

where;

F - is the resulting sling force, in Newton's;

n - is the actual number of pad eyes (for calculation purposes *n* shall not exceed 4 and shall be not less than 2);

v - is the angle between a sling leg and the vertical, in degrees and shall be assumed to be 45° unless otherwise specified.

NOTE: Single padeyes shall not be used for lifting, 4 padeyes shall be used with a minimum of 2.

4.2.2.3 Lifting with fork lift

The design force on the primary structure shall be calculated as 1.6 *Rg.*

To achieve this the internal load shall be taken as (l.6 *R - T)g* evenly distributed over the container floor.

Where fork pockets are intended only for handling of the empty container, the design load shall be taken as 1.6 *Tg.*

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4.2.3 Impact loads

4.2.3.1 General

Impact loads are dynamic loads of very short duration. Ideally, dynamic calculations or tests should be carried out to verify the ability of a container to withstand such loads.

When simplified calculations are used, and each beam is considered separately, any assumptions concerning support conditions shall be stated.

4.2.3.2 Horizontal impact

The main frame structure shall be designed to withstand a local horizontal impact force acting at any point. This force may act in any horizontal direction on the corner post. On all other frame members in the sides the load may be considered as acting at right angles to the side.

The calculated (static equivalent) stresses due to impact shall be combined with the lifting stresses resulting from static lifting forces *(Rg).*

Equivalent stresses shall not exceed:

σ_e = C (see **4.2.2.1)**

The following values shall be used for the static equivalents to an impact force:

For container posts and side rails of the bottom structure: - 0.25 *Rg*

For other frame members of the side structure, including the top rails: - 0.15 *Rg*

Maximum calculated deflections at these loadings shall not exceed:

For corner posts and bottom side rails $\frac{l_n}{250}$

where;

l_n is the total length of the rail or post in mm.

For other frame members $\frac{l_n}{250}$

where;

l_n is the length of the shortest edge of the wall being considered.

NOTE: l_n is a (nominal) reference length and will often be different from the actual span of a beam.

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4.2.3.3 Vertical impact

A vertical impact test shall be carried out in accordance with **AECCA 2012.1.** In addition, the side rails and end rails in the base shall be able to withstand vertical point forces of 0.25 *Rg* at the center span.

Equivalent stresses shall not exceed:

$\sigma_e = C$ (see **4.2.2.1)**

Calculated deflections shall not exceed:

$$\frac{l_n}{250}$$

where;

l_n is the total length of the rail.

4.2.4 Internal forces on container walls

Each container wall, including the doors, shall be designed to withstand an internal force of 0.6 *Pg* evenly distributed over the whole surface, without suffering any permanent deformation.

4.2.5 Minimum material thickness

The following minimum material thickness (t) requirements shall apply.

a) for external parts of corner posts and bottom rails i.e. parts forming the outside of the container:
for R >1000 kg; t = 1/4" (6 mm)
for R < 1000 kg; t = 1/8" (4 mm)
b) for all other parts of the primary structure: t =1/8" (4 mm);
c) for secondary structure made from metallic materials: t = 1/16" (2 mm);

NOTE: The thicknesses may have to be increased beyond these values to take account of special considerations such as rating, design, corrosion allowances, the need for impact tests of the material, etc.

4.3 Welding

All welding shall conform to AWS D1.1

Essential and non-redundant primary structural members shall be welded with full penetration welds. For other primary structure, the use of fillet welds shall be justified by design appraisal (including calculations and consideration of failure modes). Intermittent fillet welding of secondary structure is acceptable, however care shall be taken to avoid corrosion.

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4.4 Additional design details

4.4.1 Floor

Containers liable to fill with water, e.g. open topped, shall have a suitable drainage facility.

4.4.2 Doors and hatches

Doors and hatches, including hinges and locking devices both primary and secondary, shall be designed for at least the same horizontal forces as the primary structure. Locking devices shall be secure against opening of the doors during transport and lifting.

Locking arrangements shall be protected to prevent dislodgement by impact.

Hinges shall be protected against damage from impact loads.

If weather tightness is required, the doors shall be equipped with seals.

4.4.3 Intermediate cargo decks

When intermediate cargo decks are fitted they shall be designed to withstand a force of at least 0.5 $Pg\ \Psi$, uniformly distributed

where;

Ψ is the dynamic factor (= 3).

When intermediate cargo decks are designed to support other than half the total payload, the design requirement shall be calculated accordingly.

4.4.4 Internal securing points

Containers for general cargo shall have internal securing points. Each shall be designed to withstand a force of at least 10 *kN or* 2,000 lbs.

4.4.5 Fork lift pockets

Fork lift pockets shall be installed in the bottom structure and should be completely enclosed, pass through the base and be provided with the means to prevent the container from toppling from the forks.

For suggested fork lift pocket sizing see the table below.

Minimum Size	3” x 8” Rectangular Tubing	4” x 10” Rectangular Tubing
Maximum Size	6” x 10” Rectangular Tubing	6” X 12” Rectangular Tubing

Fork lift pockets shall be located such that the container is stable during handling and driving with fork lift. Container length, height, width and rating shall be taken into account.

