



**MERCURY**  
CONTAINER TRADING

*STAR* ❄️ *COOL*

TECHNICAL SPECIFICATIONS  
FOR

20' X 8' X 8'6" REFRIGERATED CONTAINER WITH INTEGRATED  
STAR COOL MACHINE

MODEL NO.: MQRS-20SS-062A

SuPoTec® FOAMING SYSTEM

- H.G.S.S. SIDE, DOOR LINING
- M.G.S.S. SIDE, BASE, ROOF, DOOR PANEL
- PRE-PAINTED ALUMINUM ROOF LINING
- CORTEN END FRAMES AND RAILS
- ALUMINIUM SCUFF LINER
- HOT ZINC SPRAYED FRAME
- INTEGRATED REFRIGERATION SYSTEM WITH STAR COOL  
MODEL SCI-40

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**Drawing Reference**

<u>NO</u>	<u>TITLE</u>	<u>DRAWING NO.</u>
1	General Arrangement	MQRI-20SS-1421A-00
2	Base Assembly	MQRI-20SS-1421A-01
3	Floor Assembly	MQRI-20SS-1421A-02
4	Integrated Front Frame Assembly	MQRI-20SS-1421A-03
5	Rear Frame Assembly	MQRI-20SS-1421A-04
6	Rear Door Assembly	MQRI-20SS-1421A-05
7	Side Wall Assembly	MQRI-20SS-1421A-06
8	Rear Jamb Assembly	MQRI-20SS-1421A-07
9	Roof Assembly	MQRI-20SS-1421A-08
10	Baffle Plate Assembly	MQRI-20SS-1421A-09
11	Integrated Front Foam Assembly	MQRI-20SS-1421A-10
12	Front Lining Assembly	MQRI-20SS-1421A-11
13	Door Lining Assembly	MQRI-20SS-1421A-12
14	Side Lining Assembly	MQRI-20SS-1421A-13
15	Refrigeration System	MQRI-20SS-1421A-14
16	Marking Arrangement	MQRI-20SS-1421A-15
17	Metalizing Application	MQRI-20SS-1421A-16

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## **1. GENERAL**

### **1.1 Operational environment**

The container is designed and manufactured for the transport of frozen, chilled and general cargo in marine, on highway and railway throughout the world. It must remain serviceable under the operating conditions encountered during each of the above mode of transport, as well as during climatic condition at temperatures of minus 40 deg.C to plus 80 deg.C without any effect on the containers strength and water-tightness.

### **1.2 Standards and regulations**

- 1) I.S.O. (TC 104 1496/2)
- 2) T.I.R. approved by G.L.
- 3) Classification Society: G.L.
- 4) C.S.C. approved by classification society.
- 5) T.C.T. : No exposed timber components to be used.
- 6) A.T.P. (Containers to be designed and tested by ATP regulations).
- 7) U.I.C. approved by classification society.
- 8) Meet USDA cold treatment registration.
- 9) Meet ATO-DLO (Springer institute) certification.
- 10) I.S.O. 1161 and ABS Section 14 corner casting regulation.

### **1.3 Handling**

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

### **1.4 Transportation**

- 1) Marine :Eight (8) high stacked (on a level 32,500kgs ratings) in the ship cell guide and Four (4) high stacked on the deck.
- 2) Road :On flat bed or skeletal chassis, secured by twist-locks or combination of twist-locks and front penetration pins to lock the two (2) bottom corner fittings.
- 3) Rail - road
  - \* 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. TESTING AND INSPECTION

### 2.1 Proto-type container

A proto-type container manufactured in accordance with this specification will be tested according to the procedures described in the ISO 1496/2 and the Classification Society's Rules. Upon completion of the test, the container will be certified by the society with a test report showing the deflection and/or variations with in the criteria of the permissible values specified in society's Rules.

1) Stacking	102,375 kgs/post	(225,690 lbs/post)
2) Top lifting	2 R	
3) Bottom lifting	2 R	
4) Restraint	R / rail.	
5) Fork pocket lifting	1.6 R	
6) End wall strength	0.4 P	
7) Side wall strength	0.6 P	
8) Roof strength	300 kgs	(660 lbs)
9) Floor strength	7,260 kgs	(16,000 lbs)
10) Racking- Transverse	15,240 kgs	(33,600 lbs)
	Longitudinal 7,620 kgs	(16,800 lbs)
11) Air tightness	25.4 mm (1") Aq. Internal pressure.	
12) Thermal test		
13) Cooling performance test		

Where        R: Max. Gross Weight  
                   P: Max. Payload  
                   T: Tare Weight

### 2.2 Production Line Container

Every container is manufactured under the effective quality control procedures to meet the specified standards.

After completion, all containers are subject to visual check, door operation check, etc.

### 2.3 Batch test

Minimum one (1) container per every production batch shall be tested for structure, heat leakage.

- 1) Air leakage test  
     Frequency: Every one (1) unit per 10 containers.
- 2) Structure test  
     Item: Stacking  
           Top lifting  
           Floor strength  
           Transverse racking  
     Frequency: Every one (1) unit per 200 containers.
- 3) Thermal test  
     Frequency: Every one (1) unit per 200 containers

### **3. DIMENSIONS AND RATINGS**

\* The dimensions and tolerances apply when measured at the temperature of 20 deg.C(68 deg.F) according to ISO 668-1995(E).

#### **3.1 External Dimensions**

	mm	ft - in	
Length (overall)	6,058 +0, -6	19 - 10 1/2	+0, -1/4
Width (overall)	2,438 +0, -5	8 - 0	+0, -3/16
Height (overall)	2,591 +0, -5	8 - 6	+0, -3/16

#### **3.2 Internal Dimensions (nominal)**

	mm	ft - in	
Length	5,454 +0, -10	17 - 10 11/16	+0, -3/8
Width	2,290 +0, -10	7 - 6 3/16	+0, -3/8
Height	2,263 +0, -10	7 - 5 1/8	+0, -3/8

#### **3.3 Door Opening Dimension (nominal)**

	mm	ft - in	
Width	2,290 +0, -5	7 - 6 3/16	+0, -3/16
Height	2,252 +0, -5	7 - 4 11/16	+0, -3/16

#### **3.4 Inside cubic capacity (nominal)**

	cu. m	cu. ft
	28.3	998

#### **3.5 Ratings**

	kgs.	lbs
Tested max. gross weight	30,480	67,200
Payload	27,640	60,940
Tare weight	2,840	6,260
(Including integrated refrigeration system) (Tolerance +2%,-2%)		

#### **3.6 Air Leakage Rate**

Maximum Air Leakage Rate (Q) : 2.5 cu.m./hr. (at 25.4 mm Aq.)

#### **3.7 Total Heat Transmission Rate**

Maximum Heat Leakage Rate (U10) : 21 kcal/hr. deg.C max.

## 4. MATERIALS

### 4.1 Steel

Description	Material	Yield point kg/sq.mm(min.)	Tensile strength kg/sq.mm(min.)
1) Corrosion resistant high tensile steel	SPA-H	35	49
2) High tensile rolled steel	SS490	29	50
3) Welded cast steel	SCW480	28	49
4) Mild carbon steel	SS400	25	41
5) Stainless steel (H.G.S.S.)			
	SUS304	21	52
	SUS436	25	46
	NTK D-7	27	61
6) Muffler grade stainless steel (M.G.S.S.)			
	SUS410, SUH409	25	41

### 4.2 Aluminum

1) Extrusion	6082-T6	26	29
	6062-T6	25	27
	6063-T5	18	21
2) Roof lining	5052-H42	16	22
	5052-H46		
3) Sheet	5052-H34	18	24

#### **4.3 Sealant**

- 1) Polyurethane or MS-polymer sealing compound. Sealant for the interior of container must be approved by FDA.
- 2) Butyl sealing compound (Unexposed)
- 3) Silicone sealing compound (Some exterior area)

#### **4.4 Foam tape**

- 1) 1.6 mm (0.063") thick, P.V.C. (Polyvinyl chloride) foam tape, one side adhesive, aluminum grey colored.
- 2) 3.0 mm(0.118") thick, E.P.D.M.(Ethylene-Propylene-Diene Monomer) anti-electrolysis foam gasket, black colored.

