40’HC REEFER COLD STORAGE
TECHNICAL SPEC. BULLBOX

REFRIGERATED CONTAINER
BULLBOX 40’HC 40’ x 8’ x 9’6

MODELO NO: BULLBOX 40’ HC REEFER COLD STORAGE
DATE OF ISSUE: October, 2017
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...)


C.S.C. Certification: In compliance with "International Convention for Safe Containers" and approved by an authorized classification society

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 30 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: Seven (7) high stacked (on a level 32,000kgs 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 (6,610 lb) Stacking 86,400 kg per post.

Air Leakage Rate (Q) (with refrigeration unit) The air leakage is approximately 15 m³/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 m³/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 45 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

<table>
<thead>
<tr>
<th></th>
<th>Max. Gross Weight</th>
<th>Tare Weight</th>
<th>Payload</th>
</tr>
</thead>
<tbody>
<tr>
<td>(R)</td>
<td>30,480 kg (67,200 lb)</td>
<td>4,650 kg (10,250 lb)</td>
<td>25,830 kg (56,950 lb)</td>
</tr>
</tbody>
</table>

Overall

<table>
<thead>
<tr>
<th>Length</th>
<th>2,192 mm + 0mm</th>
<th>40' +0/-25/64&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>2,438 mm + 0mm</td>
<td>8' 0&quot; +0/-3/16&quot;</td>
</tr>
<tr>
<td>Height</td>
<td>2,896 mm + 0mm</td>
<td>9' 6&quot; +0/-3/16&quot;</td>
</tr>
</tbody>
</table>

Internal

<table>
<thead>
<tr>
<th>Length</th>
<th>11,560 mm</th>
<th>37' 11 1/8&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>2,292 mm</td>
<td>7' 6 15/64&quot;</td>
</tr>
<tr>
<td>Height</td>
<td>2,605 mm</td>
<td>8' 6 9/16&quot;</td>
</tr>
</tbody>
</table>

Door opening

<table>
<thead>
<tr>
<th>Width</th>
<th>2,196 mm</th>
<th>7' 2 29/64&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>2,556 mm</td>
<td>8' 4 5/8&quot;</td>
</tr>
</tbody>
</table>

Internal cubic capacity (nominal)

69.0 m³ (2,435 ft³)
Gooseneck tunnel dimensions (Nominal)

Length  3171 mm   10' 4 27/32"

Width  1,029 mm  +3/-0 mm   3' 4 33/64" +1/8"/-0"

Height  120 mm  +0/-3 mm   4 23/32" +0"/-1/8"

Insulation Thickness and Density

Roof       90.0 mm   40-45 kg/m³
Side Wall  61.0 mm   40-45 kg/m³
Door        90.0 mm   50-55 kg/m³
Floor  129.9/77 mm  50-60 kg/m³
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 gooseneck tunnel. 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 T-shaped 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  SPA-H (B480) / Equivalent. 4.0mm thick steel plate cold rolled form.

Floor Flat  Reversed T-shaped extruded aluminum, flat surface is 30 mm high, A6061-T6.

Gooseneck Tunnel  Pressed steel section, 4.0mm, thick one plate. Bolster: welded construction with 4.5mm thick upper plate, 2 pieces of 4.5/6.0mm thick inner reinforcement and 4.5mm thick "U" section lower member.

Sub-floor  SPA-H (B480) / 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 SPA-H (B480) 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. Three LED fluorescent lights based on 220V are designed specifically for cold storage, and lights are fitted on the surface of inner roof.

Roof: 0.8mm thick MGSS sheet with corrugations.

Roof Bow: SPA-H (B480) / Equivalent, hat section, 1.6 mm thick.

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

Light: 220 V
04-CONSTRUCTION

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* SPA-H (B480)/ equivalent. 4.0 mm thick steel plate cold rolled form.

*Upper Bottom Side Rail* SPA-H (B480)/ equivalent. 4.0 mm thick steel plate cold rolled form.

*Side Panel* MGSS sheet with corrugations, 0.8 mm inner/1.0mm outer

*Side Post* hat section, 1.6 mm, SPA-H (B480)/Equivalent.

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

4.4 Front Frame

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* SPA-H (B480)/ Equivalent, outer 4.5 mm/ inner 4.0 mm

*Front Sill* SPA-H (B480)/ Equivalent, 4.0 mm.

*Front Header* SPA-H (B480)/ 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.

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* SPA-H (B480)/ equivalent, 6.0mm outer 6.0mm reinforcement

*Rear Header* SPA-H (B480)/ equivalent, 4.0mm.