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Pockets shall be located as far apart as practicable for the application intended but, need not be more than 8' apart from the center of pocket to center of pocket.

If a container is fitted with pockets that are only for empty handling, the container shall be marked accordingly.

4.4.6 Pad eyes

In order to prevent lateral bending moments on pad eyes, they shall be aligned with the sling to the center of lift, with a maximum manufacturing tolerance of ± 2.5%

Any difference in the diagonal measurements between lifting point centers shall not exceed 0.2 % of the length of the diagonal, or 3/16", whichever is the greater.

The diameter of holes in pad eyes shall match the shackle used, clearance between shackle pin and pad eye hole shall not exceed 10% of the nominal shackle pin diameter.

The tolerance between pad eye thickness and inside width of shackle shall not exceed 25 % of the inside width of the shackle.

Pad eyes shall be so designed as to permit free movement of the shackle and sling termination without fouling the pad eye.

Pad eyes should not protrude outside the boundaries of the container, and shall as far as possible be designed to avoid damage from other containers. If padeyes are fitted to the outside of container they shall be designed to minimize fouling against other containers. Lifting points shall be positioned on the container to preclude, as far as practicable, the risk of slings fouling against the container or its cargo during normal use.

Pad eyes shall be welded to the frame with full penetration welds. If the lifting force is transferred through the thickness of a plate, plates with specified through thickness properties shall be used.

It is recommended that pad-eyes be slotted into the primary structure

Flame cutting of pad eye holes is not acceptable.

Pad eyes shall only be drilled or milled.

If ISO-corner fittings are mounted they shall not be used for lifting with slings offshore.

4.4.7 ISO-corner fittings

Lifting offshore with shackles in these corner fittings is not acceptable.

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4.4.8 Equipment

Equipment on CCU's shall be designed and installed to withstand the dynamic loading and other environmental forces to which it may be exposed.

The following factors shall be used:

Dynamic factor (load factor) $\Psi = 3$

Design factor against breaking (safety factor) $s=2$

4.4.9 Coating and corrosion protection

CCU's shall be suitable for the offshore environment by means of construction, use of suitable material and/or corrosion and paint protection.

5 Materials

5.1 Steel - General

The chemical composition, heat treatment, weldability, mechanical properties and impact energy properties shall be suitable for the purpose. Extra high strength steels, with *RE* above 500 N/mm2, shall not be used.

When materials of different galvanic potential are joined together, the design shall be such that galvanic corrosion is avoided.

Welding consumables shall be according to AWS D 1.1 or EN 1011-1,.

Tensile testing shall be carried out according to ASTM E8 / E8M - 09 or EN 10002-1.

In order to avoid initiation of brittle fracture, the steels shall possess adequate fracture energy. Steels for primary structures shall be tested by the Charpy impact (V-notch) method according to ASTM E23. Test temperatures shall be as given in Table 1.

For Extreme/Harsh Climates

Material thickness (t) in mm	Material thickness (t) in inches	Impact test temperature in °F/°C
$t \leq 12$	$t \leq ½$"	*T*D + 10
$12 < t \leq 25$	½" < t ≤ 1"	*T*D
$t > 25$	t > 1"	*T*D - 20

Table 1 - Charpy impact test temperature - Structural steel for primary structural members

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The average energy absorption for base material specimens with their axis parallel to the final rolling direction shall not be less than given in Figure 1. For specimens with their axis transverse to the final rolling direction the valve shall be two thirds of that for longitudinally orientated specimens. Impact energy in welds or in the longitudinal direction in heat affected zones shall be not less than 27 *J* at test temperature (Table 1).

Figure 1 - Charpy V - notch, values for steel

5.2 Rolled and extruded steels in offshore container structures

5.2.1 General requirements

Where required, steels for welding shall be made by either open hearth, electric furnace or the basic oxygen steel process. Steels in the primary structure shall be killed and fine grain treated. Only materials with non-ageing properties shall be used.

5.2.2 Groups of steels

Structural steels for the primary structure shall be carbon steel, carbon-manganese steel, carbon manganese micro-alloyed steel or low-alloyed steel.

5.3 Aluminum

The chemical composition, heat treatment, weldability and mechanical properties shall be suitable for the purpose.

When materials of different galvanic potential are joined together, the design shall be such that galvanic corrosion is avoided.

Aluminum alloys used in offshore containers shall be made by rolling or extruding. Aluminum alloys and tempers specified in Table 4 and 5 may be used. Use of other alloys or tempers shall be subject to special consideration.

Alloy		Temper
ISO 209 – 1	AA	ISO / AA
		HAR / H32 HBR / H34
AlMg 3,5	5154	0 / 0 HAR / H32 HBR / H34
AlMg 4	5086	0 / 0 HAR / H32 HBR / H34
AlMg 3 Mn	5454	0 / 0 HAR / H32 HBR / H34
AlMg 4,5 Mn	5083	0 / 0 HAR / H32 HBR / H34
AlSiMgMn	6082	0 / 0 TB / T4 TE / T5 TF / T6
NOTE AA = American Aluminium Association. These references are included for information as users may encounter these references in practice.		