#### **4.5 Galvanic corrosion prevention**

E.P.D.M. insulating foam tape with Grey color (Between door hardware and Stainless steel door skin).

#### **4.6 Insulation**

- 1)Material : Environmental friendly 0-Ozone Depleting Potential and low Global Warming Potential, SuPoTec® (Modified Cyclo-pentane) blown rigid polyurethane foam

- 2) Nominal thickness and density:

	<u>thickness</u>	<u>overall density</u>	<u>core density</u>
Base	95 mm	50 kg/cu.m	40 - 47 kg/cu.m
Side	65 mm	45 kg/cu.m	35 - 42 kg/cu.m
Roof	90 mm	45 kg/cu.m	35 - 42 kg/cu.m
Door	78 mm	55 kg/cu.m	45 - 52 kg/cu.m
Front wall	67-85 mm	50 kg/cu.m	40 - 47 kg/cu.m

- 3) Surface preparation for PUR. Foam contact area:
  - Following metal surfaces contacting insulation PUR foam area to be coated with foamed adhesive:
    - Side panel and lining
    - Aluminum T-floor
    - Base panel assembly
    - Door panel and lining
    - Roof panel



## 5. CONSTRUCTION

### 5.1 Refrigeration machinery :

- Model : Integrated refrigeration system with Star Cool SCI-40

### 5.2 Base structure

- Sub-floor : M.G.S.S., 0.8mm thick main & 1.0mm front/rear end, 7mm deep corrugation, SPA-H, 3.2mm rear end welded to the bottom side rail on one side of sub-floor.
- Fork pocket : SPA-H, 4.0 mm(0.157"), One(1) piece pressed hat section with 6.0mm bottom plate.
- Cross member : SPA-H 4.0mm, three (3) pieces pressed trapezium section.

### 5.3 Flooring

- Floor stringer : P.E. located between cross member and aluminum floor board.
- Floor board : Aluminum AA6082-T6, 40 mm high, extruded round header section. Butt welding by automatic MIG welding machine.

### 5.4 Front frame structure

- Front corner post : SPA-H, 6.0 mm (0.236") outer and 2.0 mm (0.079") inner.  
Two (2) elements fabricated integral section.
- Front top rail : SPA-H, 4.0 mm (0.157") one(1) piece top rail with 4.5 mm (0.177") double plates
- Front bottom rail : SPA-H, 3.2 mm (0.126") thick outer and gusset constructed special section.  
Two (2) triangle gussets are welded to both ends of the front bottom rail and corner castings to reinforced strength.
- Front top plate : M.G.S.S., 2.0 mm (0.079") thick outer with three corrugations and "C" section reinforcement.
- Front unit plate, lower: MGSS, 1.6 mm (0.063") thick outer with five corrugations

### 5.5 Rear frame structure

- Rear corner post : SPA-H, 6.0 mm (0.236") thick outer, inner "A", and 8.0mm (0.315") inner "B" with 8.0mm (0.315") stiffeners.

- Rear header : SPA-H, 4.0 mm (0.157") outer and 3.2 mm (0.126") inner with 4.5 mm (0.177") double plates, constructed special section with four (4) gussets behind the cam keeper.
- Rear sill : SPA-H., 6.0 mm (0.236") outer and SPA-H, 4.0 mm (0.157") inner welded to SS400 DIA. 25 reinforcement.  
Two (2) SS400 10.0mm (0.394") V- trapezium section cone damage protectors are welded to the both ends of the rear sill and corner castings.
- Rear jamb post : Rigid P.V.C. extruded special section.

## **5.6 Door assembly**

- Door panel : M.G.S.S., 1.6mm (0.063") thick outer facing with SPA-H reinforced member and E.P.D.M. rubber (4) edges door gasket fastened.  
Attached two chain holder to the inner locking rods on the door.  
Each door to be capable of opening through 270 degrees.
- Door locking gear : SAEJIN model SJ-88MOD type or equivalent.  
34 mm (1.339") outer locking bar diameter.
- Hinge assembly : Hinge blade - SS400, 8mm thick, hot dip galvanized.  
Hinge pin and washer - 12.7 mm dia. SUS304  
Hinge washer - SUS304  
Hinge bush - BRONZE
- Door frame : High impact rigid plastic, extrusion.
- Door inner gasket : E.P.D.M., extruded double lip section gasket and vulcanized corners to make an one (1) piece.
- Door fastener : Door hardware including door hinges assembly to be fastened with galvanized carbon steel bolts and nuts.
- Door lining : H.G.S.S. (NTK D-7), 0.7 mm (0.028") thick, 12 mm high standing ribs corrugation panel.

## **5.7 Side assembly**

- Top side rail : SPA-H, 4.0 mm thick, one (1) piece roll formed slope open section.
- Bottom side rail : SPA-H, 4.0 mm thick lower and 3.0mm upper.  
Both end constructed SS400, 10mm thick side protector to weld to corner casting.

- Side panel : M.G.S.S., 1.0 mm thick main & 1.2 mm thick end corrugated type. Each sheet with inverted ribs to be automatically butt-welded together into one panel and continuously welded to the exterior of peripheral frame.
- Side post :SPA-H, pressed hat section, 9 pieces of 1.6 mm spot welding to side panel and 3 pieces of 4.5 mm reinforcement stitch welding to side post.
- Side stringer : Rigid P.V.C., extruded special section.
- Side lining : H.G.S.S. (NTK D-7), 0.7mm (0.028") thick , 7mm depth inverted small corrugation panel.  
Automatically butt-welded together to form one (1) piece
- Scuff liner : Aluminum 6062-T6, 2.7 mm (0.106") thick, 410 mm high, full length one pieces Alum. extrusion to be installed at bottom of each side lining panel.

### **5.8 Roof assembly**

- Roof panel : M.G.S.S., 0.8 mm thick main and end. Each sheet with 4mm high standing corrugation to be automatically butt-welded together into one panel and continuously welded to the exterior of peripheral frame.
- Roof post : M.G.S.S., 0.8 mm thick, spot welded to roof panel
- Roof stringer : Rigid P.V.C., extruded.
- Roof lining : Aluminum, 0.8mm(0.031") thick one (1) piece pre-painted white panel with small beads.

### **5.9 Additional attachment**

- 1) Floor drain:  
Four (4) kazoo drains to be provided at the front and rear gutter.
- 2) Generator mounting device:  
Clip on type generating set at both front corner posts and front top rail to be equipped with connection points to accommodate the clip-on generating set.
- 3) Lashing bar:  
Five (5) lashing bars to be installed between the outer two (2) floor tees on each side.  
(Safe working load of 1,000 kgs)

### **5.10 Marking**

All containers are to be marked in accordance with the latest CSC and TIR requirements as well as ISO, as modified by customer, specified marks.

- 1) Decal :
  - Owner's code and serial number.
  - Size and type code.
  - Capacity marking.
  - Certifying agency emblem.
  - Others.
  
- 2) Plates: Data plate (C.S.C. /T.I.R. and T.C.T., etc..).
  
- 3) Permanent identification
  - Stamped 9.5 mm (3/8") high digits the owner's serial number on the top face of the left hand rear lower corner fitting.

## **6. PRESERVATION**

### **6.1 Surface preparation of steel parts**

- 1) Hot dip galvanized to 65 microns.
  - \* Door locking rod assembly with brackets.
  - \* Door T.I.R. slam plate.
  - \* Hinge blades.
  
- 2) Zinc plated to a minimum 13 microns
  - \* Tapping screw and steel fasteners.
  
