

**PART II RULES FOR THE CONSTRUCTION
AND CLASSIFICATION OF SHIPS
IDENTIFIED BY THEIR MISSION**

TITLE 12 CONTAINER SHIPS

SECTION 3 HULL EQUIPMENT

CHAPTERS

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- B DOCUMENTS, REGULATIONS AND STANDARDS
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CHAPTER A

SCOPE

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A1. SCOPE

A2. DEFINITIONS

A1. SCOPE

100. Application

101. The present Title 12 Chapter applies to ships which are eligible for the assignment of the Class Notation “**Container Ship**”.

102. The requirements of this Chapter are additional to those of Part II, Title 11, and Section 2.

A2. DEFINITIONS

100. Definitions

101. Open-top containership means a containership especially designed so that one or more of the cargo holds need not be fitted with hatch covers.

102. Freeboard is the distance between the assigned load line and freeboard deck.

103. Freeboard deck, for the purposes of chapters I and II of Annex I of the International Convention on Load Lines, 1966 (LL 1966), is the freeboard deck according to the LL 1966 as if hatch covers are fitted on top of the hatch coamings.

104. Maximum sustained speed is defined as the maximum service speed taking into account speed loss due to resistance increase in regular waves. Voluntary speed loss is not taken into consideration.

105. Minimum ship manoeuvring speed is defined to be the minimum speed which maintains directional control and is consistent with the operating characteristics of the ship.

106. Green water is sea water other than spray shipped aboard the ship under normal operating conditions.

107. Container lashing fittings: see Table T.A2.107.1 below

TABLE T.A2.107.1 – TYPICAL CONTAINER LASHING FITTINGS

		<p>Container lashing twistlocks</p> <p>Column 1: sample semi-automatic twistlocks Column 2: sample breech base twistlock</p> <p>Pass compression, shear and tension loads.</p> <p>Placed between containers in a stack and slots into corner castings.</p>
		<p>Container lashing stacking cones</p> <p>Column 1: sample bottom stacker Column 2: sample single flanged stacker</p> <p>Pass compression and shear loads only. To prevent horizontal movement of 20 foot containers on 40 foot guides.</p> <p>Placed between containers in a stack and slots into corner castings.</p>
		<p>Container lashing cloverleaf</p> <p>Column 1: sample flush cloverleaf Column 2: sample cloverleaf raised from deck</p> <p>Locating of base twistlocks or stacking cones in the cargo hold.</p>
		<p>Container lashing "D" ring</p> <p>Column 1: sample "D" ring Column 2: sample removable "D" ring</p> <p>Tie down point for turnbuckle on deck or hatch cover</p>
		<p>Container lashing bridge fitting</p> <p>Column 1: sample tension bridge fitting Column 2: pressure and tension bridge fitting</p> <p>Forms a tight connection in tension, or both tension and compression.</p>
		<p>Container lashing bar (rod)</p> <p>Normally built from high tensile steel . Flexible in handling containers of different heights (standard and "high cube").</p> <p>To provide support for container stacks on deck. Used in conjunction with a turnbuckle</p>
		<p>Container turnbuckles</p> <p>Column 1: sample knob type container turnbuckle Column 2: sample hook-to-jaw turnbuckle</p> <p>Tensioning devices usually require an additional rod or tool to turn the barrel or body of the turnbuckle as it is tightened or loosened. The maximum range of operation (minimum to maximum working length) is one of the primary factors determining the working length of the entire lashing assembly.</p> <p>To connect a lashing rod to a lashing plate or "D" ring. By tightening, puts tension into a lashing rod.</p>

CHAPTER B DOCUMENTS, REGULATIONS AND STANDARDS

CHAPTER CONTENTS

- B1. DOCUMENTS FOR APPROVAL
 - B2. REGULATIONS
 - B3. STANDARDS
-

B1. DOCUMENTS FOR APPROVAL

100. Documents for approval

101. In addition to the documents listed in Part II, Title 11, Section 3, Chapter B, the following plans are to be submitted for container ships:

- a. Stowage arrangement of containers including stacking loads and height;
- b. Location of container supports and their connection to hull.
- c. Load diagram of the stresses transmitted to the hull by the system components, in special the lashing diagram;
- d. supporting structures and means of connection to the hull
- e. A list and/or a plan of all the fixed securing devices, indicating their location on board, is to be provided. For each type of fixed securing device, the following information is to be indicated:
 - e.1. type designation
 - e.2. sketch of the device
 - e.3. material
 - e.4. breaking load
 - e.5. maximum securing load.