Table 2 - Aluminum alloys and tempers for rolled products

Alloy		Temper
ISO 209 - 1	AA	ISO / AA
AlSi 0,5 Mg	6063	TB / T4 TF / T6
AlSiMgMn	6082	TF / T6
NOTE AA = American Aluminium Association. These references are included for information as users may encounter these references in practice.		

Table 3 - Aluminum alloys and tempers for extruded products

5.4 Non-metallic materials

Timber, plywood, fiber reinforced plastics and other non-metallic materials shall **not** be used in primary structures.

5.5 Material certificates

Materials used for the construction of offshore containers shall be furnished with documentation. All materials for primary structures shall be identifiable against the certificates.

6 Production

6.1 General

Production shall be performed according to approved drawings, specifications and procedures.

Production documents according to this standard shall be prepared and approved before production starts.

The manufacturer shall ensure the quality of the procedures and facilities used through operation of a quality assurance system.

6.2 Primary structure

6.2.1 General

During production and on the finished product it shall be possible to identify the materials used for the primary structure and link them with the corresponding documentation.

6.2.2 Approved welders

Welders shall be approved in accordance with AWS D 1.1, as appropriate to the materials being used.

6.2.3 Welding procedures

Approved welding procedures shall be used for the welding carried out on the primary structure.

Preliminary welding procedure specifications shall form the basis for the preparation of welding procedure tests.

Welding procedure specifications, welding procedure tests and approval of welding procedures shall be in accordance with relevant parts of AWS D 1.1 or EN 1011-1, *Recommendations for welding of metallic materials - Part* 1: *General guidance* and prEN 1011-2, *Recommendations for welding of metallic materials - Part* 2: *Guidance for ferritic steel* and with the requirements stated below.

Impact tests are required as part of the welding procedure tests. Test temperatures and test results shall comply with the requirements given in **4.1** including Table **1.** For $t >$ 12 mm / 1/2" four sets of impact tests shall be made: one set in the weld metal, one set at the fusion line, one set in the heat affected zone (HAZ) 2 mm / 1/16"away from fusion line and one set 5 mm / 3/16" away from fusion line.

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6.2.4 Inspection of welds

6.2.4.1 General

Welds shall be subject to visual examination for essential non-redundant and non essential primary structures, and other non-destructive examination (NDE) for primary structure from Table 5.

Welds between essential non-redundant and non essential primary structures shall be examined as for non-essential primary structures.

The percentages specified in Table 5 shall apply to the total length of weld for the type of structural assembly in question.

When fuel gas welding is applied, ultrasonic and magnetic particle examination shall be required in addition to radiographic examination.

Category of member	Type of examination			
	I Visual inspection	II Magnetic particle examination [a]	III Ultrasonic examination [b]	IV Radiographic examination [b]
Essential / Non-redundant Primary structure	100 %	100 %	100 % Pad eyes 20 % all other	10 %
Non essential primary structure	100 %	20 %	20 %	10 %
Secondary structure	100 %			

[a] Dye penetrant examination shall be used where magnetic particle examination is not possible.

[b] Depending on material thickness and possibility.

NOTE The categories applicable to the structural members shall be agreed with the certifying body in each case.

Table 5 - Non-destructive examination (NDE) of structural welds

6.2.4.2 Non-destructive examination (NDE) methods

NDE methods, see Table 5, 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 in Table 5 with those in columns III or IV being employed in the event that such is relevant.

Visual	Magnetic Particle	Dye Penetrant	Ultrasonic	Radiography
AWS D1.1	AWS D1.1	ASTM E 1220	ASTM E 164	ASTM E1032
EN 970	EN 1290	EN 571-1	EN 1714	EN 1435

Table 6 - Standards relevant to NDE methods

6.2.4.3 Weld acceptance criteria

	Visual	Magnetic Particle	Dye Penetrant	Ultrasonic	Radiography
	AWS D1.1	AWS D1.1	ASTM E 165	ASTM E 2375	ASTM E 1742
100%	Level 2	Level 2	Level 2	Level 2	Level 2
	EN 25817	AWS D1.1	EN 1289	EN 1712	EN 12517
100%	Level B	Level 1	Level 1	Level 2	Level 1

Table 7 - NDE acceptance criteria

6.2.4.4 Non-Destructive Examination (NDE) Operators

NDE Operators shall be qualified, as ASNT, to a minimum to level 2.

NDE operators shall undertake non-destructive examination in accordance with Table 6 and issue reports as to weld quality, containing the following information as a minimum:

the number of repairs carried out to meet the specified acceptance standard;
the NDE methods and procedures used;
the NDE-parameters necessary for a proper assessment;
confirmation of acceptance or rejection.