*Rear Sill* outer MGSS 6.0mm / inner SPA-H (B480)/ equivalent 4.0mm
<table>
<thead>
<tr>
<th>Parts</th>
<th>Materials by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Door Pannel</td>
<td>MGSS, 1.2mm, thick.</td>
</tr>
<tr>
<td>2) Door lining</td>
<td>Stainless steel sheet, 0.7 mm thick with batten.</td>
</tr>
<tr>
<td>3) Door curtain</td>
<td>t2.0mm, Plastic must be approved by FDA</td>
</tr>
<tr>
<td>4) Door Ramp</td>
<td>Checker aluminum plate</td>
</tr>
<tr>
<td>5) Corner casting</td>
<td>Cast steel, JIS SCW480.</td>
</tr>
<tr>
<td>6) Hinges</td>
<td>Five per door, A6061-t6</td>
</tr>
<tr>
<td>7) Locking Gears</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>8) Fasteners</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>9) Door gaskets (inner)</td>
<td>EPDM “J” section</td>
</tr>
<tr>
<td>10) Door gaskets (outer)</td>
<td>EPDM “C” section double lip</td>
</tr>
</tbody>
</table>

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

2) Exposed parts of stainless steel (MGSS only).
   - epoxy primer 50 u
   - Polyurethane top coating (RAL9010) 60 u
   Total dry film thickness - 110 microns.

3) Under coating
   - Zinc primer - 30 u
   - Top coat: Bitumen wax. - 200 u
   Total dry film thickness - 230 microns.
6. Insulation Material

Material CP blown rigid polyurethane foam.

Flammability SE class (Self-extinguishing)

Method In foamed sandwich panels.

Acrylic adhesive is coated on the inner surface of panels.
The prototype container manufactured in accordance with this specification will be tested by manufacturer under the supervision of classification society.

<table>
<thead>
<tr>
<th>Material</th>
<th>Yield Strength (min.) kg/mm²</th>
<th>Broken Strength (min.) kg/mm²</th>
<th>El. (min.) %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Steel</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Muffler Grade (DIN 1.4003) Stainless Steel Frame</td>
<td>(DIN 1.4003) YUS410W-M or R410-DH SUH409L YUS409D</td>
<td>32</td>
<td>44</td>
</tr>
<tr>
<td>b. Steel Casting for Welded structure</td>
<td>SCW480</td>
<td>28</td>
<td>49</td>
</tr>
<tr>
<td>c. Carbon Steel Pipe</td>
<td>STK41</td>
<td>23</td>
<td>41</td>
</tr>
<tr>
<td>d. Carbon Steel Forging</td>
<td>S25C</td>
<td>27</td>
<td>45</td>
</tr>
<tr>
<td>e. Mild Carbon Steel</td>
<td></td>
<td>25</td>
<td>41</td>
</tr>
<tr>
<td>f. Stainless Steel</td>
<td></td>
<td>21</td>
<td>53</td>
</tr>
<tr>
<td>g. Corten Steel</td>
<td>SPA-H (B480)</td>
<td>36</td>
<td>50</td>
</tr>
<tr>
<td><strong>Aluminium</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Al. Alloy Extrusion</td>
<td>A6061-T6</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>b. Al. Alloy Sheet</td>
<td></td>
<td>16</td>
<td>22</td>
</tr>
</tbody>
</table>
07-MATERIAL SPECIFICATIONS

Sealant

Sealant for the interior of container must be approved by FDA.
P.E. Insulation tape or PVC Foam Tape, and sponge tape:

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

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum gross weight (R)</td>
<td>30,480 kg</td>
</tr>
<tr>
<td>Tare weight (T)</td>
<td>4,650 kg</td>
</tr>
<tr>
<td>Payload (R - T) (P)</td>
<td>25,830 kg</td>
</tr>
<tr>
<td>Stacking</td>
<td>86,400 kg/post</td>
</tr>
<tr>
<td>Lifting, top corner casting</td>
<td>(2R-T)</td>
</tr>
<tr>
<td>Lifting, bottom corner casting</td>
<td>(2R-T)</td>
</tr>
<tr>
<td>Restraint compression &amp; tension (Rg)</td>
<td></td>
</tr>
<tr>
<td>Rear end wall test</td>
<td>3,185 kg</td>
</tr>
<tr>
<td>Front end wall</td>
<td>(0.4Pg)</td>
</tr>
<tr>
<td>Side wall test (0.6Pg)</td>
<td>(0.6Pg)</td>
</tr>
<tr>
<td>Roof test</td>
<td>300 kg</td>
</tr>
<tr>
<td>Floor, axle load</td>
<td>3,000 kg</td>
</tr>
<tr>
<td>Transverse rigidity</td>
<td>150 KN/end</td>
</tr>
<tr>
<td>Longitudinal rigidity</td>
<td>75 KN/side</td>
</tr>
</tbody>
</table>

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.