



# BULLBOX

**20' REEFER COLD STORAGE  
TECHNICAL SPEC. BULLBOX**

STEEL DRY CARGO CONTAINER  
BULLBOX 20' HC 20' x 8' x 9'6

MODELO NO: **BULLBOX 20' REEFER COLD  
STORAGE**

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 **1.1 General**

The containers must be designed and manufactured under sufficient quality control in order to comply with following authorized classification societies, standards and regulations.

These containers specified herein will be manufactured by Contenedores y Embalajes Normalizados, S.A (hereinafter referred to BULLBOX) under strict quality control by BULLBOX and be **approved by the classification society** (Bureau Veritas, China Classification Society, Lloyd's Register of Shipping, American Bureau of Shipping...)

*ISO Container Standards* ISO 668. ISO 1161. ISO 1496-2. ISO 6346 ISO 3874

*T.I.R. Certification* : Approved by an authorized classification society.

*C.S.C. Certification* : All the containers will be certified and complied with the requirements of the "International Convention for the Safe Containers."

*T.C.T. Certification*. No exposed timber components to be used

All the containers will be certified for design type and individually inspected by classification society, BV, ABS, LR.

\* Note : BV : Bureau Veritas (France)  
ABS : American Bureau of Shipping (USA)  
LR : Lloyd's Register of Shipping (UK)

 **1.2 Handling and transportation**

The containers will be constructed to be capable of being handled without permanent deformation on following basis.

- a) Lifting, loaded or empty, at top corner fittings vertically by means of spreaders fitted with hooks, shackles or twist-locks, regardless of any port crane speed.
- b) Lifting, loaded or empty, at bottom corner fittings using slings with terminal fittings at any angle between vertical and 45 degrees to the horizontal.

The containers will be constructed to be suitable for transportation in normal operation conditions and in the following modes:

- a) Marine: Five (5) high stacked (on a level 24,000kgs ratings).
- b) Road: On flat bed or skeleton chassis, secured by twist-locks or equivalent ones at the bottom corner fittings.
- c) Rail: Suitable for rail transport under following modes. - COFC (Container-on-flatcar): secured by twist-locks or equivalent. - Double stacking on the train. - TOFC (Trailer-on-flatcar): secured to semi-trailer chassis.

 **2. Design criteria**

Design Loadings Floor 3,000 kg (3,000 lb) Stacking 43,200 kg per post.

Air Leakage Rate (Q) (with refrigeration unit) The air leakage is approximately 10 m<sup>3</sup>/hr. when the inside pressure of the container is 25.4 mm water column and the recess box for open door from inner is plugged. And the air leakage of machine is not more than 0.5 m<sup>3</sup>/hr. Drain tubes are closed during the test. The final air leakage value will according to the test result done in factory and certified by an authorized classification society.

Total Heat Leakage Rate (U) (with refrigeration unit) The total heat loss of the container is approximately 26 Kcal/hr. °C at mean insulation wall temperature of 10 °C.

The final heat loss value will according to the test result done in factory and certified by an authorized classification society



### 3. Dimensions and ratings

Dimensions are rated at standard temperature of 20 °C (68 °F).

#### Ratings

<b>Max. Gross Weight</b>	24,000 kgs	52,910 lbs
<b>Tare Weight</b>	2,880 kgs	6,350 lbs
<b>Max. Payload</b>	21,120 kgs	46,560 lbs

#### Overall

<b>Length</b>	6,058 + 0 mm	19'10 1/2" +0
	-6 mm	- 1/4"
<b>Width</b>	2,438 + 0 mm	8" +0
	-5 mm	- 3/16"
<b>Height</b>	2,896 + 0 mm	9' 6" +0
	-5 mm	- 3/16"

#### Internal

<b>Length</b>	5,412 mm	17' 9 5/64"
<b>Width</b>	2,292 mm	7' 6 15/64"
<b>Height</b>	2,310 mm	7' 6 15/16"

#### Door opening

<b>Width</b>	2,196 mm	7' 2 29/64"
<b>Height</b>	2,558 mm	8' 4 45/64"

#### Internal cubic capacity (nominal)

32.3 cu.m	1,140 cu.ft
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#### Forklift pockets

<b>Center distance</b>	2,080 mm
<b>Width</b>	360 mm
<b>Height min</b>	116 mm

#### Insulation Thickness and Density

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**03-DIMENSIONS AND RATINGS**

<b>Roof</b>	90.0 mm	40-45 kg/m <sup>3</sup>
<b>Side Wall</b>	61.0 mm	40-45 kg/m <sup>3</sup>
<b>Door</b>	90.0 mm	50-55 kg/m <sup>3</sup>
<b>Floor</b>	129.9/77 mm	45-50 kg/m <sup>3</sup>

**Diagonal Difference**

Maximum allowable difference between length of diagonals on the centers of the corner fittings:

Roof, Bottom & Side max. 13 mm (1/2")

Front & Rear End max. 10 mm (3/8")

 **4. Construction** **4.1 Floor**

The floor is composed of corrugated sub-floor, and floor flat with reversed T-shaped floor-board with insulation of polyurethane.