- 3) Surface preparation prior to painting shall be accordance with the section 6.3 of this specification for surface preparation procedure.

## **6.2 Painting**

Total DFT meets 90/10 rule.

- 1) Coverage for DFT should be minimum 90% of the total painted surface with specified DFT mentioned below.
- 2) The rest of Maximum 10% of the painted surface should not have a DFT below 90% of the specified DFT.

### **6.2.1 Steel frames**

<b><u>Description</u></b>	<b><u>D.F.T. (microns)</u></b>
Outside surface	
Hot Zinc spray	40-60
Zinc phosphate epoxy primer	40
Acrylic top coat	50
Total (Excluding hot spray Zinc galvanizing)	90

### **6.2.2 M.G.S.S. /H.G.S.S. material parts**

Outside surface	
Zinc phosphate epoxy primer	40
Acrylic top coat	50
Total	90

### **6.2.3 M.G.S.S. panels (Only door panels)**

Outside surface	
Zinc phosphate epoxy primer	40
Urethane top coat	50
Total	90

### **6.2.4 Understructure**

Outside surface	
Zinc phosphate epoxy primer	30
Dinitrol 4941K or Tectyl 121B	200
Total	230

### **6.2.5 Top coat color** : RAL 9010white

### **6.2.6 Paint supplier** : HEMPEL (Except pretreatment primer)

Paint system :

Middle coat :Zinc phosphate epoxy primer(HEMPADUR 15554)

Top coat : Acrylic top coat(HEMPATEX HI-BUILD 4637C) for box

Urethane top coat(HEMPATHANE 55210) for door

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## **6.3 Surface preparation procedure**

### **6.3.1 Prior to assembly**

#### **6.3.1.1 Shot blasting (SPA-H parts)**

##### **A. Shot blasting**

- 1) Abrasive material: Grit, ball, cut wire or their mixture shall be used as abrasive material for blasting. Mixture shall be suitably adjusted to achieve the required quality standard.
- 2) Blasting condition:
  - Surface preparation grade: ISO 8501-1, 1988 Sa2.0
  - Density: Avg. 70 % ( For both side of sheets and outside of profiles)

##### **B. Shop primer coating**

Around 10 microns

### **6.3.2 After assembly**

#### **6.3.2.1 End frame station**

##### **A. Shot blasting**

Prior to hot spray Zinc metalizing, edge SPA-H parts will be shot blasted.

Blasting condition:

- Surface preparation grade: ISO 8501-1, 1988 Sa2.5
- Density: Avg. 95%
- Roughness: 40 - 60u (No greater than 80 microns)

##### **B. Hot Zinc spray**

- 1) Application standard: BS EN 22063 Metallic and other inorganic coating
  - Thermal spraying-Zinc, aluminum and their alloys.
- 2) 40-60 microns to exposed area

##### **C. Primer coating**

40 microns to exposed surface

### **6.3.2.2 Base frame station**

#### **A. Shot blasting**

1) Abrasive material: Grit, ball, cut wire or their mixture shall be used as abrasive material for blasting. Mixture shall be suitably adjusted to achieve the required quality standard.

2) Blasting condition

##### Corten frames:

- Surface preparation grade: ISO 8501-1, 1988 Sa2.0
- Density : Avg.70%
- Roughness: 25 - 40u

### **6.3.2.3 Main frame station**

#### **6.3.2.3.1 SPA-H parts:**

##### **A. Shot blasting**

Prior to hot spray Zinc metalizing, exhibit SPA-H parts will be shot blasted

Blasting condition:

- Surface preparation grade: ISO 8501-1, 1988 Sa2.5
- Density: Avg. 95%
- Roughness: 40 - 60u (No greater than 80 microns)

##### **B. Hot Zinc spray**

1) Application standard: BS EN 22063 Metallic and other inorganic coating

– Thermal spraying-Zinc, aluminum and their alloys.

2) 40-60 microns to top & bottom side rail, cross member, fork lift and welding seam line on the frame to panel area.

##### **C. Primer coating**

1) 30 microns zinc rich primer to no zinc metalizing area

2) 40 microns zinc phosphate epoxy primer to top and bottom side rail.

3) 30 microns zinc phosphate epoxy primer to fork lift and cross member.

##### **D. Top coating**

50 microns to end frame, top and bottom side rail.



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#### **6.3.2.3.2 MGSS/HGSS parts:**

##### **A. Shot blasting**

All exhibit MGSS/HGSS parts will be sweep blasted.

Blasting condition:

- Surface preparation grade: Uniformly affected
- Density: 30-40 %
- Roughness profile: 25 - 40u

##### **B. Primer coating**

- 1) 40 microns to door, side, and roof panel outside, panel welding seam line.
- 2) 30 microns to base panel outside, panel welding seam line.

##### **C. Top coating**

50 microns to door, side, and roof panel outside, panel welding seam line.

#### **6.3.3 Final painting touch-up**

Touch-up coating for damaged parts or low DFT area (minor repair).

All the unnecessary touch-up coating shall be avoided.

#### **6.3.4 Under coating**

The priming condition should be checked and re-sprayed if any paint holiday part is found prior to undercoating.

## II. CONTENTS FOR REFRIGERATION SYSTEM

### 11. MODEL VERSION

#### 11.1 This specification covers

- |    |                  |            |
|----|------------------|------------|
| 1) | Model            | SCI-40     |
| 2) | Version          | 3.4        |
| 3) | Release Date     | 2010-01-01 |
| 4) | Part number      | 810300A    |
| 5) | Software release | 0345       |

Model codes:

<b>Model code</b>							<b>Description</b>
SCI	-	40	-				
SCI	-	40	-	AV+			
SCI	-	40	-	W			
SCI	-	40	-	W	-	AV+	

Options:

<b>Option</b>	<b>Default</b>	<b>Possible options</b>	
Water cooling	No	Yes	
RMM modem	No	Yes	
Quest functionality	No	Yes - default off	Yes - default on
AV+ functionality	No	Yes	
Frozen economy	No	Yes - default off	Yes - default on

## **12. GENERAL DESCRIPTION**

### **12.1 General**

The *STAR\*COOL* model SCI-40 is an electric powered integrated cooling and heating system operating on refrigerant R134a.

The system is designed to maintain cargo temperatures in a range from  $-30^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$ ) to  $+30^{\circ}\text{C}$  ( $86^{\circ}\text{F}$ ).

The system is designed to operate in ambient temperatures from  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$

The refrigeration system is integrated into the front frame of a 40' HC and 20' container.

The rear bulkhead is made of pre-coated Fibre Reinforced Plastic.

#### **12.1.1 The refrigeration system is designed to operate satisfactorily under sea going and environmental conditions as specified below**

- 1) Salt-laden air, sea spray and high humidity.
- 2) Rolling: amplitude of  $30^{\circ}$  each side, period of 13 seconds.
- 3) Pitching: amplitude of  $6^{\circ}$  each side, period of 8 seconds.
- 4) Permanent list:  $15^{\circ}$  on each side.
- 5) Shock: 2g horizontal and 5g vertical.
- 6) Vibrations: of the types encountered on ships, trucks and rail.

#### **12.1.2 The system consists of the following modules**

- 1) Condenser / compressor module
- 2) Evaporator module
- 3) Evaporator fan module

#### **12.1.3 The cooling system**

The cooling system is equipped with a two – stage compressor, electrically driven through a frequency converter.

The cooling system is also equipped with an economizer, which performs the task of sub-cooling the liquid from the receiver to the evaporator, thereby increasing the cooling capacity of the cooling system.

The evaporators are controlled by electronically expansion valves.

The equipment is designed to operate on a nominal 410 / 450 AC, 3 phase, 50/60 Hz, primary power source, according to ISO 1496-2.

An integrated dual wound transformer supplies control circuit voltage.

