TECHNICAL SPECIFICATION

FOR

20' x 8' x 8'6" ISO 1CC TYPE STEEL DRY CARGO CONTAINER

WITH

CORTEN STEEL CONSTRUCTION,
CORRUGATED DOOR,
CORRUGATED ROOF,
1 PAIR OF FORKLIFT POCKET,
2 VENTILATORS &
PLYWOOD FLOOR

FOR

Container Lion
SCOPE

This specification covers the design, construction, materials, testing, inspection and performance requirements for ISO, 1CC type steel dry cargo

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A. MATERIAL LIST OF MAIN STEEL PARTS
1. GENERAL

1.1 Operational Environment

The container is designed and manufactured for the carriage of general cargo by marine, road, and rail. It is designed to maintain its structural and weather tight integrity within a temperature range of -40°C to +80°C Celsius.

1.2 Regulations and Standards

The container will conform to and satisfy the following regulations and standards (each with the latest edition).

1.2.1 ISO/TC-104

All to meet series 1 freight containers set forth.
ISO 830   Freight containers-terminology.
ISO 668   Series 1 freight containers-classification, external dimensions and ratings.
ISO 6346  Freight containers-coding, identification and marking.
ISO 1161  Series 1 freight containers-corner fittings-specification.
ISO 1496-1 Series 1 freight containers-specification and testing-
Part 1 : General cargo containers
ISO 3874  Series 1 freight containers handling and securing
ISO 1894  General purpose series 1 freight containers minimum internal dimensions
ISO 1979  Series 1 freight containers classification min. internal dimensions

1.2.2 T.I.R. Requirements and Certifications

The container shall comply with the customs convention of containers, 1972 and all subsequent revisions to date and will be identified with appropriate approval plates and markings.

1.2.3 Timber Component Treatment and Certification

All exposed timber components are treated with an Australian government approved insecticide and the container will be such identified with appropriate immunization plate.

1.2.4 U.I.C. Registration

The container will be registered and comply with the International Union of Railways (UIC) code 592-1 OR and 592-2 OR.

1.2.5 CSC Requirements

The container will comply with the rules set forth in the International Convention for Safe Containers and will be so identified with a plate.

1.2.6 Classification Society

The container will be certified by classification society “Germanischer Lloyd” in design and individually during its production.
1.4 Handling

The container will be constructed to be handled under the following conditions without distortion or effect on its structural integrity:
A. Lifting full by its top corner fittings by means of spreaders
B. Lifting full by its bottom corner fittings by means of fitting at a sling angle of 45°.
C. Lifting full or empty by forklift at its forklift pocket.

1.5 Transportation

The container will be constructed to be suitable for transportation in normal operating conditions by modes of:
A. Marine - Seven (7) high stacked based on 30,480kg M.G.W. in cell guides or
   - Four (4) high stacked and secured at the corner fittings by suitable vertical or diagonal lashings on deck
B. Rail - on flat or container car secured at its bottom corner fittings
C. Road - on flat or chassis secured at its bottom corner fittings

2. DIMENSIONS AND RATINGS

2.1 External Dimensions

Length: 6058mm ±6
Width: 2438mm ±5
Height: 2591mm ±5

2.2 Internal Dimensions

Length: 5898mm ±6
Width: 2352mm ±5
Height: 2395mm ±5

2.3 Diagonal Difference

Diagonal tolerance of front and rear frames should be less than 10mm
Diagonal tolerance of side and roof panels should be less than 13mm

2.4 Internal Capacity

33.2 m³. (1,173 ft³.)

2.5 Door Opening

Width: 2340mm ±5
Height: 2280mm ±5

2.6 Ratings

Max. Gross Wt.: 30,480kg (67,200 LBS)
Max. Payload: 28,295kg (62,380 LBS)
Tare Wt. ±/-2%: 2,185kg (4,820 LBS)

2.7 Corner Protrusions

2.7.1 The faces of the bottom corner fittings protrude from lower faces of all transverse members in the base of the container by 14.5mm (+3-3.5mm).
2.7.2 The upper faces of top corner fittings protrude from upper faces of the highest point of the roof by 6mm.

2.7.3 The outer side faces of corner fittings protrude from outside faces of corner posts by 3mm.

2.7.4 Under 1.8 x max. gross weight no part of the base will protrude more than 6mm below the bottom corner fittings.

3. MATERIAL AND CONSTRUCTION

3.1 General

The container is mainly constructed with steel frames, corrugated panels welded by CO2 shielded Arc welding. All welds of the exterior including the base frames are continuous with full penetration. Wooden floor is fixed to the cross members by self-tapping screws. All crevices will be sealed with elastic sealing compound.

