

TECHNICAL SPECIFICATION

FOR

STEEL DRY CARGO CONTAINER

**20' x 8' x 9'6" Double Side & End Door
(High Cube)
FSA – Full Side Access**

MODEL NO : CX10-21S1

SPEC. NO : CX10-21S1-S

DATE OF ISSUE : Mar 01, 2010

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1. General

1.1 Scope

This specification will cover the design, construction, materials, testing and inspection performances of 20' x 8' x 9'6" double side & end open door type steel dry cargo 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 +80°C (+176°F) without effect on the strength of the basic structure and water-tightness.

1.3 Standards and Regulations

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

1.3.1 ISO Container Standards

- ISO 830 -- Terminology in relation to freight container (Amd. 1988)
- ISO 1161 -- Series 1 freight containers - Corner fittings Specification (Amd. 1990)
- ISO 6346 -- Freight containers - coding, identification and marking - 1995(E)

1.3.2 C.S.C. Certification

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

1.3.3 T.C.T. Certification

All exposed wooden components used for container will be treated to comply with the requirements of "Cargo Containers - Quarantine Aspects and Procedures" of the Commonwealth Department of Health, Australia.

1.3.4 Classification society

All the containers will be certified for design type and individually inspected by ABS, BV or GL.

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 twist-locks.
- b) Lifting, full or empty, at bottom corner fittings using slings with terminal fittings at any angles between vertical and 45 degree to the horizontal.
- c) Lifting, full or empty, at forklift pockets using forklift truck.

1.5 Transportation

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

- a) Marine : In the ship cell guides of vessels, nine (9) 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 twist-locks or equivalent at the bottom corner fittings.
- c) Rail : On flat cars or special container cars secured by twist-locks or equivalent at the bottom corner fittings.

2. Dimensions and Ratings

2.1 External Dimensions

Length	6,058	+ 0mm - 6mm
Width	2,438	+ 0mm - 5mm
Height	2,896	+ 0mm - 5mm

- 1) No part of the container will protrude beyond the external dimensions mentioned above.
- 2) Maximum allowable differences between two diagonals on anyone of the following surfaces will be as follows:
Roof, bottom and side diagonals : 13mm
Front and rear diagonals : 10mm

2.2 Internal Dimensions

Length	5,844	+ 0mm - 6mm
Width	2,224	+ 0mm - 5mm
Height	2,604	+ 0mm - 5mm

2.3 Side door opening dimensions

Length	5,702	+ 0mm - 6mm
Height	2,474	+ 0mm - 5mm

2.4 End door opening dimensions

Length	2,114	+ 0mm - 5mm
Height	2,474	+ 0mm - 5mm

2.5 Internal cubic capacity (Nominal)

33.8cu.m 1,190 cu.ft

2.6 Forklift pockets

	OUTER	INNER FOR EMPTY
Width	360 mm	310mm
Height (min.)	115 mm	115mm
Centre to centre	2050mm +/- 50 mm	860mm +/- 50 mm

2.7 Ratings

Max. Gross Weight (R)	24,000 kg
Tare Weight (design) (T)	4,400 kg
Max. Payload (P)	19,600 kg

3. Materials

3.1 General

The following materials will be used in the construction of containers.

3.2 Part specification

	<u>Parts</u>	<u>Materials by JIS</u>
1)	Roof panels Door panels Cross members Upper and lower plates of forklift pockets Floor center rail Floor guide rail Door header Door sill Door horizontal frames Door vertical frames Corner post	Anti-Corrosive Steel: CORTEN A, SPA-H, B480 or equivalent Y.P. : 35 kg/sq.mm T.S. : 49 kg/sq.mm
2)	Bottom side rails	Rolled high tensile steel: SS400 or equivalent Y.P. : 24 kg/sq. mm T.S. : 41 kg/sq. mm
3)	Door locking bars	Structural steel round pipe. STK41 Y.P. : 24 kg/sq.mm T.S. : 41 kg/sq.mm
4)	Corner Fitting	Casted weldable steel. SCW480 Y.P. : 28 kg/sq.mm T.S. : 49 kg/sq.mm
5)	Locking gear cams and keepers	Forged weldable steel. S20C Y.P. : 23 kg/sq.mm T.S. : 44 kg/sq.mm
6)	Door hinge pins Door gasket retainer	Stainless steel. SUS304
7)	Door gasket	EPDM
8)	Floor board	Hardwood plywood, min.19-ply
9)	Ventilator	ABS resin labyrinth type