B2. REGULATIONS

100. National and International regulations

101. National and International regulations apply as relevant, such as:

- a. IMO International Convention for Safe Containers (CSC), 1972.

- b. IMO MSC/Circ.608 “Interim Guidelines for open top container ships.

B3. STANDARDS

100. Applicable standards

101. The present Title takes into consideration the following standards:

- a. ISO 668 - Series 1 freight containers - Classification external dimensions and ratings
- b. ISO 830 - Terminology in relation to freight container
- c. ISO 1161 - Series 1 freight containers - Corner fittings specification
- d. ISO 1496-1 - Series 1 freight containers - Specification and testing part 1: General cargo containers for general purposes

CHAPTER D
SPECIFIC SYSTEM REQUIREMENTS

CHAPTER CONTENTS

- D1. LIFTING APPLIANCES AND SERVICES
- D2. ANCHORING, MOORING AND TOWING
See Part II, Title 11, Section 3, D2.
- D3. MANOEUVERING SYSTEMS
See Part II, Title 11, Section 3, D32.
- D4. LIFE SAVING APPLIANCES (LSA)
See Part II, Title 11, Section 3, D4.
- D5. FIRE DETECTION, PREVENTION,
PROTECTION AND FIGHTING
See Part II, Title 11, Section 3, D5.
- D6. HULL OPENING: MEANS OF PROTECTION
AND CLOSURE
See Part II, Title 11, Section 3, D6.
- D7. HULL EQUIPMENT: FITTINGS AND
ACCESSORIES
See Part II, Title 11, Section 3, D7.

D1. LIFTING APPLIANCES AND SERVICES

100. Application

101. The present Subchapter D1 applies to handling, lashing and securing of containers.

102. In case there are ship's lifting appliances for handling the containers, the RBNA "Guide to Lifting Appliances" applies.

200. Definitions

201. **Container lashing and securing** means the system of container lashing appliances as defined in Table T.A2.107.1, including the cell guides.

300. Arrangement

301. Combinations of lashing equipment are used to secure containers to ship decks.

302. Containers shall not be stowed in locations above and below deck that preclude access for inspection and maintenance of equipment or systems required for safe operation of the vessel.

303. In general, containers shall not be stowed on deck beyond the sides of the vessel.

304. The equipment consists of twistlocks used in combination with turnbuckles, rods, stacking cones and bridge fittings.

305. On a container ship deck, the containers are often stacked five tiers high or even higher. The two or three lowest tiers are often slotted into the stacking cones and secured to the deck by means of turnbuckles connected with diagonal lashing rods. The container stacks may be secured using only lock fittings (twistlocks) at all four corners between tiers and between the base sockets and the bottom corner castings. This system may be used for securing stacks with one or more containers depending on the location, accelerations, and the wind load (if located above the weather deck). Restraint against tipping is provided by locking devices at the base of each tier.

FIGURE F.D1.305.1 – TYPICAL LASHING BRIDGE ARRANGEMENT (SHOWN 4 HIGH)