3.2 Materials

The main constructional materials are shown in Appendix A of the specification.

3.3 Corner Fittings

All corner fittings used will comply with ISO/1161 standard.

3.4 Base Structure

3.4.1 The bottom side rails are of 158 x 48 x 30 x 4.5mm thick channel section steels with a pressed profile as shown in drawing attached.

3.4.2 The cross members consist of 16 pcs of 122 x 45 x 45 x 4mm thick steel channel and 2 pcs of 122 x 80 x 45 x 4mm thick members at the floor joints.

3.4.3 Each forklift pocket is of 2 pcs of cross members welded with a 3.2mm thick top plate and 2 bottom end plates 200mm deep x 6mm thick.

3.4.4 Four corner gussets, t4 x 200mm thick protection plates will be welded from side rail to corner fittings.

3.5 Floor

3.5.1 The floor is of 28mm thick plywood. All joints between each plywood and the whole floor perimeter are sealed with an elastic sealant.

3.5.2 The plywood used will be 19 plies and will be:
   A. Hardwood (Apitong or Keruing) of a specific gravity range of 0.7-0.85 at a moisture content of 12%.
   B. Moisture content will be 13-15% when fitted to the container.

3.5.3 The plywood used will be certified to meet the requirements of Australian Commonwealth Dept. of Health (Plant Quarantine Treatment Schedule) for Timber Components (T.C.T).

3.5.4 The floor will be fixed to the steel cross members by zinc-plated self-tapping screws. The head of these screws are countersunk below the level of the upper surface of the floor by 2mm to 2.5mm. The smaller floorboards are mounted at the rear side close to the door.

3.5.5 The floor spacer with t4 x 50mm flat bar will run the full length in centre.
3.6  The Front Frame

3.6.1 The bottom end rail is of 4mm thick pressed steel and formed into open sections. The bottom end rail has 4 pcs inner vertical gussets.

3.6.2 Each front corner post is a single pressed section of 6mm steel.

3.6.3 The top front rail is a upper plate of 3mm thick and a 60 x 60 x 2.3mm thick square tube forming its profile.

3.6.4 The front panel is of 2 pcs of corrugated 2mm steel panel.

3.7  The Rear Frame

3.7.1 The door sill (rear bottom rail) is of 4.5mm thick pressed steel and formed into open sections. Each door sill has 4 pcs inner vertical gussets located just behind the cams of the door locking assembly.

3.7.2 The rear corner post is a single piece of pressed section of 6mm thick reinforced on the inside with a 113 x 40 x 10mm channel.

3.7.3 The door header has a 3mm thick top plate with a 4mm "U" channel at the bottom forming into a box shape.

3.8  Side Walls

3.8.1 The side walls are of 5 pcs of 2mm thick steel panels of both ends and 1.6mm thick intermediate steel panels without marking panels, vertically trapezium corrugated steel panels continuously welded to each other and to the end rails and corner posts. Welding penetration side panels to rails should be min. 75%.

3.8.2 The top side rails are 60 x 60 x 2.3mm steel square tube.

3.9  Roof

3.9.1 The roof is of 5 pcs corrugated 2mm steel panels with a 5mm camber continuously welded to the upper frame.

3.10  Door

3.10.1 The doors are constructed with corrugated steel panels. The panel thickness is 2mm. The top and bottom horizontal door members are of 3.2mm thick pressed 'U' type members. The vertical door members are of 50 x 100 x 3.2mm thick rectangle tube.

3.10.2 Each door is capable of swinging 270° when fully opened and can be secured in that position by means of nylon ropes attached.

3.10.3 The right door is so designed that the right door must be opened before the left in compliance with T.I.R. requirements.

3.10.4 The door gasket is of extruded EPDM with a double lip to ensure water tightness. The upper and side gaskets are of 'J' type configuration. Bottom is of a 'C' type configuration. It is attached with sealant and secured with a stainless steel retainers by blind rivets.

3.10.5 Each door is suspended by four hinges with stainless steel pins, nylon bushings and brass washers placed at the hinge pin lugs of the rear corner posts.
3.10.6 Galvanized locking devices on a galvanized ø34mm pipe are secured to the door with nuts and bolts and has nylon bushings on the brackets. The Locking devices will be installed after the container is painted.

Type: Haihang “E-Type” with forged handle or equivalent. see attached drawings:

“Exploded View” no. HH—E Type
“F-Handle” no. 97HH—E—05—1

3.10.7 A door holder per door, made of mixed nylon rope, is tied to the center-side locking rod and the receptacle (hook type) is welded to each bottom side rail to retain the door at the open position.