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

4. Construction

4.1 General

- 4.1.1 The container will be constructed with steel frames, horizontal-corrugated steel double doors at both ends and sides, die-stamped steel roof and corner fittings.
- 4.1.2 All welds of exterior including the base frames will be continuous welding using CO₂ gas, but inner part of each bottom side rail will be fastened by staggered stitch welding.
- 4.1.3 Interior welds - when needed - will be stitched with a minimum bead length of 15mm for every 300 mm. Stitch welding two-ends welding not less than 30mm long.
- 4.1.4 Gaps between adjacent components to be welded will not exceed 3 mm or the half thickness of the parts being welded.
- 4.1.5 Chloroprene sealant is to be applied at periphery of floor surface and inside non-welded seams, butyl sealant is used to caulk at invisible seam of floor joint area and between door gasket and frame.
- 4.1.6 The wooden floor will be fixed to the base frames by zinc plated self-tapping screws.

4.2 Protrusion

- 4.2.1 The plane formed by the lower faces of the bottom side rails shall be positioned by 12.5mm +5/-1.5mm above the plane formed by the lower faces of the bottom corner fittings.
- 4.2.2 The top corner fittings are to protrude a minimum of 6mm above the highest point of the roof.
- 4.2.3 The outside faces of the corner fittings will protrude from the outside faces of the corner posts by nominal 4mm.
- 4.2.4 The outside faces of the corner fittings will protrude from the outside faces of the side and end door wall by nominal 57mm.
- 4.2.5 Under maximum payload, no part of the container will protrude below the plane formed by the lower faces of the bottom corner fittings at the time of maximum deflection.
- 4.2.6 Under 1.8 x maximum gross weight, no part of the 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, seventeen (17) cross members, and two sets of forklift pockets.

4.4.1 Bottom side rail

The bottom side rail is built of 246x140x28x16mm “H shape” steel, the floor guide rails of 3.0mm thick pressed angle section steel are provided to the bottom side rails by staggered stitch welding.

4.4.2 Cross member

The cross members are made of pressed channel section steel with a dimension of 45x122x45x4.0mm for the normal areas and 75x122/190x45x4.0mm for the floor butt joints, and another 45x190x45x4.0mm channel section steel as side rails of forklift pockets. The cross members are placed fully to withstand floor strength and welded to each bottom side rail.

4.4.3 Forklift pockets

Each container has two sets of forklift pocket, one set is used to full loaded condition and another is used to empty loaded condition. each forklift pocket is built of 3.0mm thick full depth flat steel top plate and the lower flange of bottom side rail as lower plates between two channel section cross members.

The two sets of forklift pockets is designed in accordance with ISO requirements.

4.5 Flooring

The floor will consist of six pieces plywood boards, floor centre rail, and self-tapping screws.

4.5.1 Floor

The wooden floor to be constructed with 28mm thick min.19~21-ply hardwood plywood boards are laid longitudinally on the transverse members between the 4.0mm thick flat steel floor centre rail and the 3.0mm thick pressed angle section steel floor guide rails stitched welded to the bottom side rails.

The floorboards are tightly secured to each transverse member by self-tapping screws, and all butt joint areas and peripheries of the floorboards are caulked with sealant.

- 1) Wood species : Apitong or Keruing
- 2) Glue : Phenol-formaldehyde resin.
- 3) Treatment :
 - a) Preservative: Meganium 2000 or others.
 - b) In accordance with Australian Health Department Regulations, 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 (4) screws per cross member but five (5) screws at joint areas. Screw heads are to be countersunk with about 2mm below the floor top surface.

4.6 Side door structure

The side door frame will be composed of bottom side rail (door sill), two corner posts, one top side rail (door header) and four corner fittings which will be welded together to make the door-way.

4.6.1 Door sill

Please refer to 4.4.1 and drawings.

4.6.2 Door corner post

Each door post of hollow section is fabricated with 6.0mm thick outer bender and a angle section steel as 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. Six (6) sets of hinge are welded to each door corner post.

4.6.3 Door header

The door header is constructed with 4.5mm thick pressed "U" section steel lower part having eight internal gussets at the back of each locking cam keeper location and a 4.5mm thick pressed steel upper part, which are formed into box section by continuous welding.

4.7 End door frame structure

The end door 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.

4.7.1 Door sill

The door sill to be made of a 4.5mm thick pressed open section steel is reinforced by four internal gussets of a 4.0mm thick at the back of each locking cam keeper location.

