

40'x8'x9'6"

TECHNICAL SPECIFICATION

FOR

STEEL OPEN HARD TOP CONTAINER

40' x 8' x 9'6" ISO 1AAA TYPE (Bamboo Floor)

MODEL NO

: CX14-41HTO01

SPEC. NO

: CX14-41HTO01-S

DATE OF ISSUE : Aug 03, 2019

INDEX

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	General	2
2	Dimensions and Ratings	4
3	Materials	5
4	Construction	6
5	Surface preservation	11
6	Markings	12
7	Testing and Inspections	13
8	Guarantee	14

1. General

1.1 Scope

This specification will cover the design, construction, materials, testing and inspection performances of 40' x 8' x 9'6" ISO 1AAA type steel open hard top containers.

These containers specified herein will be manufactured at (hereinafter referred to under strict quality control by and be approved by the classification society or agency.

1.2 Operational environment

The container will be designed and constructed for carriage of general cargo by marine (on or below deck), road and rail throughout the world. All materials used in the construction will be to withstand extremes of temperature range from -30°C (-22°F) to +70°C (+176°F) without effect on the strength of the basic structure and watertightness.

1.3 <u>Standards and Regulations</u>

The container will satisfy the following requirements and regulations, unless otherwise mentioned in this specification.

1.3.1 <u>ISO Container Standards</u> (1AAA type)

ISO 668 -- Series 1 freight containers - Classification external dimensions and ratings [Amd. 1993 (E)]
 ISO 830 -- Terminology in relation to freight container (Amd. 1988)
 ISO 1161 -- Series 1 freight containers - Corner fittings Specification (Amd. 1990)

ISO 1496-1 -- Series 1 freight containers - Specification and testing.

part 1: General cargo containers for general purposes (Amd.2 - 1998)

ISO 6346 -- Freight containers - coding, identification and marking - 1995(E)

1.3.2 T.I.R. Certification

All the containers will be certified and comply with "The Customs Convention on the International Transport of Goods under the cover of T.I.R. Carnets." or "The Customs Convention on Containers."

1.3.3 <u>C.S.C. Certification</u>

All the containers will be certified and comply with the requirements of the "International Convention for the Safe Containers."

1.3.4 <u>T.C.T. Certification</u>

All exposed wooden components used for container will be treated to comply with the requirements of Department of Agriculture and Water Resources (DAWR) regulations: Australian Biosecurity Import Conditions (BICON).

1.3.5 Classification society

All the containers will be certified for design type and individually inspected by classification

society, BV, ABS, or LR,

Note:

BV

Bureau Veritas (France)

ABS :

.

American Bureau of Shipping (USA)

LR

Lloyd's Register of Shipping (UK)

1.4 Handling

The container will be constructed to be capable of being handled without any permanent deformation under the following conditions:

- a) Lifting, full or empty, at top corner fittings vertically by means of spreaders fitted with hooks, shackles or twistlocks.
- b) Lifting, full or empty, at bottom corner fittings using slings with terminal fittings at any angles between vertical and 30 degrees to the horizontal.
- c) Lifting, empty, at forklift pockets using forklift truck.

1.5 <u>Transportation</u>

The container will be constructed to be suitable for transportation in the following modes:

a) Marine:

In the ship cell guides of vessels, seven (7) high stacked.

On the deck of vessels, four (4) high stacked and secured by vertical and

diagonal wire lashings.

b) Road

On flat bed or skeletal chassis, secured by twistlocks or equivalent at the

bottom corner fittings.

c) Rail

On flat cars or special container cars secured by twistlocks or equivalent at

the bottom corner fittings.

dbove.
bove. ollowing
bove. ollowing
bove.
bove.
bove. ollowing
bove.
bove. ollowing
following

3. **Materials**

3.1

<u>General</u>
The following materials will be used in the construction of containers.
<u>Part specification</u>