6.3 Secondary structure

The fabrication procedure shall reflect the requirement that the secondary structure shall prevent cargo from falling out of the offshore container and, if required, prevent water from entering.

Welds between primary and secondary structures shall be performed as for secondary structures and shall be examined as such.

The welding procedure used for the secondary structure shall be in accordance with the relevant part of AWS D1.1.

7 Marking

7.1 Safety marking

The tops of closed containers and the top rails of open and framed containers shall be marked as follows:

closed containers shall be marked with a band of solid high contrasting color not less than 3" (75 mm) wide or greater round the roof perimeter or 2" (50 mm) highly reflective tape; if the roof of the container is recessed below the top perimeter rail, at least the top surface of the top rail shall be marked;

open and framed containers, shall be marked with a band of solid high visibility contrasting color not less than 3" (75 mm) or greater on the top rails or 2" (50 mm) highly reflective tape.

Where a container is fitted with fork pockets designed for handling the container only when empty (e.g. long baskets) then the words "Empty lift only" shall be clearly displayed near each set of fork pockets.

7.2 Identification markings

Each container shall be marked with a unique container number, issued by the owner, as a prime identifier for use as the common cross-reference on all in-service certification, shipping documentation, etc.

The container number shall be prominently and indelibly, displayed on all sides of the container (as viewed from ground level) in characters of a contrasting color.

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NOTE: For open sided containers it may be necessary to attach panels specifically to carry the container number.

If a container has a roof, the container number shall be displayed on the roof. Where character size is restricted by the available space they should be as large as practicable. The marking shall be carried out in such a way as to avoid incorrect interpretation (e.g. by underlining). Where applicable the lower edge of the marking shall be positioned near the side of the container in which the door is located.

NOTE: In exceptional circumstances the owner may change the container number and re-mark the container accordingly. In this case the inspection plate should be replaced.

7.3 Information markings

The maximum gross weight, the tare weight, and the payload (in pounds/kilograms) should be displayed in characters of a contrasting color.

7.4 Other markings

If the container is fitted with an intermediate deck the payload of the deck shall be displayed on the inside of the container in a position where it is clearly visible at all times, in characters of a contrasting color not less than 2" (50 mm) high.

The user of the container may add additional information marking such as owners name, etc.

8 Plating of containers

8.1 General

Containers shall be fitted with a plate carrying the information specified in 8**.2**

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

The information on the plate shall be in the English language.

The text shall be permanently and legibly marked on the plates in characters not less than 1/8" (4 mm) in height.

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8.2 Information plate

The plate shall contain the following information:

fabricator's serial number
maximum gross weight in pounds/kilograms, at the design sling angle
tare weight in pounds/kilograms
working load limit in pounds/kilograms and intermediate deck payload (if applicable)

NOTE 1 A recommended format for the plate is shown in Figure 2.

NOTE 2 The information plate may be combined with the inspection plate.