3.11. Sealant
Butyl based sealant is to be used for non-exposed parts such as floor lap joint area and between door gasket and frame. For internal exposed parts such as the periphery of the floor, chloroprene sealant is to be used.

3.12. Special Features

3.12.1 Shoring Slots: 60 x 40mm slots are provided for on each of the rear corner posts so that a 2” thick batten can be secured to give protection against shifting cargo.

3.12.2 Lashing Rings: 4 rings with ø12mm will be welded to each of the bottom and top side rails. Each lashing point is designed to provide a “2000kg pull load in any direction” without any permanent deformation of lashing ring and surrounding area.

2 lashing bars will be welded to each corner post at the position of 150mm higher from top surface at bottom corner fitting and 150mm lower from the bottom surface of top corner fitting. Each lashing rod on the corner post is designed to provide a “1000kg pull load in and direction” without any permanent deformation.

3.12.3 Ventilators - ventilators should be small type fabricated from A.B.S. resin by injection molding process. They will be secured to the second corrugation recess from right corner post of both side walls, by means of three Aluminum Huck bolts.

3.12.4 Two pcs of 200 x 75 x 9mm thick cone damage protectors ('C' channels) are placed at both sides of front end rail as well as door sill.

3.12.5 Reinforcement plates - the 300 x 270 x 4mm steel plate are welded to the upper surface of the top end frames around the top corner fittings.

3.12.6 Customs Seal Provision
Customs seal provision are made on each locking handle and retainer in accordance with TIR requirements.

4. SURFACE PROTECTION

4.1. Surface Preparation
All steel components, prior to forming, will be shot-blasted to a SA 2.5 standard surface by means of an automatic centrifugal shot surface cleaning machine. A weld-able primer compatible to the paint system will be applied immediately to a thickness of 10 micron to preserve the surface integrity during the assembly process. After the container is assembled it is shot-blasted again manually to clean all the welds and any other area that was contaminated during the assembly process. Slags and spatters are removed by means of grinding or needle hammers.
4.2 **Paint**

Supplier: Hempel – Hai Hong

*Exterior*: Color: RAL 5010 Gentian blue

Apply one coat of zinc rich primer no. Hempadur Zinc 15360 to 30 mic. DFT.

Apply one coat of epoxy resin primer no. Hempadur Hi-Build 45200/45201 to 40 mic. DFT. (Grey)

Apply one coat of Acrylic top coat no. Hempatex 56430 to 40 mic. DFT. (50 mic. DFT. On roof)

Total 110 mic. DFT. (120 mic. DFT. On roof)

*Interior*: Color: RAL 7035 Light grey

Apply one coat of zinc rich primer no. Hempadur Zinc 15360 to 30 mic. DFT.

Apply one coat of epoxy resin top coat no. Hempadur Hi-Build 45200/45201 to 60 mic. DFT.

Total 90 mic. DFT.

4.3 **Undercoating**

The whole underside will be coated with 35 mic. of zinc rich primer no. Hempadur Zinc 15360 and 200 mic. of Waxy or Bituminous undercoating. Color: Black

Total 235 mic. DFT.

Issued in June 2010, subject to modifications and amendments.
APPENDIX A

Material list for main steel parts:

YP = YIELD POINT (kg/mm²)
E = ELONGATION %
TS = TENSILE STRENGTH (kg/mm²)

FRONT PANEL - SPA-H OR EQUIVALENT
FRONT TOP RAIL - YP=35 TS=49 E=22
FRONT CORNER POST -
FRONT BOTTOM RAIL -
REAR CORNER POST-OUTER -
DOOR PANEL -
DOOR HEADER -
DOOR RAIL -
DOOR EDGE MEMBER -
DOOR SILL -
SIDE PANEL -
TOP SIDE RAIL -
BOTTOM SIDE RAIL -
ROOF PANEL -
CROSS MEMBER -
REINFORCEMENT PLATE -
FORK LIFT POCKET -
FLOOR SPACER -

DOOR SEAL RETAINER - STAINLESS
CONE DAMAGE PROTECTOR - JIS: SS41 HOT ROLLED
SHAPED STEEL
YP=25 TS=41 E=21

REAR CORNER POST-INNER - JIS: SM50YA HOT-ROLLED
HI-TENSILE SHAPED STEEL
YP=37 TS=50 E=15

LOCKING BAR - JIS: STK41
YP=23 TS=41 E=23

CORNER FITTING - JIS: SCW49 MOD. WELDABLE
CASTING
YP=28 TS=49 E=20

DOOR HINGE - JIS: S25C FORGING STEEL
YP=23 TS=44 E=20

DOOR LOCKING CAM AND KEEPER - JIS: S20C FORGING STEEL
YP=23 TS=44 E=19