3.2

	<u>Parts</u>	Materials		
1)	Door panels			
	Side panels	Anti-Corrosive Steel:		
	Front panels	CORTEN A, SPA-H, B480 or equivalent		
	Top panels	Y.P. : 35 kg/sq. mm		
	Top side rails (upper)	T.S. : 49 kg/sq. mm		
	Cross members			
	Bottom side rails			
	Floor guide rail			
	Gooseneck tunnel			
	Door sill			
	Door header			
	Door horizontal frames			
	Door vertical frames			
	Rear corner posts (outer)			
	Front top end rail (upper)			
	Front bottom end rail			
	Front corner posts			
	Floor centre rail			
2)	Cone damage protector	Structural Steel: SS400		
	Lashing fittings	Y.P. : 25 kg/sq. mm		
		T.S. : 41 kg/sq. mm		
3)	Rear corner posts (inner)	Rolled high tensile steel: SM490A or		
		equivalent material		
		Y.P. : 33 kg/sq. mm		
		T.S. : 50 kg/sq. mm		
4)	Door Locking bars	Structural steel round pipe: STK41		
	Roof bow	Y.P. : 25 kg/sq. mm		
		T.S. : 41 kg/sq. mm		
5)	Corner Fitting	Casted weldable steel: SCW480		
٥)	Corner i itting	Y.P. : 28 kg/sq. mm		
		T.S. : 49 kg/sq. mm		
		3 1		
6)	Locking gear cams and keepers	Forged weldable steel: S20C		
		Y.P. : 23 kg/sq. mm		
		T.S. : 44 kg/sq. mm		
7)	Door hinge pins	Stainless steel: SUS304		
	Door gasket retainer			
	Locking device pins			
8)	Floor board	Bamboo floor, 21-ply		
9)	Door gasket	EPDM		
	Roof gasket			

Y.P. --- Yielding Point T.S. --- Tensile Strength * Note:

4. Construction

4.1 General

- 4.1.1 The container will be constructed with steel frames, fully vertical-corrugated steel sides and front wall, horizontal-corrugated steel double doors at rear end, Bamboo flooring, removable roof cover and corner fittings.
- 4.1.2 One gooseneck tunnel, two removable covers and a removable top rail will be provided.
- 4.1.3 All steelwork will be built up by means of automatic and semi-automatic CO₂ gas arc welding (MAG welding). All welds of exterior including the base frames will be continuous welding on both sides except welds of joints for flooring.
- 4.1.4 Interior welds will be intermittent with a minimum bead length of 15mm for every 300mm about.
- 4.1.5 Welds will be even bead and have full penetration without undercut or porosity.
- 4.1.6 Gaps between adjacent components to be welded will not exceed 3mm or the half thickness of the parts being welded which is the smaller.
- 4.1.7 The internal bend radius of the pressed section of the steel will be less than 1.0 time the thickness of the material being pressed.
- 4.1.8 Chloroprene sealant is to be applied at periphery of floor surface and inside unwelded seams, butyl sealant is used to caulk at invisible seam of floor joint area and between door gasket and rame.

4.2 Protrusion

- 4.2.1 The upper faces of the top corner fittings will protrude above the highest level of the roof cover by 6mm.
- 4.2.2 For the containers under empty condition the lower faces of the cross member in their bases including their end transverse members shall be on a plane located at 17mm above the lower faces of the bottom corner fittings except the corner plates.
- 4.2.3 The outside faces of the corner fittings will protrude from the outside faces of the corner posts by minimum 4mm for side structure and 4mm for front end structure.
- 4.2.4 The outside faces of the corner fittings will protrude from side wall by nominal 8mm and from the outside face of the end wall by 8mm.
- 4.2.5 For the containers under the condition such as the load equal to 1.8R-T is uniformly distributed over the floor, no part of the base of container will protrude more than 6.0mm below the plane formed by the lower faces of the bottom corner fittings at the time of maximum deflection.

4.3 Corner fittings

The corner fittings will be designed in accordance with ISO 1161 (Amd. 1990) and manufactured at the works approved by classification society.

4.4 Base frame structure

Base frame will be composed of two (2) bottom side rails, a gooseneck tunnel and totally twenty-eight (28) cross members.

4.4.1 Bottom side rail

Each bottom side rail is built of 52x30x155x28xt4.5mm thick cold-formed double "Z" section steel made in one piece. The lower flange of the bottom side rail is outward so as to facilitate easy removal of the cross members during repair and of less susceptible corrosion. Reinforcement plates are to be made of 4.0mm thick angle section steels. The angle steels are welded to bottom corner fitting.

4.4.2 Gooseneck tunnel

The gooseneck tunnel consists of 4.0mm thick pressed hat section steel plate, twelve 4.0mm thick pressed channel section bows which are welded to the top plate, one 4.0mm thick enclosed section tunnel rear bolster which is a rectangular hollow section steel or separated into two "C" section parts, and sixteen 4.0mm thick tunnel outriggers.