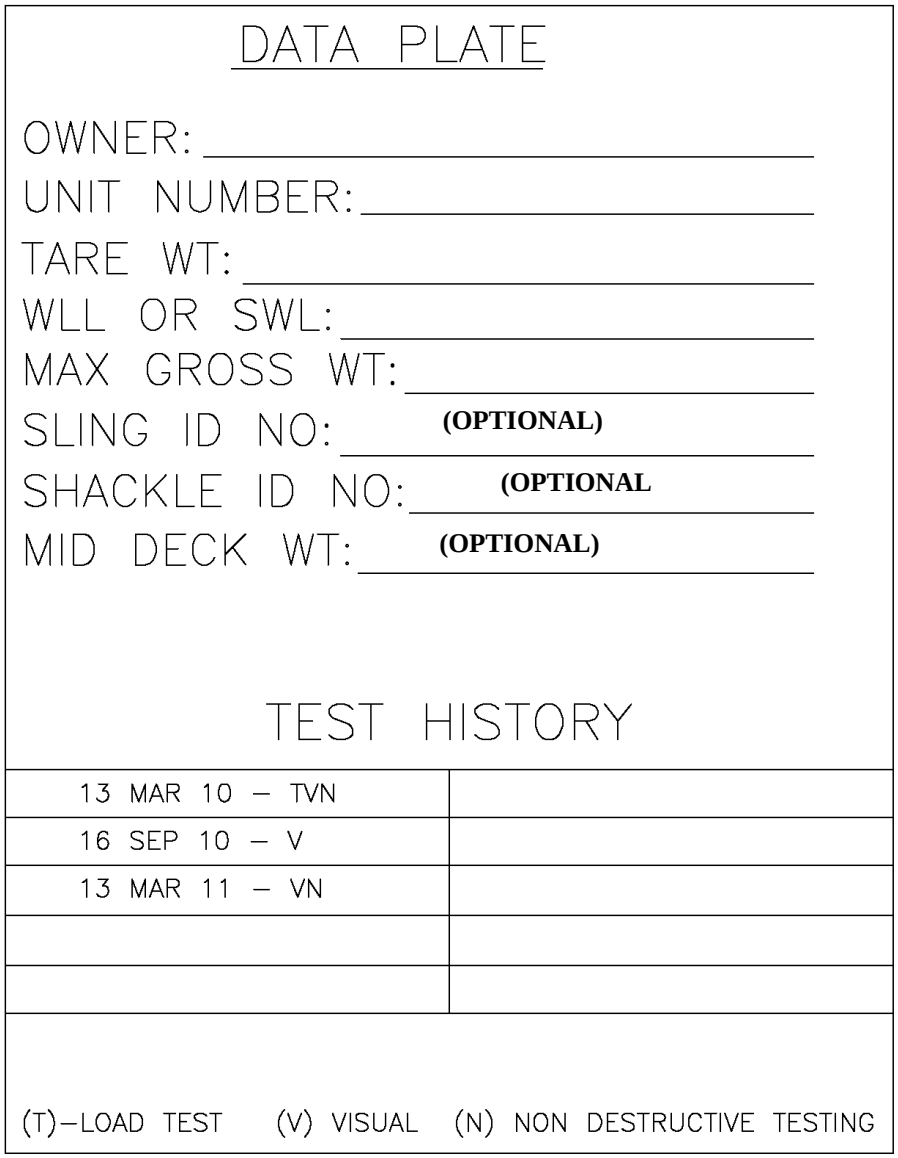
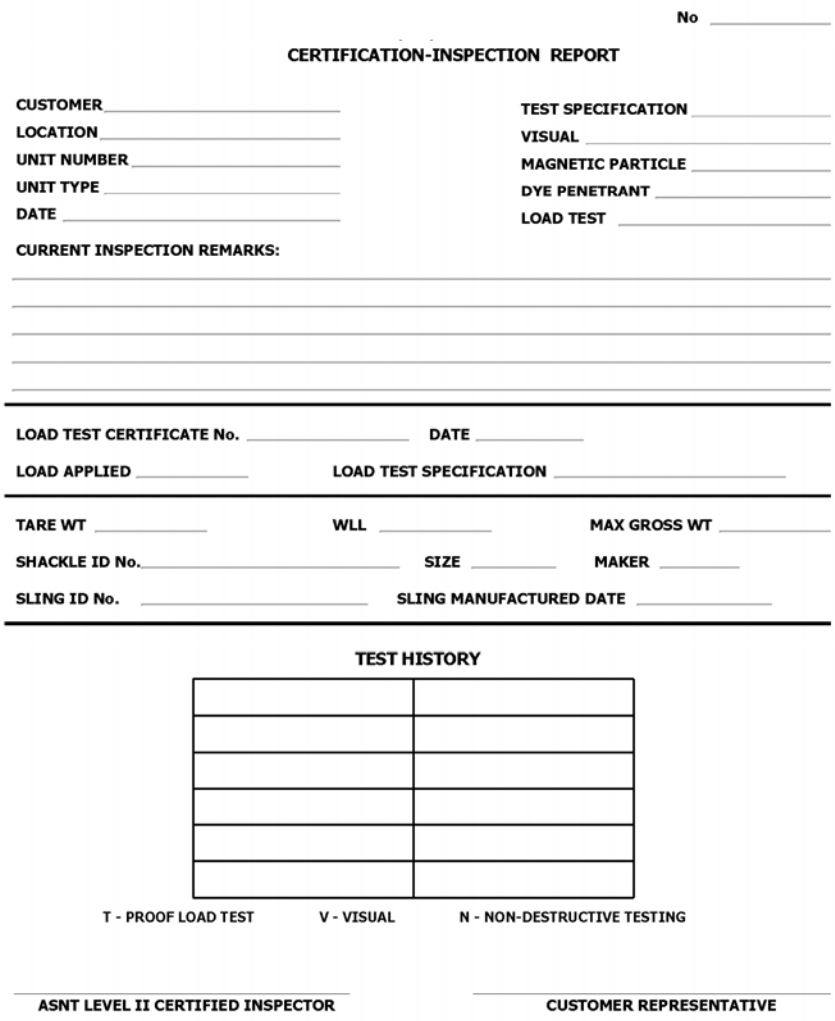


Figure 2 - Example of information plate layout

Note: Sling ID, Shackle ID and Mid Deck Wt. are optional on data plates.

8.3 Inspection Report



No _____

CERTIFICATION-INSPECTION REPORT

CUSTOMER _____ TEST SPECIFICATION _____

LOCATION _____ VISUAL _____

UNIT NUMBER _____ MAGNETIC PARTICLE _____

UNIT TYPE _____ DYE PENETRANT _____

DATE _____ LOAD TEST _____

CURRENT INSPECTION REMARKS:

LOAD TEST CERTIFICATE No. _____ DATE _____

LOAD APPLIED _____ LOAD TEST SPECIFICATION _____

TARE WT _____ WLL _____ MAX GROSS WT _____

SHACKLE ID No. _____ SIZE _____ MAKER _____

SLING ID No. _____ SLING MANUFACTURED DATE _____

TEST HISTORY

T - PROOF LOAD TEST V - VISUAL N - NON-DESTRUCTIVE TESTING

ASNT LEVEL II CERTIFIED INSPECTOR

CUSTOMER REPRESENTATIVE

Figure 4 - Example of Periodic Inspection Report

9 Certificate of conformity

9.1 General

All containers to be used offshore shall be issued with a certificate of conformity to this standard.