The corrugated sub-floor is welded to the lower bottom side rails and forklift pockets. Between reversed T-shaped floor-board and the sub-floor, some plastic nylon spacers are placed on cross member. Aluminum angle plates are to be screwed to each PE by full threaded steel screws and Aluminum angle plates are welded to the reversed Tshaped floor-board.

Four (4) drain holes are provided at the front and rear end of the container.  
There is the float Valve in the drain cover, which adjusts water in and out automatically.

*Lower Bottom Side Rail* Corten A / Equivalent. 4.0mm thick steel plate cold rolled form.

*Floor Flat* Reversed T-shaped extruded aluminum, flat surface is 30 mm high, A 6061-T6.

*Forklift Pocket* Top hat section pressed steel, 6.0mm, bottom plate, 6.0 mm, Corten A / Equivalent.

*Sub-floor* Corten A / Equivalent, 1.6mm thick with pressed corrugation.

*Floor Filler* PE

 **4.2 Roof**

The roof is composed of several MGSS panels butt welded together by automatic TIG welding with corrugations facing upwards onto which hat section corten A roof bows are welded to outer skin by spot welding. At the perimeter, the roof sheet is welded to the outside flange of the top side rail. Two LED fluorescent lights based on 220V are designed specifically for cold storage, and lights are fitted to the inner roof

*Roof* : 0.8 mm thick MGSS sheet with corrugations.

*Roof Bow*: Corten A / Equivalent, hat section, 1.6 mm thick.

*Roof lining* :0.8mm thick corrugated aluminum panels (preprinted transparent) tightly pressed together on joint to form one whole panel by occlusive technology.

*Lamp* : 220 V

 **4.3 Side Wall**

The side wall is composed of top side rails, upper bottom side rails, MGSS panels, and hat section side posts which are welded to the outer skin by spot welding; the outer skin is composed of several MGSS panels butt welded together by automatic TIG welding. Several stainless steel sheets with corrugations are welded together to form a one-piece lining. The interior switch of the alarm and fluorescent light is installed on the rear of the right side wall.

*Top Side Rail* Corten A / equivalent. 4.0 mm thick steel plate cold rolled form.

*Upper Bottom Side Rail* Corten A / equivalent. 4.0 mm thick steel plate cold rolled form.

*Side Panel* MGSS sheet with corrugations, 0.8 mm inner/ t1.0mm outer

*Side Post* Hat section, 1.6 mm, Corten A/Equivalent.

*Side Lining* 0.7mm thick stainless steel, with corrugations

 **4.4 Front Fame**

Front frame is composed of corten steel frame members. The reefer machine will be installed into the front frame. Receptacle is installed on the outside of front header.

*Front Corner :* Post Corten A/Equivalent, 4.0mm.

*Front Sill :* Corten A/Equivalent, 4.0mm.

*Front Header :* Corten A/Equivalent, 4.0 mm.

*Corner Casting :* Cast steel, JIS SCW480

*Receptacle :* 220V

 **4.5 Rear frame and Door**

Rear end wall is composed of corten steel frame and door. The rear door is split design, a smaller left door and a larger right door which can be opened from the inside.

The rear door is composed of 1.2mm thick MGSS panel, aluminum alloy frame and corrugated stainless steel inner lining with polyurethane insulation. Each door has hinges and locking gears and a door rope which holds it. The outer E.P.D.M "C" section double Lip and inner EPDM "J" section gasket with molded corners are provided.

A curtain assembly will be fixed on the rear end near door. Ramp has a lip at the front where it meets the door sill.

Rear Corner Post Corten A / equivalent, 6.0mm outer 6.0mm reinforcement

Rear Header Corten A / equivalent, 4.0mm, inner.

Rear Sill outer SPA-H 6.0mm / inner Corten A 4.0mm

Parts	Materials
1) <b>Door Pannel</b>	Outside Surface (MGSS sheet) painted to container's top color, 1.2mm.
2) <b>Door lining</b>	Stainless steel sheet, 0.7 mm thick with batten.
3) <b>Door curtain</b>	t2.0mm, Plastic must be approved by FDA
4) <b>Door Ramp</b>	Checker aluminum plate
5) <b>Corner casting</b>	Cast steel, JIS SCW480.
6) <b>Hinges</b>	steel
7) <b>Locking Gears</b>	Stainless steel
8) <b>Fasteners</b>	Stainless Steel
9) <b>Door gaskets (inner)</b>	EPDM "J" section
10) <b>Door gaskets (outer)</b>	EPDM "C" section double lip

Refrigeration Unit:

Machinery mounting

Designed and fabricated according to refrigeration unit requirements



## 5. Protective treatment



### 5.1 Surface preparation

#### *Prior to assembly*

- 1) All steel components (except MGSS), prior to forming will be shot blasted to Swedish Standard Sa2.5 to remove rust, mill scale etc.
- 2) MGSS components, prior to painting, will be cleaned to all oil and dirt etc.