An automatic system, power supply sensing and correction, is provided to ensure the correct direction of rotation for the fan motors. This is done regardless of the incoming phase sequence from the primary power supply, provided that all fan motors are wired correctly.

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The system is controlled by an electronic controller manufactured by Lodam Electronics, controlling on the supply temperature probe in chilled mode (temperature setting above or equal to  $-5^{\circ}\text{C}$  ( $23^{\circ}\text{F}$ )) and on the return temperature in the frozen mode (temperature setting below  $-5^{\circ}\text{C}$  ( $23^{\circ}\text{F}$ )).  
Controller accuracy is  $\pm 0.25^{\circ}\text{C}$  ( $\pm 0.45^{\circ}\text{F}$ ).

In frozen mode heating is disabled.

System can operate the evaporator fans in 2 speeds (High- and low speed). This is chosen from the controller display, under operation menu.

At set point temperature above or equal to  $0^{\circ}\text{C}$  ( $+32^{\circ}\text{F}$ ) and closed fresh air ventilation, the controller is default set to low speed on the evaporator fans.

The air from the system is delivered to the bottom of the container, with return air through the top of the evaporator coil section (bottom air delivery).

The system is equipped with a de-humidification function controlled by the electronic controller of the system. The humidity set point can be set in the range from 95 – 50 % RH. The system can control to the lowest level. The de-humidification function is active as long as the temperature control is in set point range. The system is equipped with heating elements, mounted under the evaporator coil, for the dehumidification.

The de-humidification system is disabled in economy mode.

The system is equipped with a dual system for defrosting. There is installed a hot-gas valve, in the refrigeration system, for hot-gas defrosting of the evaporator coil. Furthermore the heating elements, mounted under the evaporator coil, are energized during defrost.

This dual system for defrosting ensures fast defrost sequence and thereby only a very small input of heat to the container. This results in a very small temperature variations for the transported cargo, after a defrost sequence. The dual system for defrost also ensures an even distribution of heat to the evaporator coil. The result of this is that there is no building up of ice in corners or other places of the evaporator coil.

The two defrost systems, hot-gas and heating elements, are independent. This ensures a defrost sequence to be carried out, even with one system failing.

The defrost method is on-demand defrost.

The system is equipped with a data-logger, incorporated in the controller.

The logging interval is in pre-defined intervals, 15, 30, 60 or 120 minutes.

## **12.2 Recording of the USDA**

Recording of the USDA-sensors (3 pieces) and Cargo-sensor is done with an interval of one hour according to USDA requirements. With a logging interval of one hour, there is storage capacity for 365 days of temperature loggings.

Data-logger accuracy is  $\pm 0.25^{\circ}\text{C}$  ( $\pm 0.45^{\circ}\text{F}$ ).

The data-log can be retrieved with a PC-system StarView and Psion Logman, via high-speed serial communication port.

The controller has a battery back-up system for the data-logger, which after power-off of the system continues logging in battery mode 120 times and then stops.

The controller is prepared for communication with Remote Monitoring Modem (RMM), according to ISO standard 10368, for monitoring at the ship bridge or control room.

## **12.3 Pre trip inspection**

Pre Trip Inspection is a standard test used to ensure that the reefer machine is without failure and can be released for next trip.

Under PTI test, in the menu, it is possible to select between a normal PTI test and a Short PTI test, according to below table.

Normal PTI test
1. Function Test
2. Run test at $+5^{\circ}\text{C}$
3. Run test at $0^{\circ}\text{C}$
4. Hold test at $0^{\circ}\text{C}$
5. Run test at $-18^{\circ}\text{C}$
6. Defrosting test

Short PTI test
1. Function Test
2. Run test at $+5^{\circ}\text{C}$
3. Run test at $0^{\circ}\text{C}$
4. Hold test at $0^{\circ}\text{C}$
5. Defrosting test

---

## **12.4 Programs**

The system is equipped with the following programs:

### **12.4.1 Cold Treatment**

Cold treatment is a non chemical treatment of cargo that eliminates the risk of fruit flies when importing or exporting fruit. Cold treatment is selected in the user interface in the operation menu in the menu programs. The duration of a cold treatment and the temperature vary depending on the type of fruit. These parameters are set in the CT menu based on National Authority outlines that can be different from country to country. The treatment temperature is per default set to 0°C.

During a cold treatment a "CT " is displayed next to the set point temperature in the controller interface. Humidity control and economy airflow mode cannot be activated during cold treatment.

Upon completion of a cold treatment program the commodity is slowly heated up to the desired set point temperature to ensure the quality of the commodity. The temperature increases 0.1°C per hour until set point is reached.

The program can be stopped by the operator at all times and is permanently interrupted by deactivation of cold treatment or initiation Pre Trip Inspection (PTI).

### **12.4.2 Multiple temperature setpoints**

The Multiple Temperature Setpoints (MTS) program enables the system to change the set point temperatures of a shipment automatically up to six times during transport, e.g. for the ripening of bananas. The MTS program is activated in the user interface in the operation menu in the menu programs. The duration, the set point temperatures and the humidity set point are selected. Temperature increases are fixed to 0.1°C per hour. Once the MTS program is active the set point temperature cannot be changed manually.

During the program "MTS" is displayed next to the set point temperature in the controller interface. The actual temperature is at all times displayed in the user interface.

Upon completion of the MTS program the system continues to maintain the latest set point temperature. The program can be stopped by the operator at all times and is permanently interrupted by an initiation of cold treatment or Pre Trip Inspection (PTI).

### **12.4.3 Quest - energy optimized function (Optional)**

The Quest function enables an energy optimized mode and is active in the temperature range from -1°C to 30°C. The controlling parameters and running pattern are defined in a fixed, confidential protocol, owned by Wageningen UR.

The Quest function is activated as default if the circumstances allow it.

Star Cool is responsible for that the Quest function is operating within the parameters and the running pattern defined by the protocol. Star Cool is however not liable for any consequent damages caused by the Quest functionality.

### **12.4.4 Frozen Economy – Energy Optimized Function**

The function is enabled in temperature range from -15°C to -30°C.

The unit is stop when the temperature reaches 1°C below setpoint temperature. Both compressor and evaporator fan ventilators are stopped.

After 15 minutes, a temperature check is made by starting the evaporator fan ventilators for a short time.

- If the temperature is less than 2°C above setpoint, the evaporator fan ventilators are stopped for additional 15 minutes.
- If the temperature is more than 2°C above setpoint, the compressor is starting a pull down until the temperature reach 1°C below setpoint temperature.

### **12.4.5 Automatic Ventilation - AV+ (Included)**

Automatic Ventilation (AV+), the unit will monitor and try to maintain both the CO<sub>2</sub> and the O<sub>2</sub> at their setpoints by adjusting the opening of the fresh air valves as needed.

The adjustment is depended on the respiration from the cargo.

The CO<sub>2</sub> setpoint is adjustable in the range of 1% -12% and the setpoint of O<sub>2</sub> is adjustable in the range of 0% - 19%.

Both setpoints can be entered via the display.

### **12.5 Design standards**

- 1) Refrigeration system complies with CE-marked according to Machinery Directive (98/37).
- 2) Refrigeration system is tested according to ARI, capacity-test method. Refrigeration system complies with international Customs Regulations for container (TIR).
- 3) Refrigeration system complies with relevant ISO-standards. Refrigeration system complies with Australian and New Zealand Health regulations.
- 4) Refrigeration system complies with ATO requirement for airflow.
- 5) Refrigeration system complies with USDA cold treatment and med fly quarantine requirements.
- 6) Refrigeration system complies with relevant ATP-standards.
- 7) Air performance according to AMCA.
- 8) Taint test according to BS 3755.



### **13. REFRIGERATION SYSTEM DATA**

#### **13.1 Refrigerant charge, R134a**

4.5 kg, with water cooled condenser

#### **13.2 Evaporator airflow**

4650 m<sup>3</sup>/h@ 190 pa, high speed, 60 Hz.