The certificate shall be retained by the owner.

In addition, certificates of examination and tests shall be issued as described in **10.2.**

Each container shall have its own fabrication number.

9.2 Documentation

The AECCA certificate of conformity shall be based on the following documentation collated in an "as built" dossier, which shall be retained by the fabricator for at least five years:

structural calculations;

drawings including a general arrangement drawing;

specifications for welding procedures (WPS);

welders certificates;

material certificates;

report on traceability of materials;

report from fabrication inspection;

report from dimensional control;

report from non-destructive examination (NDE);

report from proof testing;

report from final inspection.

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9.3 Contents of the certificate of conformity

The AECCA certificate of conformity shall contain the following information:

container fabrication number;

the Certificate number;

description of the container including:

i) external dimensions;
il) number of lifting points;
iii) name of fabricator;
iv) month/year of fabrication;
v) maximum gross weight in kilograms/pounds;
vi) tare weight in kilograms/pounds;
vii) payload in kilograms/pounds;
viii) reference to the as built dossier;
ix) the total gross mass in kilograms/pounds applicable to the all points lifting test;
x) the actual method of test;
xl) angle of lifting set legs (from vertical);
xii) shackle bolt diameter.

conformity to other requirements and/or codes;

a statement that the container described has been designed, fabricated and tested in accordance with AECCA 2012.1;

remarks;

signature on behalf of the certifying body.

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9.4 Certificate of Conformity for Existing Equipment

Equipment in this category shall be classified by AECCA 2012.1 as Existing Equipment.

All existing equipment must meet the design requirements set forth in section 1 and shall conform to all testing and inspection requirements set forth in section 2.

The AECCA certificate of conformity for Existing Equipment shall contain the following information:

The following documentation must be reviewed and accepted by an AECCA Approved Inspector before being issued an AECCA Approved CCU Information plate along with AECCA Certificate of Conformity.

1. Certified Engineered Stamped Drawings and Calculations
2. Welder Certifications
3. MTR's
4. Procedures for construction and inspection
5. Certificate of Conformity
6. Test History
7. Physical inspection by AECCA Approved Inspector

9.5 Certificate of Conformity for New Equipment

Equipment in this category shall be classified by AECCA 2012.1 as New Equipment.

All new equipment must meet the design requirements set forth in section 1 and shall conform to all testing and inspection requirements set forth in section 2.

The AECCA certificate of conformity for New Equipment shall contain the following information:

The following documentation must be reviewed and accepted by an AECCA Approved Inspector before being issued an AECCA Approved CCU Information plate along with AECCA Certificate of Conformity.

1. Engineered Drawings and Calculations
2. Welder Certifications
3. MTR's
4. Procedures for construction and inspection
5. Certificate of Conformity
6. Test History
7. Physical inspection by AECCA Approved Inspector

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9.6 AECCA Approved Inspector Requirements

All inspectors must meet the minimum requirements set forth in this section. While companies may operate under the title AECCA Approved Inspection company title, every inspector involved with AECCA Inspections shall be an Approved Inspector. Below is a list of minimum requirements in order to be an AECCA Approved Inspector.

1. A minimum of 5 years of field experience with Offshore CCU's
2. A basic knowledge of how to read and interpret drawings
3. ASNT Level II Certification in a minimum of Magnetic Particle Inspection, Dye Penetrant Inspection and Visual Inspection.
4. A basic knowledge of engineering in order to identify critical load path joints.
5. As a minimum 2 year Associates Degree, preferably in an engineering science.
6. Must be familiar with companies AECCA approved procedures which must also be signed off by an ASNT Level III Inspector.

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10 DAMAGE SUSTAINABILITY

10.1 General

The Owner and End User will use this section to help identify equipment deemed to be out of service until the necessary repairs have been made. Any repairs to critical components including but not limited to; critical components or any other damage that would affect the safe use of the Cargo Carrying Unit must be inspected by an AECCA 2012.1 approved Inspector before allowing the equipment to be put back in service.

10.2 Damage and Repair Procedures

The repair facilities used by the Owner shall ensure the quality of the procedures and facilities by a qualiy assurance system at least in accordance with AECCA 2012.1.

If a container is damaged in such a way that it does not comply with this recommended practice it shall not be used until the proper repairs are carried out and inspected by an AECCA 2012.1 approved inspector.

A Cargo Carrying Unit sustaining damage which may affect the safe handling of the unit, the End User shall contact the Owner as soon as practicable.

Any major repair to critical load path joints or padeyes on the Cargo Carrying Unit shall warrant a load test, followed by non destructive inspection and visual inspection.