The gooseneck tunnel is designed in accordance with ISO requirements.

4.4.3 Cross member

The cross members are made of pressed channel section steel with a dimension of 45x122 x45x4.0 mm for the normal areas and 75x122x45x4.0mm for the floor butt joints. The cross members are placed fully to withstand floor strength and welded to each bottom side rail. Three (3) pieces of 4.0mm gussets to be fully welded at each inside of floor joint crossmember.

4.5 Flooring

The floor will consist of twelve pieces bamboo floor boards, floor center rail, and self-tapping screws.

4.5.1 Floor

The bamboo floor to be constructed with 28mm thick min.19-ply bamboo boards which is the first three layers on top/bottom the grain should be in longitudinal direction are laid longitudinally on the transverse members and the floor centre rail of 4.0mm thick flat bar painted with internal paint system. The floorboards are tightly secured to each member by self-tapping screws, and all butt joint areas and peripheries of the floorboards are caulked with sealant.

1) Wood species: bamboo

2) Glue : Phenol-formaldehyde resin.

3) Treatment :

a) Preservative: MEGANIUM 2000 or others

in accordance with Australian Health Department Regulations.

b) Average moisture content will be 12% before installation.

4.5.2 Self-tapping screw

Each floor board is fixed to the transverse members by zinc plated self-tapping screws that are 8.0mm dia. shank x 16mm dia. head x 45mm length, and fastened by four screws per cross member but five screws at joint areas. Screw heads are to be countersunk through about 2mm below the

floor top surface.

4.6 Rear frame structure

The rear frame will be composed of one door sill, two corner posts, one door header and four corner fittings, which will be welded together to make the door-way.

4.6.1 Door sill

The door sill to be made of a 4.5mm thick pressed open section steel is reinforced by four internal gussets at the back of each locking cam keeper location.

The upper face of the door sill has a 10mm slope for better drainage.

A 200 x 75mm section is cut out at each end of the door sill and reinforced by a 200 x 75mm channel steel as a protection against handling equipment damages.

4.6.2 Rear corner post

Each rear corner post of hollow section is fabricated with pressed, 6.0mm thick, steel outer part and 40x113x12mm hot-rolled channel section steel inner part, which are welded continuously together to ensure a maximum width of the door opening and to give a sufficient strength against stacking and racking forces.

Four (4) sets of hinge pin lugs are welded to each rear corner post.

4.6.3 Door header

The swing header is constructed from a lower part of a 6.0mm thick pressed "U" shaped steel pressing with internal stiffener ribs at the location of the back of cam keeper and an upper part of a 4.5mm thick steel pressing rear header plate with angle served as top frame support, they are welded together to form a box section to provide a high rigidity. The removable header is capable of swinging to either side through an arc greater than 90 degrees.

The swing header is supported by two hinges having 22.5 mm dia. stainless steel hinge pin and provided with EPDM rubber gasket to prevent the leakage of the water into the container. The hinge pins additional a small chain to prevent the pins drop down and even disappears when removable the headers away

4.7 Door

- 4.7.1 Each container will have double wing doors at rear end frame, and each door will be capable of swinging approximately 270 degrees.
- 4.7.2 Each door is constructed with 3.0mm thick pressed channel section steel horizontal frames for the top and bottom, 100x50x3.2mm thick rectangular hollow section vertical frames for both post side and center side of door respectively, 2.0mm thick horizontally corrugated steel door panel, which are continuously welded within frames.
- 4.7.3 Two sets of galvanized "HH-ET" or equivalent model locking assemblies with steel handles are respectively fitted to each door using high tensile zinc plated steel bolts according to TIR requirements. Locking bar retainers are fitted with nylon bushings at the top, bottom and intermediate bracket.
- 4.7.4 The left-hand door can not be opened without opening the right-hand door when the container is sealed in accordance with TIR requirements.

- 4.7.5 The door hold-back of nylon rope is provided to the centre locking bar on each door and a hook of steel bar is welded to each bottom side rail.
- 4.8.5 Each door is suspended by hinges being provided with stainless steel pins, self-lubricating brass bushings and stainless steel washers, which are placed at the hinge lugs of the rear corner posts.
- 4.7.7 The door gasket to be made of an extruded double lip type (J-C type vertical and upper are "J", lower is "C") EPDM rubber is installed to the door peripheral frames with stainless steel gasket retainers which must be caulked with butyl sealant before installation of gasket, and fastened by stainless steel rivets at a pitch of 150mm.