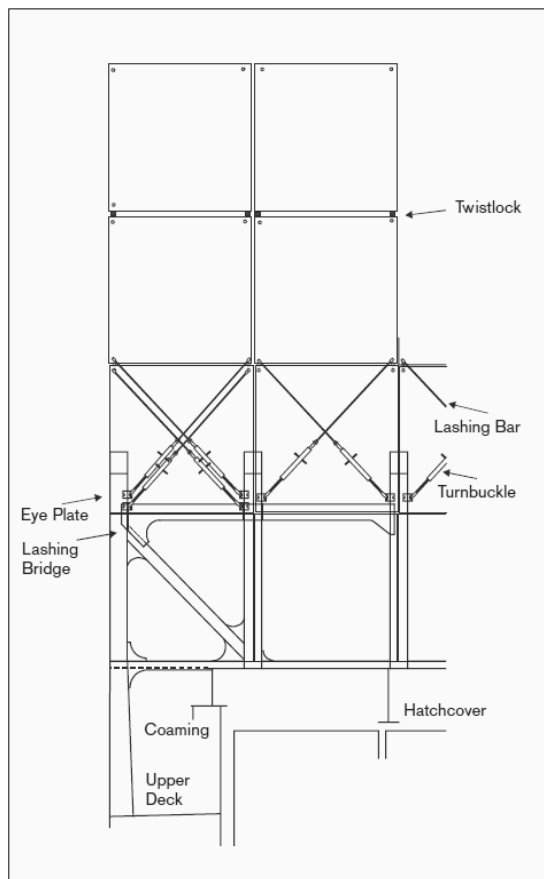


FIGURE F.D1.305.2 – TYPICAL CONTAINER VESSEL HATCHCOVER’S LASHING ARRANGEMENT

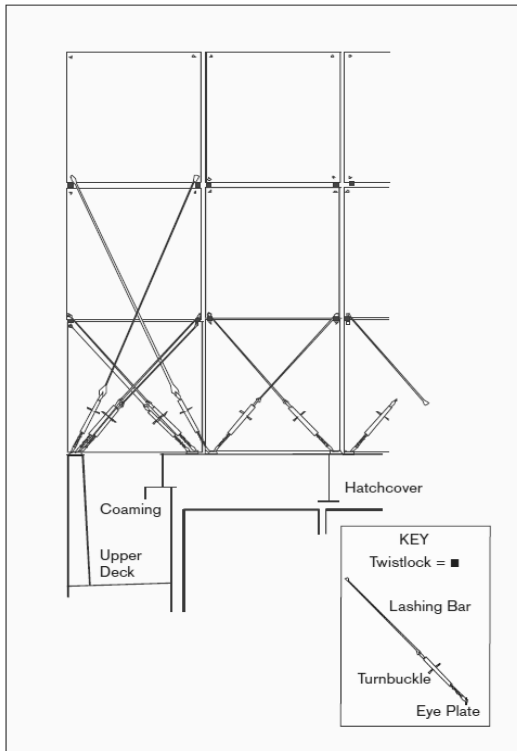


FIGURE F.D1.305.3 – TYPICAL “ON LID” ARRANGEMENT



400. Design principles

401. The maximum allowable loads, according to ISO 1496-1-1990 are as follows:

TABLE T.D1.401.1 – MAXIMUM ALLOWABLE LOADS ACCORDING TO ISO 1496-1: 1990

	ISO 1496-1:1990	
	20 ft	40 ft
Horizontal force from lashing on container fitting acting parallel to the side face	15,0	15,0
Horizontal force from lashing on container fitting acting parallel to the end face	22,5	22,5
Vertical force from lashing on container fitting acting parallel to the end or side face	30,0	30,0
Racking force on container end	15,0	15,0
Racking force on container side	10,0	10,0
Vertical forces at each top corner, tension	25,0	25,0
Vertical forces at each bottom corner, tension	25,0	25,0
Vertical forces at each corner post, compression	86,4	86,4
Transverse forces acting at the level of and parallel to the top face, tension or compression	34,0	34,0
Transverse forces acting at the level of and parallel to the bottom face, tension or compression	50,0	50,0

402. Attached part on the structure of the hull need to be dimensioned in accordance with the combined stress and is

not taken greater than the value calculated with the following equation:

$$\sigma_c = \sqrt{\sigma^2 + 3 \times \tau^2} = 15,6 \text{ daN/mm}^2 \\ (16 \text{ kgf/mm}^2)$$

403. The base structure shall be designed to withstand all forces, particularly lateral forces, induced by the cargo in service. This is particularly important where provisions are made for securing of cargo to the base structure of the container.

D6. HULL OPENINGS AND MEANS OF CLOSURE

100. Definitionss

- See Part II, Title 11, Section 3, D6.

200. Hatchcovers

201. to 203. - See Part II, Title 11, Section 3, D6.

204. Hatch covers supporting containers shall be dimensioned in accordance with Part II, Title 11, Section 3, Chapter H.

205. The container lashing fittings on the hatch coamings shall be dimensioned according to the loads they transmit, taking into consideration the stresses introduced by the containers due to the container weights, ship's movements and wind force.