10.3 Certification

A repair report shall be kept on file by the Owner is to include:

a. Documentation or Drawings showing location of damage
b. Load test certificate, if repairs affect critical load path joints or padeyes
c. Non destructive report stating equipment is ready to resume service

10.4 Record Retention

All documents related to the design, manufacturing and repair shall be kept for the life of the equipment.

a. Professional engineer stamped drawings
b. Professional engineer stamped calculations
c. Repair reports
d. Non compliance reports

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11 LOAD TESTING

11.1 Load Testing

All Cargo Carrying Units shall be subjected to a load test followed by the proper non destructive inspection and visual inspection before being deemed ready for service. A visual examination shall be made prior to any load testing to ensure the equipment is free from any visible defects that would adversely affect the load testing procedure.

The calculated weight for a load test shall be a minimum 2.5 times the Cargo Carrying Units' maximum gross weight (MGW). Cargo Carrying Units shall be load tested in such a way that best simulates the normal working load. Load test shall be performed after major structural repairs/modifications or every 5 years.

11.2 Load Testing Methods

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This section will explain the acceptable methods of load testing CCU's. Load testing shall only be carried out by experienced personnel to minimize damage to the CCU's. A load cell or pressure transducer shall be affixed to any load testing operation and shall be certified yearly to ensure the accuracy of the load test.

11.2.1 Hydraulic Ram (Pushing)

The use of a hydraulic ram attached to a testing apparatus placed in the center of the CCU.

Attach suitable rigging gear based upon 2.5 times the MGW.

Sling angles shall not be less than 45°.

The securing of the unit must be in such a way to simulate the normal loading of the CCU.

11.2.2 Hydraulic Ram (Pulling)

The use of a hydraulic ram attached to a permanent vertical test bed.

Attach suitable rigging gear based upon 2.5 times the MGW.

Sling angles shall not be less than 45°

The securing of the unit must be in such a way to simulate the normal loading of the CCU.

11.2.3 Dead Weight

The use of certified weights attached to CCU and lifted by means of a vertical load test stand or crane.

Certified weights are to be made out of concrete or lead. All weights shall be recertified yearly and have a unique identification number along with the actual weight stamped or spray painted on each piece.

Care shall be used in the storage and handling of certified weights. Damage to any certified weight shall be fixed and recertified.

Attach suitable rigging gear based upon 2.5 times the MGW.

Sling angles shall not be less than 45°

11.3 Single Padeye Pull Testing

Single padeye pull testing shall only be accepted on non critical padeyes, D rings, or equipment tie down points located inside the CCU.

Single padeye pull testing of CCU's padeyes is no acceptable.

Specialty pieces of equipment deemed by the engineer, customer and the inspection agency where single padeye pull testing is accepted shall only be limited to equipment/padeyes that only carries a known static load.

While these types of tests are accepted they should be limited in use, due to weight restrictions on surrounding members. Care should be given not to point load these members.

11.4 Certification

A graph or inspection report shall have a minimum of the following information contained within:

a. Owner of Cargo Carrying Unit
b. Owner unit number
c. Unique load test certificate number
d. Date
e. Load applied
f. Maximum gross weight
g. Inspection Agency

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11.5 Calibration/Certification

Yearly calibration on load cells and pressure transducers shall be carried out by experienced personnel in accordance to ASTM E-4 +/- 1%, traceable to the National Institute of Standards and Technology.

Yearly calibration on certified weights shall be performed by experienced personnel.

11.6 Record Retention

All documents related to the calibration, pull testing and inspection shall be kept for different amounts
of time, see below.

a. Load cell yearly calibration – Updated yearly
b. Certified weights yearly calibration – Updated yearly
c. Pull test report – Kept for 5 years
d. Initial NDT report – Updated yearly

12 CRITICAL RIGGING COMPONENTS INSPECTION

12.1 Shackles

All shackles shall be individually identified by one of the following methods, hard stamping on the body of the shackle or fitting of a tag and wire on the shackle body. Shackles that are captivated in the thimble do not need to be marked. Stamping shall be carried out using low stress stamps in areas specified by shackle manufacturers. All shackles must meet or exceed Federal Specification - RR-C-271D Type IVA, Grade A, Class 3. All shackles on a CCU shall be of the same manufacturer, size, WLL and type (Anchor Bolt). Shackle manufacturers shall be ISO 9001 certified. No screw pin shackles shall be used.

12.1.1 Inspection

The inspection of shackles shall be carried out by the AECCA 2012.1 inspector each time a unit is inspected. Any deformation, inability to read shackle numbers (if shackles are non captivated) or if the shackle pins do not match the shackle bodies then the inspector shall mark the unit out of service until it has been corrected.

See section 14.2 for inspection cycles.

12.2 Wire Rope Sling

All wire slings must conform to the intent of ANSI B30.9.

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12.2.1 Inspection

The inspection of slings shall be carried out by the AECCA 2012.1 inspector each time a unit is inspected. Any deformation or the inability to read the sling tag/tube then the inspector shall mark the unit out of service until it has been corrected.