2400 m<sup>3</sup>/h@ 63 pa, low speed, 60 Hz.

#### **13.3 Condenser airflow**

4500 m<sup>3</sup>/h, 60 Hz.

#### **13.4 Net R134a refrigeration cooling capacity**

@ +37.8°C (+100 °F) ambient, Power supply: 460 V / 60 Hz.

Air to evaporator	Cooling capacity	Power requirement	Cosinus Phi
-28.9°C (-20°F)	4000 watt (3440 kcal/h)	5710 watt (4911 kcal/h)	0.96
-17.8°C (0°F)	6500 watt (5590 kcal/h)	7040 watt (6054 kcal/h)	0.96
+1.7°C (+35°F)	11500 watt (9890 kcal/h)	12300 watt (10578 kcal/h)	0.96

Reefer container with a heat leakage of max 40 w/k (U<sub>20</sub>).

#### **13.5 Max. heating effect**

6350 watt (5460 kcal/h) @ 460V / 60 Hz, incl. fan motor heat.

#### **13.6 Unit air leakage**

Less than 0.25 m<sup>3</sup>/h at 500 Pa.

## **14. GENERAL SPECIFICATION**

### **14.1 Noise level**

< 75 db (A) in 250 Hz band. Measured 1.5 m in front of container and 1.2 m above the ground, with the system operating at 50 Hz.

### **14.2 Compressor – motor assembly**

1) Make	Bitzer
2) Type	Semi – hermetic two-stage reciprocating.
3) Number of cylinders	2 Low stages cylinders. 2 High stage cylinders.
4) Speed	Variable, frequency converter controlled.
5) Model	S4BCF – 5.2Y.
6) Nominal power	5.5 kW.
7) Compressor oil type	Reniso Triton SEZ 55 or equivalent
8) Compressor housing	Seawater resistant aluminum, unpainted.
9) Displacement	Low stage: 42.6 m <sup>3</sup> /h @ 110 Hz. High stage: 26.8 m <sup>3</sup> /h @ 110 Hz.
10) Weight	58 Kg.

### **14.3 Frequency converter**

1) Make	Danfoss
2) Type	FCM 375
3) Frequency range	20 – 110 Hz
4) Converter housing	Seawater resistant aluminum, unpainted.
5) Tightness	IP 55

### **14.4 High Pressure cut – out switch**

Cut –out	22.4 bar ±0.7 bar.
Cut – in	15.9 bar ±1.2 bar.

### **14.5 Fusible plug**

Blow temperature	100 °C (212 °F).
------------------	------------------

### **14.6 Economizer**

1) Make	DANFOSS
2) Type	Brazed plate heat exchanger
3) Material	Stainless steel, AISI 316 L

**14.7 Evaporator coil**

1) Make	Luvata / Dunan
2) Tube material	Copper, grooved. EN 12735 – 2.
3) Fin material	Aluminum, Hydrophilic treated
4) Fin spacing	3.4 mm
5) Attitude	45° from horizontal
6) Number of rows	6, dual piping (split 2/4) ø7 mm/ ø9.52 mm.
7) Number of circuits	16
8) Face area	0.725 m <sup>2</sup>
9) Surface area	64.5 m <sup>2</sup>

**14.8 Condenser coil**

1) Make	Luvata / Dunan
2) Tube material	Copper, grooved. EN 12735 – 2.
3) Fin material	Aluminum
4) Fin spacing	2.0 mm
5) Number of rows	4, ø7 mm tubes.
6) Face area	0.36 m <sup>2</sup>
7) Surface area	32 m <sup>2</sup>
8) Coating, tube/fin	Cataphoresis treatment, with additional acrylic resin.

**14.9 Evaporator fan**

1) Hub material	Polyamide, glass reinforced
2) Type	Axial
3) Number of fans	2
4) Number of blades	7
5) Pitch	25°
6) Diameter	ø315mm
7) Blade material	Polyamide, glass reinforced
8) Drive	Direct on motor shaft

**14.10 Condenser fan**

1) Hub material	Polypropylene, glass fiber reinforced
2) Type	Axial
3) Number of fans	1
4) Number of blades	4
5) Pitch	30°
6) Diameter	ø440 mm
7) Blade material	Polypropylene, glass fiber reinforced
8) Drive	Direct on motor shaft

### **14.11 Receiver**

Electro polished stainless steel

Interchangeable with optional combined receiver / water cooled condenser.

### **14.12 Defrosting**

- |                             |  |
|-----------------------------|--|
| 1) Defrost initiation       | Automatic or manual initiation from the keypad.  |
| 2) Trip defrosting interval | Demand defrost function is implemented in the controller software.<br>This function is monitoring the temperatures over the evaporator coil and based on differences in these temperatures initiates a defrost sequence. |

### **14.13 Defrosting method**

Hot gas, combined with electrical heaters.

### **14.14 Fresh air exchange**

- 1) Adjustable 0 - 220 m<sup>3</sup>/h (0–21 CFM) @ 60 Hz.
- 2) Adjustable 0 - 170 m<sup>3</sup>/h (0–00 CFM) @ 50 Hz.
- 3) Maximum meets ATO requirements.
- 4) While setting fresh air exchange rate, the controller display will show only the exchange rate.

### **14.15 Refrigeration controls**

- |                       |   |
|-----------------------|---|
| 1) Expansion valves   | 2 pieces, electronically controlled from controller.                                |
| 2) Filter drier       | Danfoss DML 164 with O - ring or equivalent.  |
| 3) Hot – gas valve    | Solenoid valve  |
| 4) Moisture indicator | Incorporated in receiver sight glass.<br>Material: Brass acc. to EN 12164 / CW602N. |
| 5) Piping             | Solid copper tubes according to EN 12735 – 1.                                       |
| 6) Pipe Coating       | Primer: Epoxy resin zf - a120<br>Topcoat: Polyurethane resin Hipon - 50.            |

## **15. ELECTRICAL DATA**

### **15.1 Input power**

3 x 410 ± 50 V at 50 Hz ± 2.5 Hz  
3 x 450 ± 50 V at 60 Hz ± 2.5 Hz

### **15.2 Control circuit voltage**

12 Vdc Nominal  
16 Vdc - 40 Vdc

### **15.3 Circuit Breaker**

Main power ampere 16 A.

### **15.4 Contactors**

Nominal: 9 amp @ 40°C & 400 volt.  
Max: 7 amp @ 70°C & 520 volt.  
Start current: 6 x nominal

### **15.5 Fuses**

Control circuit 0.4 A, tube fuse.

### **15.6 Power plug**

Type CEE 17, 4 pole, with earth. 32 amp.  
400/460 V / 50/60 Hz

### **15.7 Power Cable**

1) Type 4 x 2.5 mm<sup>2</sup>, 450 / 750 V, PU - sheath.  
2) Length 18 m  
3) Colour Yellow  
4) Temperature Range -37°C to +90°C

### **15.8 USDA socket requirements**

Location Rear left side  
Number 3 pieces + 1 cargo sensor  
Type Deutsch HD 10, female socket. Tin Plated.

**15.9 Evaporator fan motor**

1) Make	Grundfos
2) Type	Enclosed, non - vented
3) Frame size	071B14
4) Shaft material	Stainless steel, X20CrNi172
5) No. of motors	2
6) Voltage	3 – phases, 350 / 500 Vac, 50/60 Hz.
7) Nominal power	0.45/0.07 kW @ 460V/60 Hz
8) Protection, electrical	Thermistors
9) Speed	Dual - speed 3460 / 2850 rpm (60/50 Hz). 1760 / 1425 rpm (60/50 Hz).
10) Rotation	Counter – clockwise, when viewed from shaft end.
11) Bearings	Permanently lubricated, sealed.
12) Bearing size	Drive end            Non - drive end 6304 2Z C3        6201 2Z C3
13) Bearing lubricant	Klüberquiet BQH 72 - 102 or equivalent. Temperature range: -40°C - +140°C.