#### *After assembly*

- 1) All M.G.S.S. parts will be sweep blasted and cleared to remove all oil rust, dirt and etc.
- 2) Surface treatment for painting will be done blasting on welding seam-line and all welding slags, splatters and other foreign materials will be removed.



### 5.2. Paint Surfaces

#### Steel parts

- 1) Exposed parts of steel (CORTEN A) structure.

- shop primer 10u
  - zinc primer 20u
  - epoxy primer 40u
  - Polyurethane top coating (RAL9010) 50u
- Total film thickness - 120 microns.

- 2) Exposed parts of stainless steel (MGSS only).

- epoxy primer 50u
  - Polyurethane top coating (RAL9010) 60u
- Total dry film thickness - 110 microns. 5.2.2

- 3) Under coating

- Zinc primer - 30 u
  - Top coat: Bitumen wax. - 200 u
- Total dry film thickness - 230 microns.

 **6. Insulation Material**

Material R141b blown rigid polyurethane foam.

Flammability SE class (Self-extinguishing)

Method In foamed sandwich panels.

Acrylic adhesive is coated on the inner surface of panels.


**7. Material specifications**

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

(min.)	Material	Yield Strength (min.) kg/mm <sup>2</sup>	Broken Strength (min.) kg/mm <sup>2</sup>	EL %
Steel				

a. Muffler Grade (DIN 1.4003) Stainless Steel Frame	(DIN 1.4003) YUS410W-M or R410-DH  SUH409L YUS409D	32  18	44  37	20  25
b. Steel Casting for Welded structure	SCW480	28	49	23
c. Carbon Steel Pipe	STK41	23	41	23
d. Carbon Steel Forging	S25C	27	45	27
e. Mild Carbon Steel	SS41	25	41	21
f. Stainless Steel		21	53	40
g. Corten steel		36	50	22

**Aluminium**

a. Al. Alloy Extrusion	A6061-T6	25	27	8
b. Al. Alloy Sheet		16	22	5

**Sealant**

Sealant for the interior of container must be approved by FDA.

P.E. Insulation tape or PVC Foam Tape,

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07-MATERIAL SPECIFICATIONS

PVC Foam Tape: Panel lapping

Sealant (Grey): Interior of container

Sealant (Grey): Exterior of container

Butyl: Under structure and hidden part

Adhesive

Acrylic : Metal to metal

Polyurethane : Metal to nonmetal

**8. Markings**

All containers are to be marked in accordance with ISO latest standard, regulations and owner's specifications. Decals shall be self adhesive kiss-cut cast vinyl film with back cutting.



## 9. Testing and inspection

### Prototype Container

A prototype container, built to the production design, is subjected to the following tests in accordance with the latest ISO standards (ISO 1496/2-1996) and certified by the Classification Society.

### Summary of Structure Tests

Maximum gross weight (R)	24,000 kg
Tare weight (T)	4,650 kg
Payload (R - T) (P)	21,120 kg
Stacking	43,200 kg/post
Lifting, top corner casting	(2R-T)
Lifting, bottom corner casting	(2R-T)
Restraint	compression & tension)(Rg)
Rear end wall test	3,185 kg
Front end wall	( 0.4Pg)
Side wall test (0.6Pg)	(0.6Pg)
Roof test	300 kg
Floor, axle load	3,000 kg
Transverse rigidity	15,240 kg/end
Longitudinal rigidity	7,620 kg/side
Lifting , forklift pocket	(1.6R-T)

### Air Leakage Test (Each container)

The container is tested for air leakage at a static internal pressure of 25.4 mm water column. Drain tubes are closed during the test.

### Thermal Test

These tests will be carried out in accordance with ISO 1496/2.

**Dimension Check**The containers will be checked for specified dimension to ensure compliance with this specification.

**10. Guarantee**

**Workmanship and Materials** The manufacturer shall guarantee the workmanship, design, construction and materials against any defect for one (1) year after the acceptance of the container.

**Paint System** The paint system including workmanship and materials shall be guaranteed against such as corrosion, paint failure, color fading, discoloration and all other defects for a period of three (3) years.

Corrosion shall be defined as rusting which exceeds RE3 (European Scale of Rusting).

**Marking System** Marking decals, including workmanship and materials shall be guaranteed against any defect including but not limited to tenting, fading, and discoloration, chalking and peeling for a period of five (5) years after acceptance of the container.



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