See section 14.2 for inspection cycles.

12.3 Certification

Annual recertification of slings must be kept on file until superseded by another sling.

All slings shall be traceable to an original manufacturer and date. This information does not have to be present on the sling but must be kept on file.

12.4 Record Retention

All documents related to the proof testing of rigging gear shall be kept for different amounts of time, see below.

Shackle Certificate – Shall be kept on file for the life of the shackles.

Sling Certificate – Annual recertification of slings must be kept on file until superseded by another sling.

13 NONDESTRUCTIVE EXAMINATION OF CRITICAL COMPONENTS

Any component that is directly associated with the areas during lifting shall be considered critical components and must be inspected periodically in conjunction with padeye welds. These items shall be determined in the field by the AECCA 2012.1 inspector or by the engineer that has stamped the drawings and calculations.

13.1 Nondestructive Examination Procedures

All AECCA 2012.1 approved inspection companies shall have their procedures approved and signed by an ASNT Level III inspector.

13.2 Nondestructive Examination Personnel Qualifications

All inspectors shall be a minimum of ASNT Level II in the NDT method being used. And must conform to the information contained with SNT-TC-1A.

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14 INSPECTION CYCLES

14.1 CCU Inspections

14.1.1 Load Testing (5 Year Inspection)

All CCU's shall be load tested prior to being put into initial service, after any major repair to critical components or 5 years from the prior load test.

14.1.2 Non Destructive Testing (6 Month and 1 Year Inspection)

14.1.2.1 Magnetic Particle/Dye Penetrate Inspection

All critical components shall be magnetic particle inspected (ferrous material) or dye penetrate inspected (non ferrous material) after load testing and on a 1 year annual basis until the next load testing cycle.

Any indications found will be marked. The inspector shall determine its relevance and if the CCU shall be taken out of service. If a unit is taken out of service the inspector shall provide options for fixing the relevant indication.

14.1.2.2 Visual Inspection

All CCU's shall be visually inspected every 6 months for any damage to the critical components and/or overall structure and all related welds.

14.2 Sling and Shackle Inspection

14.2.1 Proof Testing (1 Year certification)

All slings shall be visually inspected and proof tested on a yearly basis by competent personnel for a maximum of 5 years.

The rebuilding of legs on a sling is permitted, but the sling age must still be considered from the original manufactured date.

Shackles shall be proof tested prior to being put into service until any major deformation is present.

Sling life shall be determined by the condition of the sling.

After proof testing of shackles has been completed the throat openings shall be measured and compared against manufacturers allowable tolerances.

14.2.2 Visual Inspection (6 Month certification)

All sling sets shall be visually inspected every 6 months to ensure the integrity of the units' lifting set. All inspections shall be carried out by an inspector and ultimately has the authority to have a sling removed and put out of service.

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14.3 Inspection Matrix

	6 Months	1 Year	5 Year
Sling	Visual Inspection (V)	Visual Inspection (V) Proof Test (T)	*
Shackles	Visual Inspection (V)	Visual Inspection (V)	**
CCU's	Visual Inspection (V)	Visual Inspection (V) Non Destructive Testing (N)	Proof Test (T) Visual Inspection (V) Non Destructive Testing (N)

* Remaining sling life shall be determined at this time.

** Remaining shackle life shall be determined at this time. See 14.2.1

15 MARKING

15.1 Data Plate

All units must have a data plate securely attached to the unit. Caution must be taken to ensure that any means of securing the data plate to the unit does not become a potential snag hazard. Data plates must be stamped and markings shall not be smaller than 1/8". See figure 1 for an example. The following information must be present on each data plate:

a. Owner of unit
b. Unit number
c. Tare weight
d. Working load limit
e. Maximum gross weight
f. Shackle number (if applicable)
g. Sling number (if applicable)
h. Mid deck weight (if applicable)
i. Design Temp Range (if applicable)
j. Inspection history
k. Inspection legend

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The plate shall contain the following information:

fabricator's serial number
maximum gross weight in pounds/kilograms, at the design sling angle
tare weight in pounds/kilograms
working load limit in pounds/kilograms and intermediate deck payload (if applicable)

NOTE 1 A recommended format for the plate is shown in Figure 2.

NOTE 2 The information plate may be combined with the inspection plate.

DATA PLATE

OWNER: _____

UNIT NUMBER: _____

TARE WT: _____

WLL OR SWL: _____

MAX GROSS WT: _____

SLING ID NO: **(OPTIONAL)** _____

SHACKLE ID NO: **(OPTIONAL** _____

MID DECK WT: **(OPTIONAL)** _____

TEST HISTORY

13 MAR 10 – TVN	
16 SEP 10 – V	
13 MAR 11 – VN	

(T)–LOAD TEST (V) VISUAL (N) NON DESTRUCTIVE TESTING

Figure 2 - Example of information plate layout

Note: Sling ID, Shackle ID and Mid Deck Wt. are optional on data plates.