4.8 Roof structure

The roof constructed with two sets removable hard-top with overlapping area at center of the container, and each removable hard-top constructed with roof frame, roof panel, top lift device, roof locking mechanisms and seal gasket.

4.8.1 Roof frame

The roof frame will be constructed with two (2) side rails, two (2) end rails and four (4) reinforcement.

Side rail: 100x48x5.3mm channel section End rail: 100x48x5.3mm channel section Reinforcement: 80x40x3.0mm square tube

4.8.2 Roof panel

The roof panel of each cover will be constructed by five 2.0 mm thick die-stamp corrugated steel sheets with a certain upwards at the centre of each trough and corrugation. These sheets are butt

welded together to form one panel and continuously welded to the roof frame.

4.8.3 Lift rings

Four (4) sets of Top lift devices are welded to each roof panels.

Bar: 20 mm in diameter. Center distance: 2080 mm

Reinforcement plate: A 3mm thickness plate will be welded under each lifting bar.

4.8.4 <u>Locking mechanism</u>.

Five (5) sets of roof locking mechanism are provided on each side wall.

4.8.5 Seal gasket

An EPDM roof gasket is glued inside of roof frame for water tightness.

4.8.6 <u>Adjustable roof bowst</u>

Four(4) adjustable roof bows are hot-dip galvanized tubes Φ 34 x 3.2 mm, Both end of each adjustable roof bow are suspended by the roof bow sockets which welded to each top side rail.

4.9 Top side rail

Each top side rail is used a square steel pipe and one top support angle as top frame support.

Top side rail: 150 x 100 x 4.0 mm Top support angle: 4.5 mm thick

4.10 Side wall

The trapezium section side wall is constructed with 2.0mm thick fully vertically continuous corrugated steel panels for the intermediate parts and both end parts which are butt welded together to form one panel and continuously welded to the side rails and corner posts. All overlapped joints between corner posts and side panels and un-welded joints between top/bottom rails and side panels are caulked inside with sealant.

4.11 Front structure

The front end will be composed of one bottom end rail, two corner posts, one front header, four corner fittings and corrugated end wall, which are welded together as a sub-assembly.

4.11.1 Bottom end rail

The front bottom rail consists of two longitudinal end protectors and a square tube on top with flat strips as the wood supports. Two bottom corner protectors are provided adjacent to the bottom casting to prevent damage due to any twist lock misalignment.

4.11.2 Front corner post

Each corner post is made of 6.0mm thick pressed open section steel in a single piece, and designed to give a sufficient strength against stacking and racking forces.

4.11.3 Front header

The front top rail is constructed of 4.5mm thick pressing steel plate, with angle served as top frame support with some ribs, they are welded together to provide a high rigidity.

4.11.4 Front wall

The trapezium section front wall is constructed with 2.0mm thick vertically corrugated steel panels, butt welded together to form one panel, and continuously welded to front end rails and corner posts. All overlapped joints between corner posts and front panels and unwelded joints between top/bottom rails and front panels are caulked inside with sealant.

4.12 Special feature

4.12.1 Customs seal provisions

Customs seal and padlock provisions are made on each locking handle retainer to cover the sealed area in accordance with TIR requirements.

4.13.2 <u>Lashing fittings</u>

Ten (10) lashing hoop rings are welded to each top and bottom side rail at recessed corrugations of side panels but not extruded any cargo space (total 40 rings). Each lashing point is designed to provide a "1,500 kgs pull load in any direction" without any permanent deformation of lashing ring and surrounding area.

Three (3) lashing rods are welded to each corner post at the position of 150mm higher from the floor and 200 mm lower from the bottom surface of top corner fittings and in the middle between these two rods. Each lashing rod on the corner post is designed to provide a "1,000 kgs pull load in any direction" without any permanent deformation.

4.13.3 Shoring slot

A shoring slot, having a size of 60mm width x 40mm depth is provided on each rear corner post so that 2 1/4" thick battens can be arranged to be able to prevent doors from damage due to shifting cargo.