4.7.2 Door header

The door header is constructed with 4.0mm thick pressed "U" section steel lower part having four internal gussets at the back of each locking cam keeper location and 3.0mm thick pressed steel upper part, which are formed into box section by continuous welding.

4.7.3 Door corner post

Please refer to 4.6.2.

4.8 Door

4.8.1 Each container will have double wing doors at both side frame, each door-wing will be constructed with two(2) doors to be coupled by five hinges. In addition, two single-wing doors at both end frame.

4.8.2 Each door is constructed with 3.0mm thick pressed channel section steel horizontal frames for the top and bottom, 100x50x3.2mm rectangular hollow section vertical frames and 2.0mm thick horizontally corrugated steel door panel, which are continuously welded within frames.

4.8.3 Total twenty four (24) sets of galvanized with “HH-E” model locking assemblies with steel handles are respectively fitted to each door using high tensile zinc plated steel bolts according T.I.R. requirements. Locking bar retainers are fitted with nylon bushings at the top, bottom and intermediate bracket.

Locking gears should be assembled after painting and not to be painted.

4.8.4 The left -hand door can not be opened without opening the right hand door when the container is sealed in accordance with TIR requirements.

4.8.5 Each door is suspended by hinges being provided with stainless steel pins, self-lubricating brass bushings and brass washers.

4.8.6 The door gasket to be made of an extruded triple lip J-C type EPDM rubber is installed to the door peripheral frames with 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.

4.9 Roof structure

The roof will be constructed with five five-corrugated (die-stamped) steel panels and four corner protection plates.

4.9.1 Roof panel

The roof panel is constructed with 2.0mm thick die-stamped steel sheets having about 6.0mm upward smooth camber, which are welded together to form one panel and continuously welded to the top side rails and top end rails. All overlapped joints of inside non-welded seams are caulked with chloroprene sealant.

4.9.2 Protection plate

Each corner of the roof in the vicinity of top corner fittings is reinforced by 3.0mm thick rectangular steel plate to prevent the damage caused by mishandling of lifting equipment.

4.10 Special feature

4.10.1 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.

4.11.2 Lashing fittings

Five (5) lashing rings are welded to each top & bottom side rails (total 20 rings). Each lashing rod on the corner post is designed to provide a "1,000 kgs pull load in any direction" without any permanent deformation. The position of lashing rings please refers to drawings.

5. Surface preservation

5.1 Surface preparation

- 1) All steel surfaces - prior to forming or after - will be fully abrasive shot blasted conforming to Swedish Standard SA2 1/2 with near white metal surface, and anchor profiles of 25 to 35 microns to remove all rust, dirt, mill scale and all other foreign materials.
- 2) All door hardware will be hot-dipping zinc galvanized with approximately 75 microns thickness.
- 3) All fasteners such as self-tapping screws and bolts, nuts, hinges, cam keepers, 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, UIC, TCT, TIR and CSC 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 thickness 0.8mm 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 TCT will be riveted on the door permanently by stainless steel blind rivets. The entire periphery except bottom will be caulked with sealant.
- 2) The owner's serial numbers and manufacturer's serial numbers will be stamped into the lower corner fitting.