300. Access hatches

- See Part II, Title 11, Section 3, D6

400. Manholes

- See Part II, Title 11, Section 3, D6

500. Side shell openings

- See Part II, Title 11, Section 3, D6

600. Bottom and drain plugs

- See Part II, Title 11, Section 3, D6

700. Dangerous goods carried on open top container ships

[IMO MSC/Circ.608 "Interim Guidelines for open top container ships"]

- a. dangerous goods for which "on deck only" stowage is specified in the IMO IMDG Code, should not be carried in or vertically above open-top container holds.
- b. in addition, containers with dangerous goods extending more than 1 m above the top of the watertight upper boundary around an open-top container hold and containing liquids, gases or vapours heavier than air and for which "on deck only" stowage is specified, should not be carried within one container space horizontally from the boundary of the open-top container holds.
- c. dangerous goods other than those described in D1.101 should not be carried in or vertically above open-top container holds unless such holds are in full compliance with regulation II-2/54 of SOLAS 1974, as amended, applicable to enclosed container cargo spaces, as appropriate for the cargo carried.
- d. containers with dangerous goods extending more than 1 m above the top of the watertight upper boundary around an open-top container hold should not be carried within one container space, horizontally from the boundary of an open-top container hold unless that hold is in full compliance with regulation II-2/54 of SOLAS 1974, as amended, applicable to enclosed container cargo spaces, as appropriate for the cargo carried.
- e. instead of the table of segregation of freight containers on board container ships contained in section of the IMDG Code, the table contained in the appendix hereto should be applied for segregation of dangerous goods for open-top container holds.

TABLE T.D6.700.1. SEGREGATION OF FREIGHT CONTAINERS FOR OPEN TOP CONTAINERSHIP HOLD

SEGREGATION REQUIREMENT	VERTICAL			HORIZONTAL						
	CLOSED VERSUS CLOSED	CLOSED VERSUS OPEN	OPEN VERSUS OPEN		CLOSED VERSUS CLOSED		CLOSED VERSUS OPEN		OPEN VERSUS OPEN	
					ON DECK	UNDER DECK	ON DECK	UNDER DECK	ON DECK	UNDER DECK
"AWAY FROM"	ONE ON TOP OF THE OTHER PERMITTED	OPEN ON TOP OF CLOSED PERMITTED	NOT IN THE SAME VERTICAL LINE	FORE AND AFT	NO RESTRICTION	NO RESTRICTION	NO RESTRICTION	NO RESTRICTION	ONE CONTAINER SPACE	ONE CONTAINER SPACE OR ONE BULKHEAD
		OTHERWISE AS FOR OPEN VERSUS OPEN		ATHWART-SHIPS	NO RESTRICTION	NO RESTRICTION	NO RESTRICTION	NO RESTRICTION	ONE CONTAINER SPACE	ONE CONTAINER SPACE
"SEPARATED FROM" 2	NOT IN THE SAME VERTICAL LINE	AS FOR OPEN VERSUS OPEN	NOT IN THE SAME VERTICAL LINE	FORE AND AFT	ONE CONTAINER SPACE	ONE CONTAINER SPACE OR ONE BULKHEAD	ONE CONTAINER SPACE	ONE CONTAINER SPACE OR ONE BULKHEAD	ONE CONTAINER SPACE AND NOT ABOVE SAME HOLD	ONE BULKHEAD
				ATHWART-SHIPS	ONE CONTAINER SPACE	ONE CONTAINER SPACE	TWO CONTAINER SPACES	TWO CONTAINER SPACES	TWO CONTAINER SPACES AND NOT ABOVE SAME HOLD	ONE BULKHEAD
"SEPARATED BY A COMPLETE COMPARTMENT OR HOLD FROM" 3		AS FOR OPEN VERSUS OPEN	NOT IN THE SAME VERTICAL LINE	FORE AND AFT	ONE CONTAINER SPACE AND NOT ABOVE SAME HOLD	ONE BULKHEAD	ONE CONTAINER SPACE AND NOT IN OR ABOVE SAME HOLD	ONE BULKHEAD	TWO CONTAINER SPACES AND NOT ABOVE SAME HOLD	TWO BULKHEADS
				ATHWART-SHIPS	TWO CONTAINER SPACES AND NOT ABOVE SAME HOLD	ONE BULKHEAD	TWO CONTAINER SPACES AND NOT ABOVE SAME HOLD	ONE BULKHEAD	THREE CONTAINER SPACES AND NOT ABOVE SAME HOLD	TWO BULKHEADS
"SEPARATED LONGITUDINALLY BY AN INTERVENING COMPLETE COMPARTMENT OR HOLD FROM" 4	PROHIBITED		NOT IN THE SAME VERTICAL LINE	FORE AND AFT	MINIMUM HORIZONTAL DISTANCE OF 24 m AND NOT ABOVE SAME HOLD	ONE BULKHEAD AND MINIMUM HORIZONTAL DISTANCE OF 24 H *	MINIMUM HORIZONTAL DISTANCE OF 24 m AND NOT ABOVE SAME HOLD	TWO BULKHEADS	MINIMUM HORIZONTAL DISTANCE OF 24 m AND NOT ABOVE SAME HOLD	TWO BULKHEADS
				ATHWART-SHIPS	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED

