



**TECHNICAL SPECIFICATION**

**FOR A TYPICAL**

**20' X 8' X 8'6" ISO 1CC TYPE**

**STEEL DRY CARGO CONTAINER**

**“REMOVAL”**

**MODEL NO.:**

**SPECIFICATION NO.:** 205MAG\_20RM

**ISSUED ON :** October 16, 2003



## **SCOPE**

This specification covers the design, construction, materials, testing, inspection and performance requirements for ISO, ICC type steel dry cargo containers.

The containers specified herein are manufactured under the quality control of the manufacturer in its plant within the perimeters as such set forth by the Classification Societies.

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## 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 weathertight integrity within a temperature range of -30 degree C to 80 degree C.

### 1.2. Regulations and Standards

The container will conform to and satisfy the following regulations and standards.

#### 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

#### 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 in design and individually during its production.

#### 1.3. 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 degrees.
- C. Lifting full or empty by forklift at its forklift pocket.

#### 1.4. Transportation

The container will be constructed to be suitable for transportation in normal operating conditions by modes of:

- A. Marine - (4) Four high stacked on deck or (7) Seven high stacked (Based on 30,480 KG weight) in cell guided by vertical or diagonal lashings
- 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: 6,058 MM 0 -6  
Width: 2,438 MM 0 -5  
Height: 2,591 MM 0 -5

### 2.2 Internal Dimensions

Length: 5,898 MM 0 -6  
Width: 2,352 MM 0 -5  
Height: 2,395 MM 0 -5

### 2.3 Diagonal Difference

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



#### 2.4 Internal Capacity

33.2 CU.M. (1,173 CU.FT.)

#### 2.5 Door Opening

Width: 2,343 MM 0 -5  
Height: 2,280 MM 0 -5

#### 2.6 Ratings

Max. Gross Wt.: 30,480 KGS (67,200 LBS)  
Max. Payload: 28,295 KGS (62,380 LBS)  
Tare Wt. +/-2%: 2,185 KGS (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 14.5 MM (+3,-3.5 MM).

2.7.2 The upper faces of top corner fittings protrude from upper faces of the highest point of the roof by 6 MM.

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

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

### **3. MATERIAL AND CONSTRUCTION**

#### 3.1. General

The container is mainly constructed with steel frames, corrugated panels welded by CO<sub>2</sub> 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 158x48x30x4.5 MM thick channel section steels with a pressed profile as shown in drawing attached.
- 3.4.2 The cross members consist of 16 pcs of 122x45x45x4 MM thick steel channel and 2 pcs of 122x80x45x4 MM thick members at the floor joints.
- 3.4.3 Each forklift pocket is of 2 pcs of cross members welded with a 3 MM thick top plate and 2 bottom end plates 200 MM deep x 6 MM thick.
- 3.4.4 Four corner gussets, t4.0x200 MM thick protection plates will be welded from side rail to corner fittings.

#### 3.5. Floor

- 3.5.1 The floor is of 28 MM 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 of a specific gravity range of 0.7-0.85 at a moisture content of 12%. E.G. Keruing, Apitong, Birch.
  - 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 2 MM to 2.5 MM.
- 3.5.5 The floor spacer with t4.0x50 MM flat bar will run the full length in center.

#### 3.6. The Front Frame

- 3.6.1 The bottom end rail is of 4.0 MM 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 6 MM steel.
- 3.6.3 The top front rail is a upper plate of 3 MM thick and a 60x60x3 MM thick square tube forming its profile.
- 3.6.4 The front panel is of 2 pcs of corrugated 2 MM steel panel.

### 3.7 The Rear Frame

- 3.7.1 The door sill (rear bottom rail) is of 4.5 MM 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 4.5 MM thick reinforced on the inside with a 113x40x12 MM channel.
- 3.7.3 The door header has a 3 MM thick top plate with a 4 MM "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 2.0 MM thick steel panels of both ends and 1.6 MM 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 60x60x3 MM steel square tube.

### 3.9 Roof

- 3.9.1 The roof is of 5 pcs corrugated 2 MM steel panels with a 5 MM 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 2 MM. The top and bottom horizontal door members are of 3.0 MM thick pressed 'U' type members. The vertical door members are of 50x100x3.2 MM thick rectangle tube.
- 3.10.2 Each door is capable of swinging 270 degrees 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 34 MM dia. 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.

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: 61.5x40 MM 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 12 MM dia. will be welded to each of the bottom and top side rails. These rings shall have a capacity of 1,500 KGS. 2 lashing bars will be welded to each corner post.

**A t4.0x50 mm of steel lashing strip will be welded in half height on side and front panels inside. It will be painted with same painting as container interior.**

3.12.3 Ventilators - **10** ventilators should be small type fabricated from A.B.S. resin by injection molding process. They will be secured to the **mid corrugation recess of each side panels**, by means of three Aluminum Huck bolts.