7. Testing and Inspections

7.1 Testing

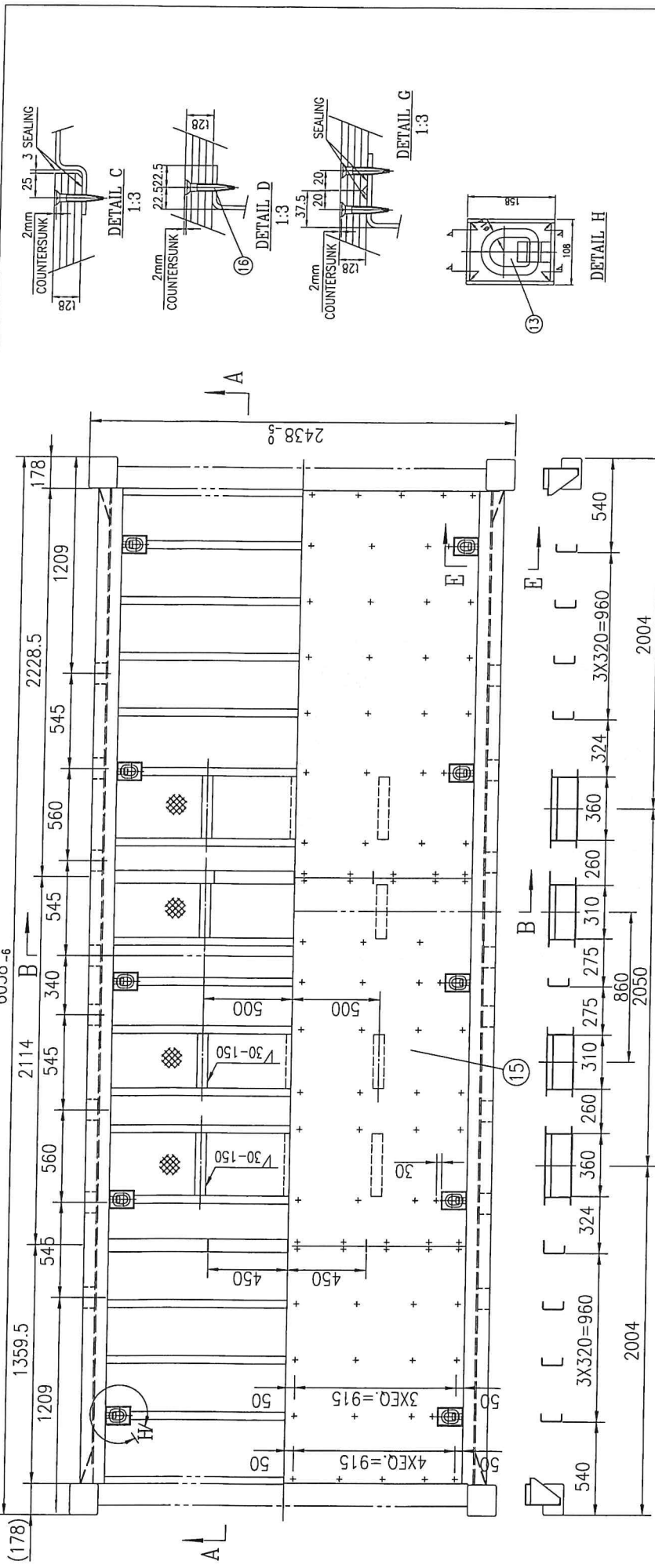
7.1.1 Prototype testing

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

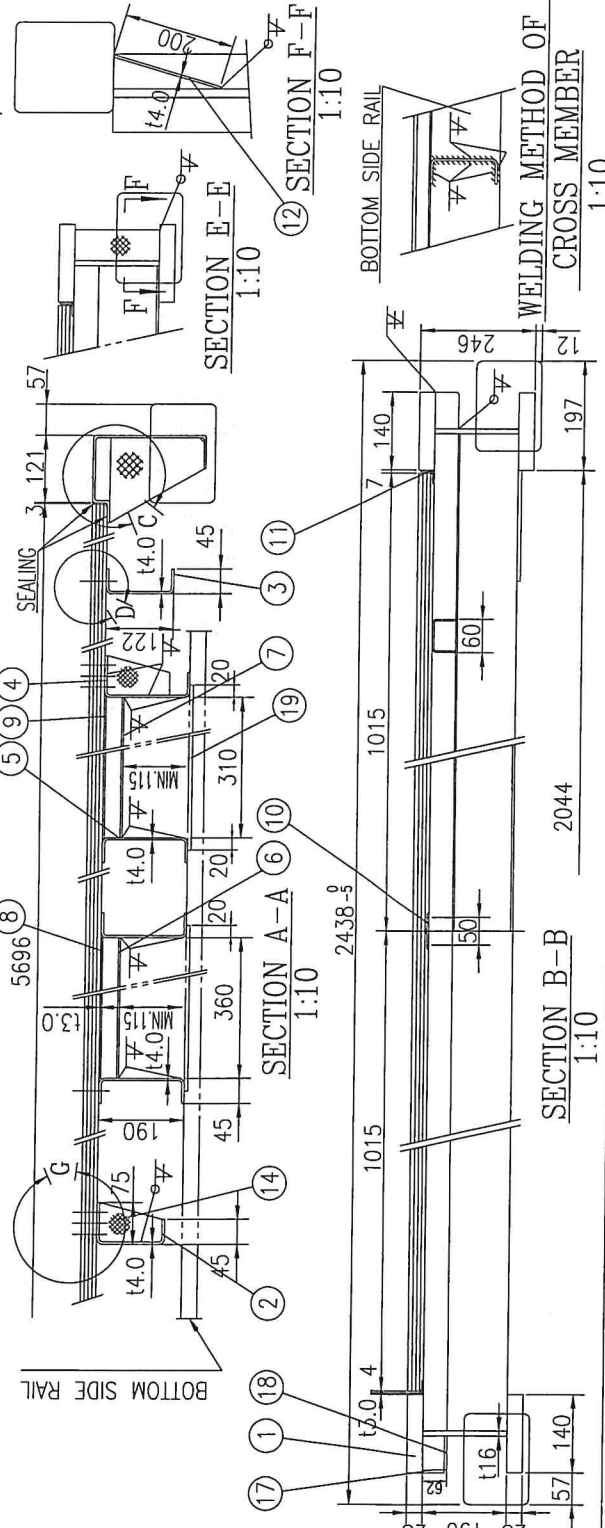
	<u>Test items & loads</u>	<u>Test methods</u>
A)	Stacking Internal load : 1.8R-T Test load : 86,400kg/post.	Hydraulic cylinder load will be applied to each corner post through top corner fittings. Offset: 25.4 mm lateral 38.0 mm longitudinal Time duration : 5 minutes
B)	Lifting (from top corner fittings) Internal load : 2R-T	Lifting vertically. Time duration : 5 minutes
C)	Lifting (from bottom corner fittings) Internal load : 2R-T	Lifting 45 degree to the horizontal. Time duration : 5 minutes
C1)	Lifting (for forklift pockets) Internal load : 1.6R-T (outer)	Lifting by horizontal bars. Bar length : 1,828mm Bar width : 200mm Time duration : 5 minutes
D)	Restraint (longitudinal) Internal load : R-T Test load : 2R	Hydraulic cylinder load will be applied to the bottom side rails. Time duration : 5 minutes
E)	Wall strength (end) Test load : 0.4(R-T)=0.4P	Compressed air bag will be used. Time duration : 5 minutes
F)	Wall strength (side) Test load : 0.6(R-T)=0.6P	Compressed air bag will be used on one side only. Time duration : 5 minutes
G)	Roof strength (weakest part) Test load : 300 kg	Applied area will be 600x300mm longitudinal and transverse.
H)	Floor strength Test load : 7,260 kg (16,000 lb)	Use of a special truck. Total contact area: 284 sq.cm Wheel width : 180 mm Wheel centre : 760 mm
I)	Racking (transverse) Test load : 15,240 kg	Hydraulic cylinder load will be applied to the header rail through top corner fittings. Time duration : 5 minutes
J)	Racking (longitudinal) Test load : 7,620 kg	Hydraulic cylinder load will be applied to the top side rail through top corner fitting on one side only. Two times for pulling and pushing. Time duration : 5 minutes