**15.10 Condenser fan motor**

1) Make	Grundfos / ABB.
2) Type	Enclosed, non - vented
3) Frame size	071B3
4) Shaft material	Stainless steel, X20CrNi172
5) No. of motors	1
6) Voltage	3 - phases, 350 / 500 Vac, 50/60 Hz.
7) Nominal power	0.37/0.06 kW @ 460V/60 Hz
8) Protection, electrical	Thermistors
9) Speed	Dual – speed 1740 / 1460 rpm (60/50 Hz) 870 / 730 rpm (60/50 Hz).
10) Rotation	Counter – clockwise, when viewed from shaft end.
11) Bearings	Permanently lubricated, sealed
12) Bearing size	Drive end            Non - drive end 6204 2Z C3        6201 2Z C3
13) Bearing lubricant	Klüberquiet BQH 72 - 102 or equivalent. Temperature range: -40°C - +140°C.

---

**15.11 Evaporator coil heaters**

- |           |  |
|-----------|--|
| 1) Type   | 8.5mm dia. in stainless steel AISI 304 |
| 2) Number | 6                                      |
| 3) Rating | 750 W each @ 400V.                     |

**15.12 Temperature sensors, including USDA**

- |                    |                                  |
|--------------------|----------------------------------|
| 1) Type            | NTC, 10 kohm @ 25°C, type 10k3A1 |
| 2) Operating temp. | -40°C to +100°C.                 |
| 3) Accuracy        | ±0.15°C, range -30°C to +100°C.  |

**15.13 Pressure transmitters**

- |         |   |
|---------|---|
| 1) Make | Saginomiya (NSK)  |
| 2) Type | Ratio metric pressure transmitter, with sealed gauge measuring principle.<br>¼" in. female flare connection with deflator |

## **16. MISCELLANEOUS**

### **16.1 General**

Humidity Sensor (10-100 % RH)

Tin-plated cables

2 pieces of removable evaporator hatch.

Integrated vacuum valve to prevent structural damage on the container.

Auto PTI, with function test and fault diagnostics.

Non-CFC blown insulation foam, average thickness 65 mm.

Bolt, screws and nuts in stainless steel.

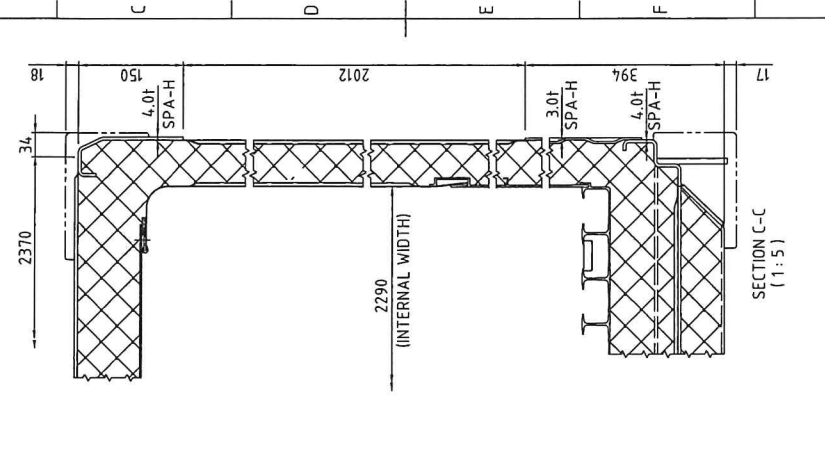
Closed cell neoprene gaskets.

Cover plates are painted with polyester powder, color RAL 9003.

Fresh air exchange is measured and logged in m<sup>3</sup>/h, definition 5 m<sup>3</sup>/h.



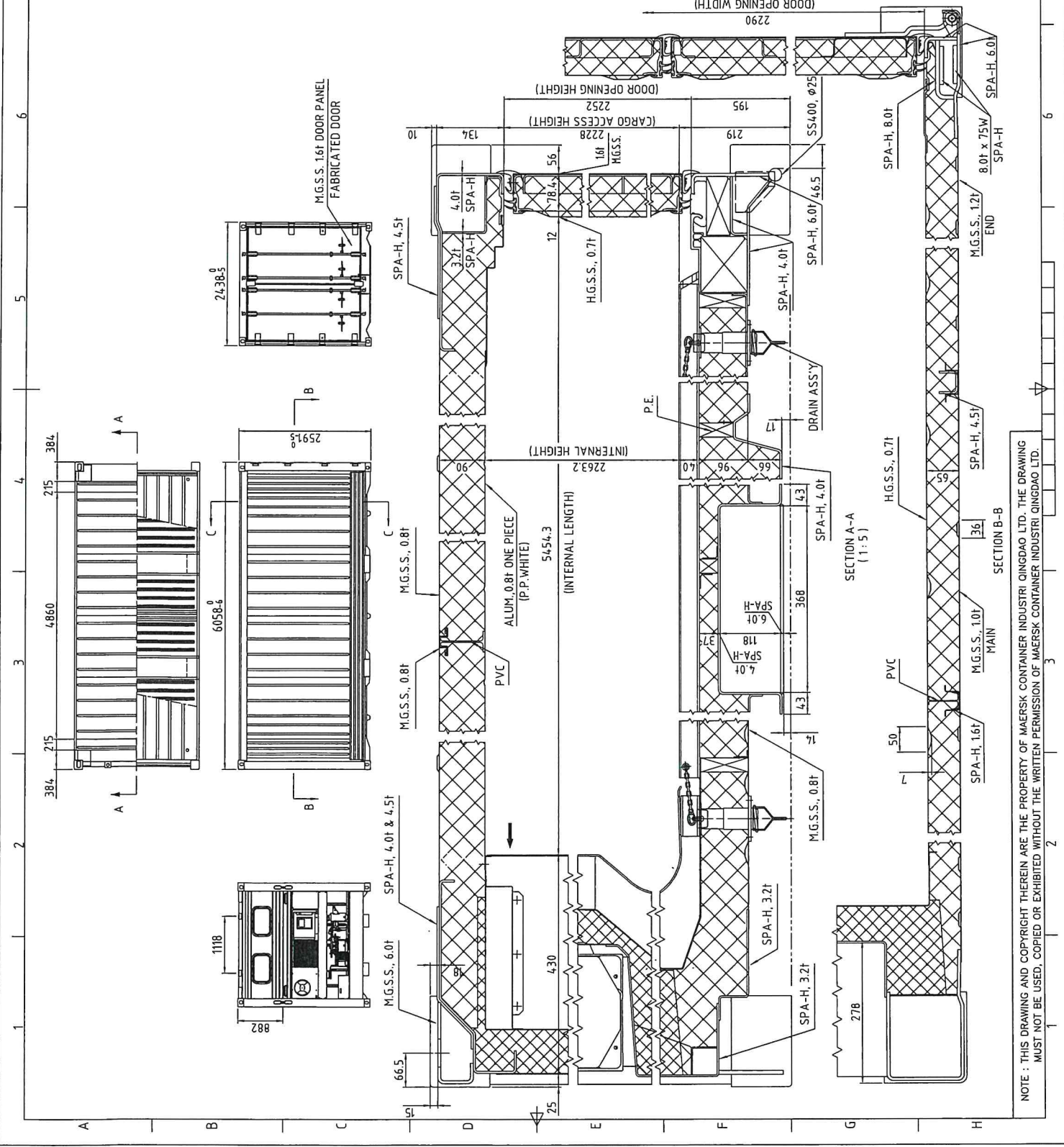
EXTERNAL		LENGTH	6,058.4 <sup>-0.4</sup> MM	19' - 10 1/2" <sup>-0.4</sup>
		WIDTH	2,438.3 <sup>-0.3</sup> MM	8' - 0" <sup>-3/16"</sup>
		HEIGHT	2,591.3 <sup>-0.3</sup> MM	8' - 6" <sup>-3/16"</sup>
INTERNAL		LENGTH	5,454.3 <sup>-0.3</sup> MM	17' - 10 11/16" <sup>-3/16"</sup>
		WIDTH	2,290.3 <sup>-0.3</sup> MM	7' - 6 3/16" <sup>-3/16"</sup>
		HEIGHT	2,263.3 <sup>-0.3</sup> MM	7' - 5 1/8" <sup>-3/16"</sup>
DOOR OPENING		WIDTH	2,290.3 <sup>-0.3</sup> MM	7' - 6 3/16" <sup>-3/16"</sup>
		HEIGHT	2,252.3 <sup>-0.3</sup> MM	7' - 4 11/16" <sup>-3/16"</sup>
TARE WEIGHT (INCLUDING UNIT)			30,480 KG.	67,200 LB.
MAX. PAYLOAD			27,640 KG.	60,940 LB.
INSIDE CUBIC CAPACITY			283 CU.M	998 CUFT