3.12.4 Two pcs of 200x75x9.0 MM 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 300x270x3 MM 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

*Exterior: Top coat color: RAL-9010*

Apply one coat of zinc rich primer to 30 mic. DFT.

Apply one coat of epoxy primer to 40 mic. DFT.

**Apply one coat of Acrylic Top Coat to 50 mic. DFT.**

Total 120 mic. DFT.

*Interior: color: light grey RAL-7035*

Apply one coat of zinc rich primer to 25 mic. DFT.

Apply one coat of epoxy top coat to 50 mic. DFT.

Total 75 mic. DFT.

### 4.3. Undercoating

The whole underside will be coated with 25 mic. of zinc rich primer and 180 mic. of Waxy or Bituminous undercoating.

Total 205 mic. DFT.

## 5. MARKING

### 5.1. Lettering

The container will be marked in accordance with ISO requirements, owner's specifications, and other regulatory authorities.

### 5.2. Materials

The decals are of a self adhesive type and are warranted for seven (7) years against normal wear and tear. All data plates will be stainless steel and secured by steel blind rivets and sealed with silicon sealant.



### 5.3 Plating and Stamping

- 5.3.1 Owner's and manufacturer's serial number will be stamped into the inside right rear corner post at eye level.
- 5.3.2 Chemically etched stainless steel plates ( Consolidated data plate i.e. TIR, CSC, TCT ).will be permanently riveted with steel blind rivets and sealant will be applied around these plates.

## **6. TESTING AND INSPECTION**

### 6.1. Materials and Parts Inspection

All materials and parts are inspected by the manufacturer's Quality Control department to ensure they are up to the specification called for in the design.

### 6.2. Production Line Quality Control

All containers are manufactured under effective quality control procedures to meet the specified standards. All dimensions are checked and smooth operation of the doors are ensured after each container's completion. A light and watertight test is conducted on all containers.

Quality control personnel independent of the production dept. will be inspecting on all phases of the production as well as ad hoc inspections by the classification society's surveyor and buyer's representatives to assure the quality of the container.

## APPENDIX A

Material list for main steel parts:

YP = YIELD POINT (KG/MM<sup>2</sup>)

E = ELONGATION %

TS = TENSILE STRENGTH (KG/MM<sup>2</sup>)

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

**APPENDIX B**

**TESTING ITEMS, LOADS AND CRITERIA**

NOTE: Figures in brackets of "residual deformation" column show the total residual deformation after completion of the series tests 1, 2A, 2B, 2C, 3, and 6

R: Gross Weight 30,480 KG  
 P: Payload 28,295 KG  
 T: Tare Weight 2,185 KG  
 \*Measured from the plane of bottom corner fittings.  
 \*\*Elastic Deformation  
 \*\*\*Dimensions within ISO tolerance

Test Load	Permissible Criteria		
	Deflection under Load	Residual Deformation	
<b>1. Stacking</b>			
848 KN (86,400 KG) per post	Corner Posts	** 4MM	2MM
Offset: 25MM laterally 38MM longitudinally	Bottom Side	4MM	
	Rails		
	Cross Members	*6MM	3MM
(1.8R-T) loaded on floor			
<b>2.A. Lifting from the four top corner fittings</b>			
(2R), vertically (2R-T), loaded on floor	Bottom Side	4MM	
	Rails		
	Cross Members	*6MM	3MM
<b>2.B. Lifting from the four bottom corner fittings</b>			
(2R), lifting forces 45 angle (2R-T), Loaded on floor	Bottom Side	4MM	
	Rails		
	Cross Members	*6MM	3MM
<b>2.C. Lifting from fork pockets</b>			
(1.6R): (1.6R-T):loaded on floor	Bottom Side	*6MM	3MM
	Rails		

3.	Restraint  (2R), per rail, compression and tension longitudinally, (R-T) loaded on floor	Bottom Side Rails  Vertically Longitudinally	3MM 2MM
4.	Strength of End Walls  (0.4P) uniformly	Front End Panel Door Panel	8MM 5MM
5.	Strength of Side Walls  (0.6P) uniformly	Side Panel Top & Bottom Side Rails	10MM 4MM
6.	Floor Strength  7,260 KG, axle weight 3,630 KG per wheel	Cross Members	3MM
7.	Strength of the Roof  300 KG, distributed over an area of 300MM x 600MM	Roof Panel	5MM
8.A.	Rigidity (Transverse)  15,240 KG, horizontally, push and pull	End Frame (diagonal)	** 60MM 10MM
8.B.	Rigidity (Longitudinal)  7,620 KG, horizontally, push and pull	Side Frame (at Top Fittings)	** 25MM 7MM
9.	Weatherproofness  By Spray Rack System: Nozzle Pressure: Nozzle Diameter: Distance from Container Surface to Nozzle: Remove Speed:	0.5 hour min. 1 KG / CM <sup>2</sup> 12.5 MM 1.5 M 100 MM/SEC.	