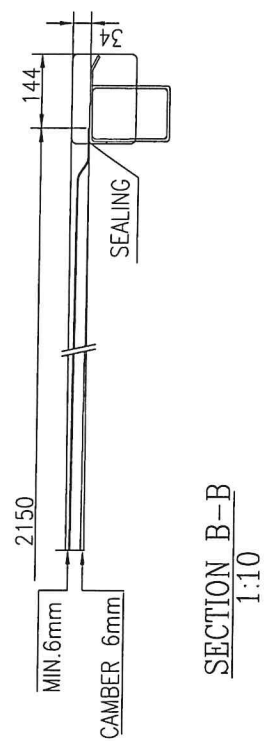
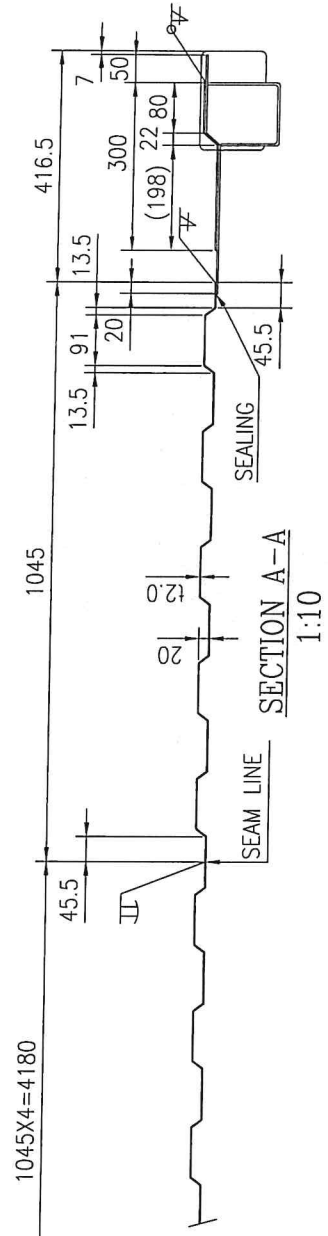
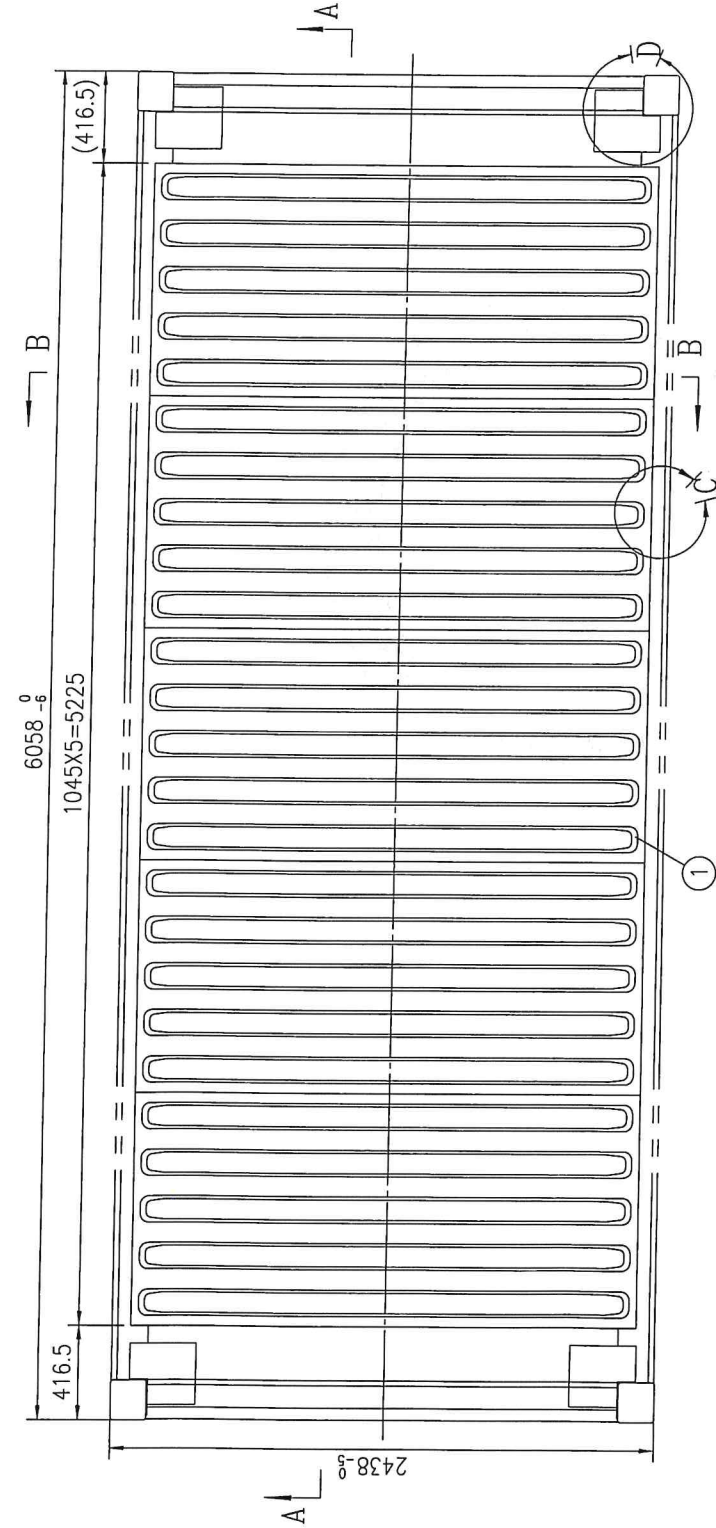
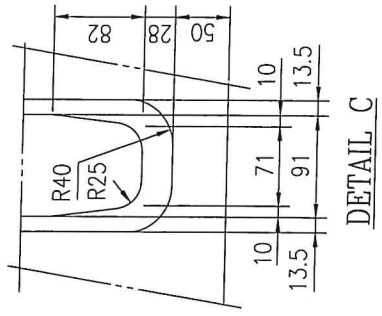
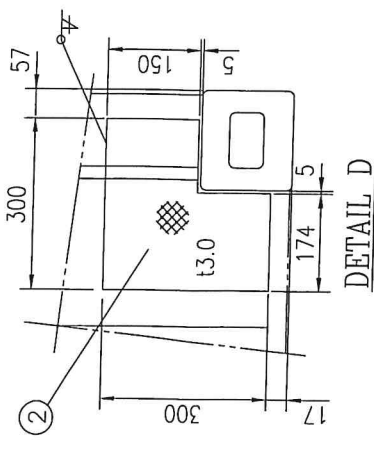
K)	Operation of door	After completion of test, the operation of doors, locks, hinges, etc. will be checked.
L)	Dimensions and weight	After completion of test, the dimensions and weight will be checked.
M)	Weather-tightness	Inside diameter of nozzle : 12.5mm Distance : 1.5 m Speed : 100 mm/sec. Pressure : 1 kg/sq.cm