NO.	DATE	REVISION RECORD	BY	VERIFIED
<b>GENERAL ARRANGEMENT (INTEGRATED FRONT)</b>				
APPROVED	MARK-LIM	CUSTOMER NAME	MAPELLAN	
VERIFIED	H.J.PARK	CONT. SIZE	20'	DATE 2010-03-02
DESIGN	WILLIAM.ZHOU	SCALE	1:50	PROJ. NO. MORI-2055-1421A-00
DRAWN	X.D.KONG	DRWG. NO.		

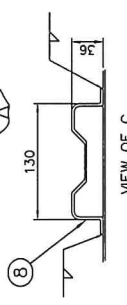
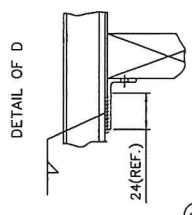
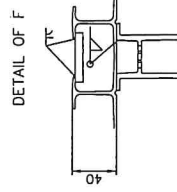
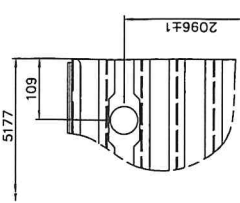
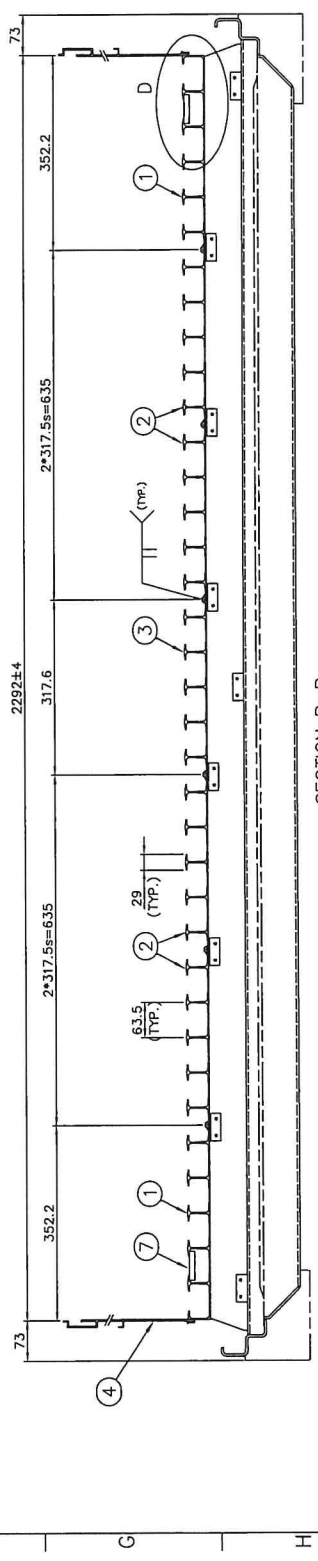
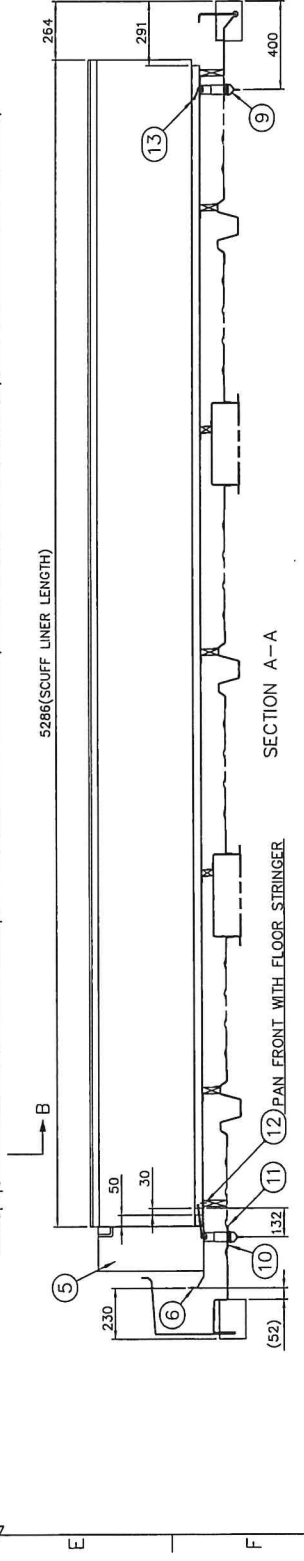
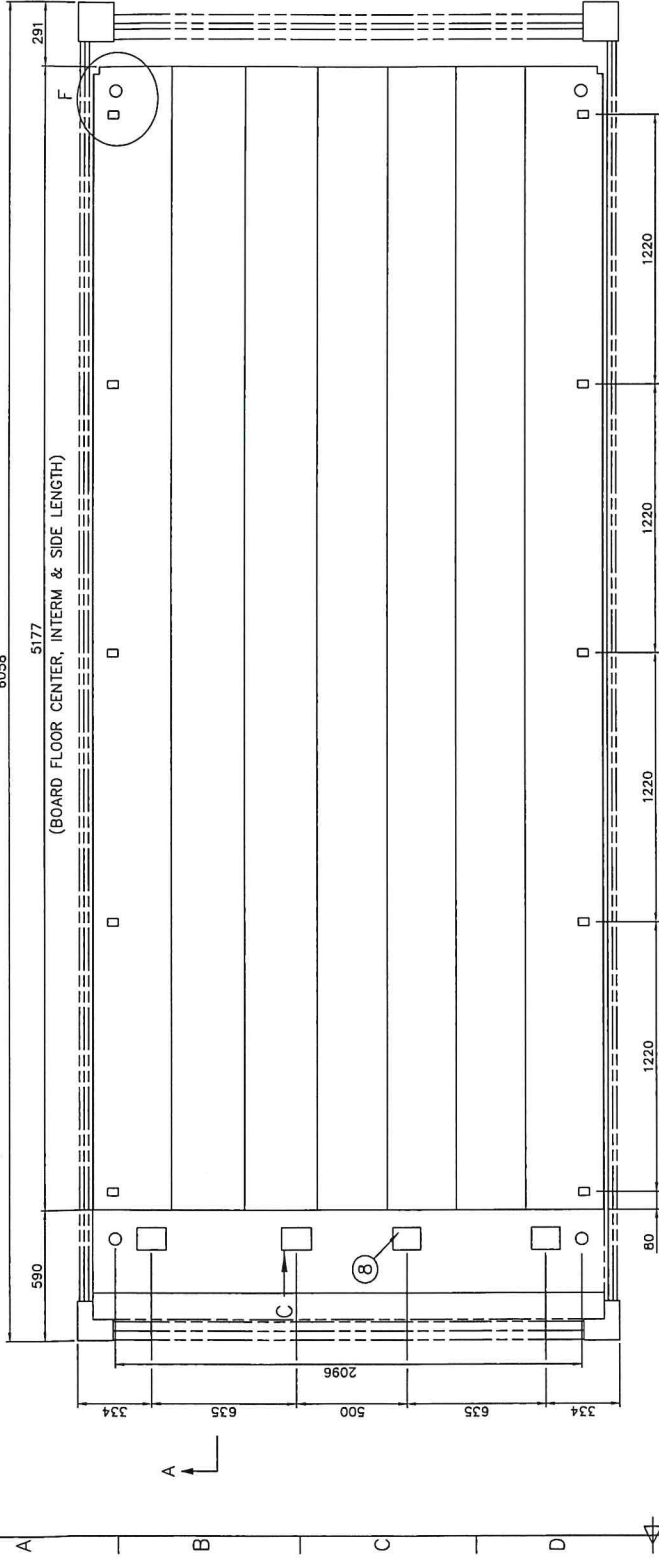