5. Surface preservation

5.1 <u>Surface preparation</u>

- 1) All steel surfaces prior to forming or after will be fully abrasive shot blasted conforming to Swedish Standard SA2 1/2 to remove all rust, dirt, mill scale and all other foreign materials.
- All door hardware will be hot-dipping zinc galvanized with approximately 75 microns thickness. Locking bolts hot-dipping zinc galvanized approximately 30 microns thickness.
- 3) All fasteners such as self-tapping screws and bolts, nuts, hinges, cam keepers and lashing fittings will be electro-galvanized with approximately 13 microns thickness.

5.2 Coating

5.2.1 The total dry film will be (microns):

	EXT.	INT.	BASE	
1st shop primer	10	10	10	
Waterborne Epoxy zinc primer	20	20	20	
Waterborne Epoxy middle coat	40		-	
Waterborne Epoxy top coat		40		
Waterborne Acrylic top coat	40	-		
Waterborne undercoating			200	
Total	110	70	230	

Note: The equivalent effect waterborne paint and waterborne undercoating will be applied. The paint system and supplier (inclusive of undercoating) will be submitted to customer's approval in advance before production.

6. Marking

6.1 Arrangement

The container will be marked in accordance with ISO, CSC and TIR requirements, owner's marking specifications and other required regulations.

6.2 Materials

1) Decal:

Self-adhesive, high tensile PVC film for seven (7) years guarantee without

peeling off, tenting or colour fading.

2) Certification plate:

18-8 type stainless steel plates to be chemically etched by acid and treated

by enamel.

6.3 Specifications

- 1) Identification plates such as consolidated data plate consisting of CSC and TIR will be riveted on the door permanently by stainless steel rivets. The entire periphery except the bottom side will be caulked with sealant.
- 2) The owner's and manufacturer's serial numbers will be respectively stamped on top plane of rear lower left and right corner fittings and stamped into the inside of right rear corner post at eye level.

7. <u>Testing and Inspections</u>

7.1 <u>Testing</u>

7.1.1 Prototype testing

The prototype container to be manufactured in accordance with this specification will be tested by manufacturer under the supervision of classification society.

	Test items & loads	Test methods
A)	Stacking	Hydraulic cylinder load will be applied to each
1	Internal load: 1.8R-T	corner post through top corner fittings.
	Test load: 97,200kg/post	Offset: 25.4 mm lateral
		38.0 mm longitudinal
B)	Lifting (from top corner fittings)	Lifting vertically.
	Internal load : 2R-T	Time duration : 5 minutes
C)	Lifting (from bottom corner fittings)	Lifting 30 degree to the horizontal.
	Internal load : 2R-T	Time duration : 5 minutes
D)	Restraint (longitudinal)	Hydraulic cylinder load will be applied to the
	Internal load : R-T	bottom side rails.
	Test load : 2R	
E)	Lifting (for forklift pockets)	Bar length: 1,828mm
	0.625R-T	Bar width : 200mm
E)		Time duration : 5 minutes
F)	Floor strength	Use of a special truck.
	Test load : 5,460 kgs	Total contact area: 284 sq. cm
	(12,040 lbs)	Wheel width : 180 mm
		Wheel centre : 760 mm
G)	Wall strength (front)	Compressed air bag will be used.
	Test load: 0.4(R-T)=0.4P	
H)	Wall strength (side)	Compressed air bag will be used on one side only.
	Test load : 0.6(R-T)=0.6P	sompressed an oug win or used on one side only.
I)	Wall strength (door)	Compa on front well strongth to t
L)	Test load: 0.4(R-T)=0.4P	Same as front wall strength test.
	, ,	
J)	Roof strength(weakest part)	Applied area will be 600x300mm longitudinal and
	Test load: 300kg	transverse.
K)	Racking (transverse)	Hydraulic cylinder load will be applied to the
	Test load: 15,240 kgs 150,000	header rail through top corner fittings.
P)	newtons Racking (longitudinal)	Hydraulia avlindar lond will be smalled to the
1)	Test load: 7,620 kgs	Hydraulic cylinder load will be applied to the top side rail through top corner fitting on one side
	1 test todd . 7,020 kgs	side rail illiough top corner fitting on one side

		only. Two times for pulling and pushing.
L)	Operation of door	After completion of test, the operation of doors, locks, hinges, etc. will be checked.
M)	Dimensions and weight	After completion of test, the dimensions and weight will be checked.
N)	Weatherproofness	Inside dia. of nozzle: 12.5mm Distance: 1.5 m Speed: 100 mm/sec. Pressure: 1 kg/sq. cm

Maximum Gross Weight Tare Weight Maximum Payload * Note: R

T P



