* Note: **R** Maximum Gross Weight
T Tare Weight
P Maximum Payload



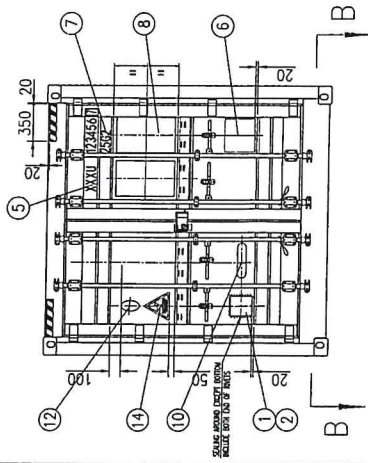
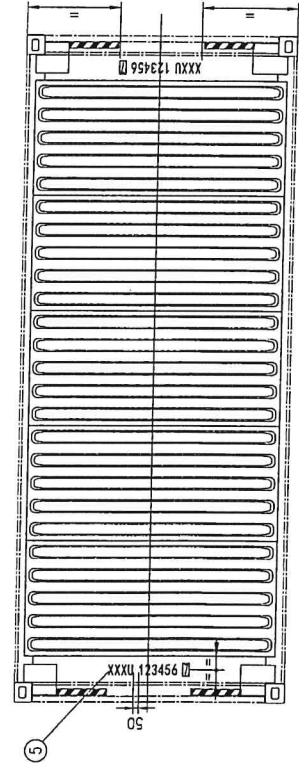
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19	16	16	FP. LOWER PLATE-LARGE-SMALL/4	SPA-H 16.0X200X400/350	
18	16	16	CX10-2151-118	PANEL SPA-H 13.0	
17	16	16	CX10-2151-117	PLATE SPA-H 13.0	
16	1	1	180	S20C 180X45 ZINC PLATED	
15	1	1	180	S20C 180X45 ZINC PLATED	
14	1	1	180	S20C 180X45 ZINC PLATED	
13	1	1	180	S20C 180X45 ZINC PLATED	
12	1	1	180	S20C 180X45 ZINC PLATED	
11	1	1	180	S20C 180X45 ZINC PLATED	
10	1	1	180	S20C 180X45 ZINC PLATED	
9	1	1	180	S20C 180X45 ZINC PLATED	
8	1	1	180	S20C 180X45 ZINC PLATED	
7	1	1	180	S20C 180X45 ZINC PLATED	
6	1	1	180	S20C 180X45 ZINC PLATED	
5	1	1	180	S20C 180X45 ZINC PLATED	
4	1	1	180	S20C 180X45 ZINC PLATED	
3	1	1	180	S20C 180X45 ZINC PLATED	
2	1	1	180	S20C 180X45 ZINC PLATED	
1	1	1	180	S20C 180X45 ZINC PLATED	