*container not less than 6 m from intervening bulkhead

NOTE:

All bulkheads and decks should be resistant to fire and liquid.

CHAPTER E
FIRE PROTECTION, FIRE DETECTION AND FIRE
EXTINCTION FOR SHIPS HAVING GROSS
TONNAGE GT ≥ 500

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- E1. GENERAL
- E2. FIRE SAFETY OBJECTIVES AND FUNCTIONAL REQUIREMENTS
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- E3. DEFINITIONS
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- E4. PROBABILITY OF IGNITION
See Part II, Title 11, Section 3, Chapter E1
- E5. FIRE GROWTH POTENTIAL
See Part II, Title 11, Section 3, Chapter E1
- E6. SMOKE GENERATION POTENTIAL AND TOXICITY
See Part II, Title 11, Section 3, Chapter E1
- E7. DETECTION AND ALARM
- E8. CONTROL OF SMOKE SPREAD
See Part II, Title 11, Section 3, Chapter E1
- E9. CONTAINMENT OF FIRE
- E10. STRUCTURAL INTEGRITY
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- E11. FIRE FIGHTING
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- E13. ALTERNATIVE DESIGN ARRANGEMENTS
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- E14. PROTECTION OF VEHICLE, SPECIAL CATEGORY AND Ro-Ro SPACES
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- E15. CASUALTY THRESHOLD, SAFE RETURN TO PORT AND SAFE AREAS
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- E16. DESIGN CRITERIA FOR SYSTEMS TO REMAIN OPERATIONAL AFTER A FIRE CASUALTY
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- E17. SAFETY CENTRE ON PASSENGER SHIPS
See Part II, Title 11, Section 3, Chapter E1

E7. DETECTION AND ALARM

100. Application

101. The requirements of the present Subchapter E7 apply for open type container ships, and are additional to those in Part II, Title 11, Section 3, E7.

200. Fire detection system in open hold area of open top container ships

201. Whenever a fire detection system is required in the open hold area, the fire detection system shall be designed and arranged to take account of the specific hold and container configuration and ventilation arrangement.

E9. CONTAINMENT OF FIRE

100. Application

101. The requirements of the present Subchapter E9 apply for open type container ships, and are additional to those in Part II, Title 11, Section 3, E9.

200. Fire protection requirements

201. The fire protection system for open-top container holds shall be based on the philosophy of containing the fire in the bay of origin and to cool adjacent areas to prevent structural damage.

E11. FIRE FIGHTING

100. Application

101. The requirements of the present Subchapter E11 apply for open type container ships, and are additional to those in Part II, Title 11, Section 3, E11.

200. Fixed water spray system

201. Open-top container holds shall be protected by a fixed water spray system. The system shall be capable of spraying water into the cargo hold from deck level downward. The system shall be designed and arranged to take account of the specific hold and container configuration. If found necessary, RBNA may require a full-scale test.

202. The water spray system should be able to effectively contain a fire in the container bay of origin. The spray system shall be subdivided, with each subdivision to consist of a ring-line at deck level in an open cargo hold around a container bay.

203. The water spray system shall be capable of spraying the outer vertical boundaries of each container bay in an open cargo hold and of cooling the adjacent structure. The uniform application density should be not

less than 1.1 liters/min/m². At least one dedicated fire extinguishing pump for the hold water spray system with a capacity to serve all container bays in any one open-top container hold simultaneously shall be provided. The pump(s) shall be installed outside the open-top area. The availability of water to the water spray system shall be at least 50% of the total capacity, with adequate spray patterns in the open-top container hold, and with any one dedicated pump inoperable. For the case of a single dedicated water spray pump this may be accomplished by an interconnection to an alternative source from the weather deck.

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