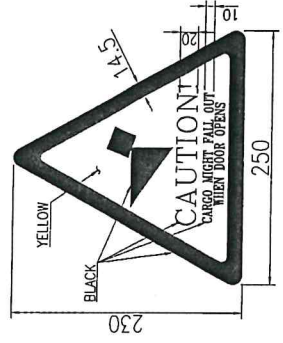
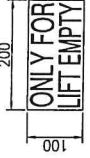
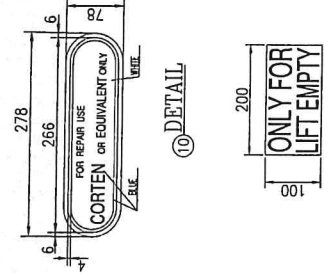
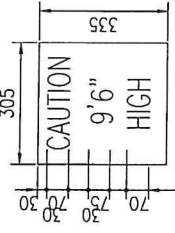
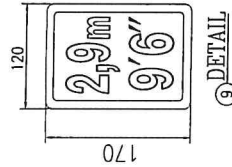
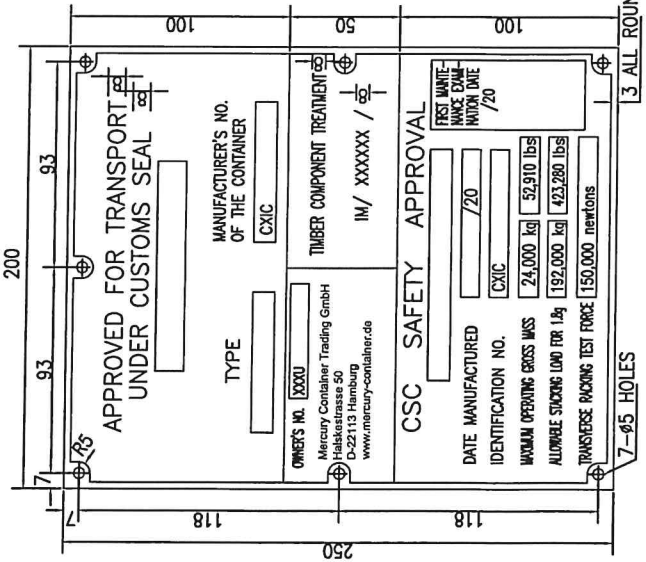
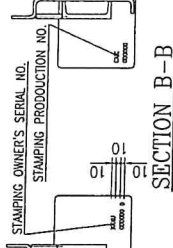
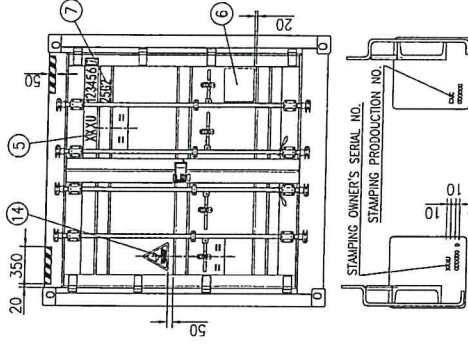
2	CX10-21S1-302	ROOF GUSSET	5/23	SPA-H 13.0	
1	CX10-21S1-301	ROOF PANEL	5	SPA-H 12.0	
THA	DWG. NO.	DESCRIPTION	QTY	MATERIAL	REMARK
					CX10-21S1-300
					项装配
					ROOF ASSEMBLY
					SCALE
					SHEET 1 OF 1
					1:25
					2010-03-01
					APPROVED
					ZHANG JIANJIANG
					CHECKED
					ZOU JINLIU
					DESIGNED
					DING XUEWEN
					DATE
					NAME
					FILE NO.

INSIDE RIGHT OF CONTAINER



DETAIL 8

M.G.W.	320	24,000 KGS
TARE	320	52,910 LBS
NET	320	4,400 KGS
CU.CAP.	320	9,700 LBS
	320	19,600 KGS
	320	43,210 LBS
	320	33.8 CU.M.
	320	1,190 CU.FT.



15	EMPTY MARK	4	DECAL	BLACK ON YELLOW
14	DROP DOWN CAUTION	4	DECAL	BLACK ON YELLOW
13	WARNING MARK (50X350)	12	DECAL	BLACK ON YELLOW
12	CLASS EMBLEM	1	DECAL	
11				
10	REPAIR MARK	1	DECAL	
9	HEIGHT MARK	2	DECAL	BLACK ON YELLOW
8	HEIGHT & CAPACITY	1	DECAL	
7	SIZE & TYPE CODE	4	DECAL	
6	CAUTION MARK	4	DECAL	BLACK ON YELLOW
5	OWNER'S CODE SERIAL NO.	8	DECAL	WHITE KISS CUT
4				
3				
2	BLIND RIVET	7	SUS304	Ø4X8
1	CONSOLIDATED DATA PLATE	1	SUS304	10.8
ITEM	DWG. NO.	DISCUSSION	MATERIAL	REMARK
				CY20-21SONC-700

MARK I/P/T FILE NO.	NAME	DATE	MARKING DRAWING SCALE	SHEET 1 OF 1
DESIGNED	KUANG YK		1 : 50	
CHECKED	ZHONG SL			
APPROVED	DAWD XU	2020.04.14		