**MAERSK CONTAINER INDUSTRY QINGDAO LTD.**



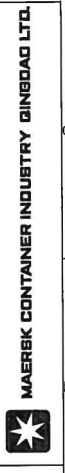
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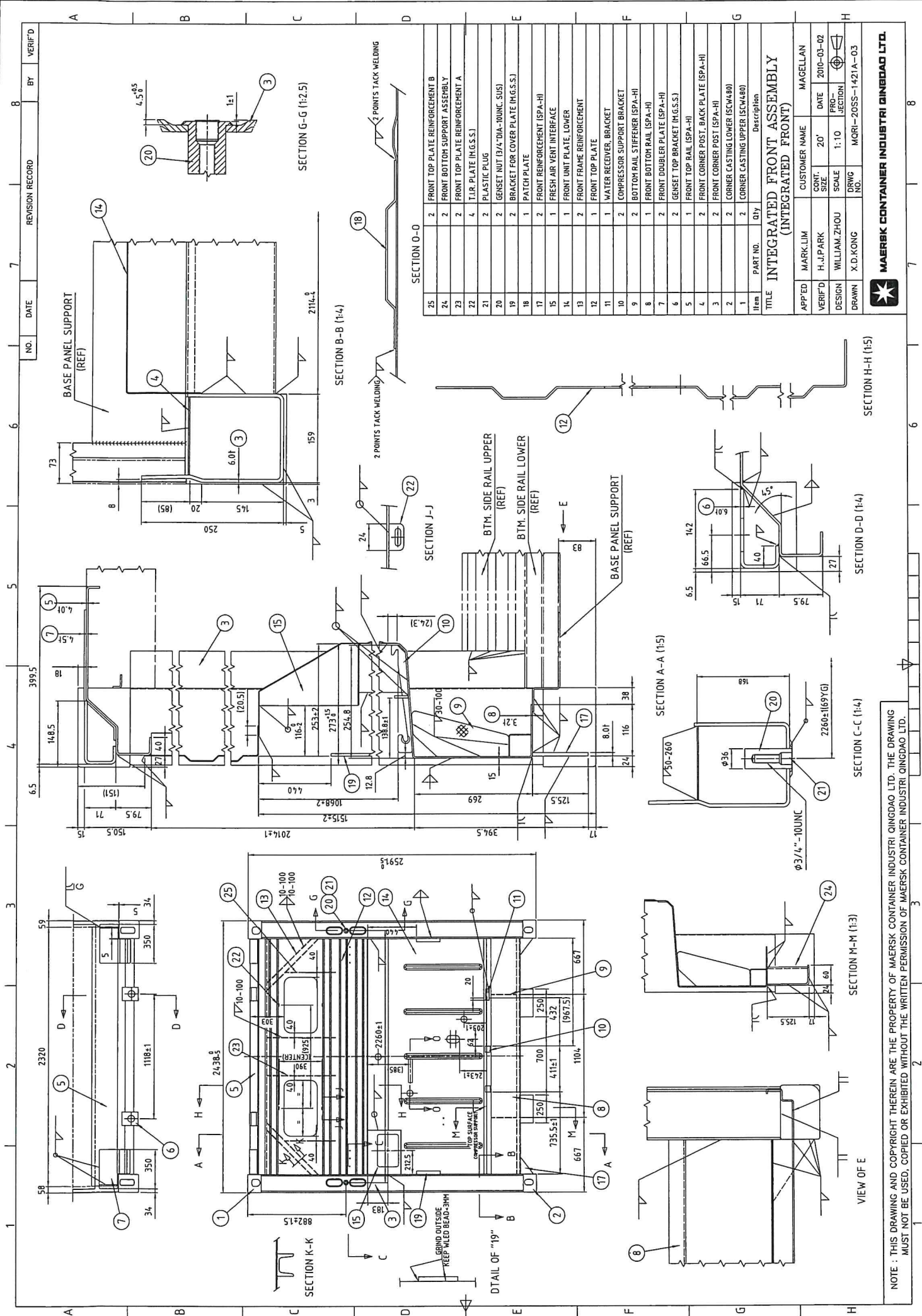


Item	PART NO.	Qty	Description
13			4 DRIVE RIVET (3/16" DIA., 5161-0827)
12			5 NAIL (STL, #2x1 1/2" LG)
11			4/R MS OR URETHANE SEALANT, GREY
10			16 BLIND RIVET (ALUM., 3/16" DIA., TIMM GRIP)
9			4 DRAIN ASS'Y
8			4 BAFFLE SUPPORT CHANNEL
7			10 LASHING BAR
6			1 PAN FRONT LOWER ASS'Y
5			2 SCUFF LINER, FRONT END
4			2 SCUFF LINER
3			1 BOARD FLOOR CENTER
2			4 BOARD FLOOR SIDE
1			2 BOARD FLOOR SIDE

TITLE			
FLOOR ASSEMBLY (INTEGRATED FRONT)			
APP'D	MARK. LIM	CUSTOMER NAME	MAGELLAN
VERIFIED	H. J. PARK	CONT. SIZE	20'
DESIGN	WILLIAM ZHOU	SCALE	1:16
DRAWN	X. D. KONG	DRWG NO.	MORI-205S-1421A-02



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SECTION O-O

25	2	FRONT TOP PLATE REINFORCEMENT B
24	2	FRONT BOTTOM SUPPORT ASSEMBLY
23	2	FRONT TOP PLATE REINFORCEMENT A
22	4	T.I.R. PLATE (M.G.S.S.)
21	2	PLASTIC PLUG
20	2	GENSET NUT (3/4"-10UNC. SUS)
19	2	BRACKET FOR COVER PLATE (M.G.S.S.)
18	1	PATCH PLATE
17	2	FRONT REINFORCEMENT (SPA-H)
16	1	FRESH AIR VENT INTERFACE
15	1	FRONT UNIT PLATE, LOWER
14	1	FRONT FRAME REINFORCEMENT
13	2	FRONT TOP PLATE
12	1	WATER RECEIVER, BRACKET
11	2	COMPRESSOR SUPPORT BRACKET
10	2	BOTTOM RAIL STIFFENER (SPA-H)
9	1	FRONT BOTTOM RAIL (SPA-H)
8	2	FRONT DOUBLER PLATE (SPA-H)
7	2	GENSET TOP BRACKET (M.G.S.S.)
6	1	FRONT TOP RAIL (SPA-H)
5	2	FRONT CORNER POST, BACK PLATE (SPA-H)
4	2	FRONT CORNER POST (SPA-H)
3	2	CORNER CASTING LOWER (SCW480)
2	2	CORNER CASTING UPPER (SCW480)
1	2	CORNER CASTING LOWER (SCW480)

SECTION G-G (1:2.5)

SECTION B-B (1:4)

SECTION A-A (1:5)

SECTION D-D (1:4)

SECTION C-C (1:4)

SECTION M-M (1:3)

VIEW OF E

SECTION H-H (1:5)

SECTION J-J

SECTION K-K

DETAIL OF "19"

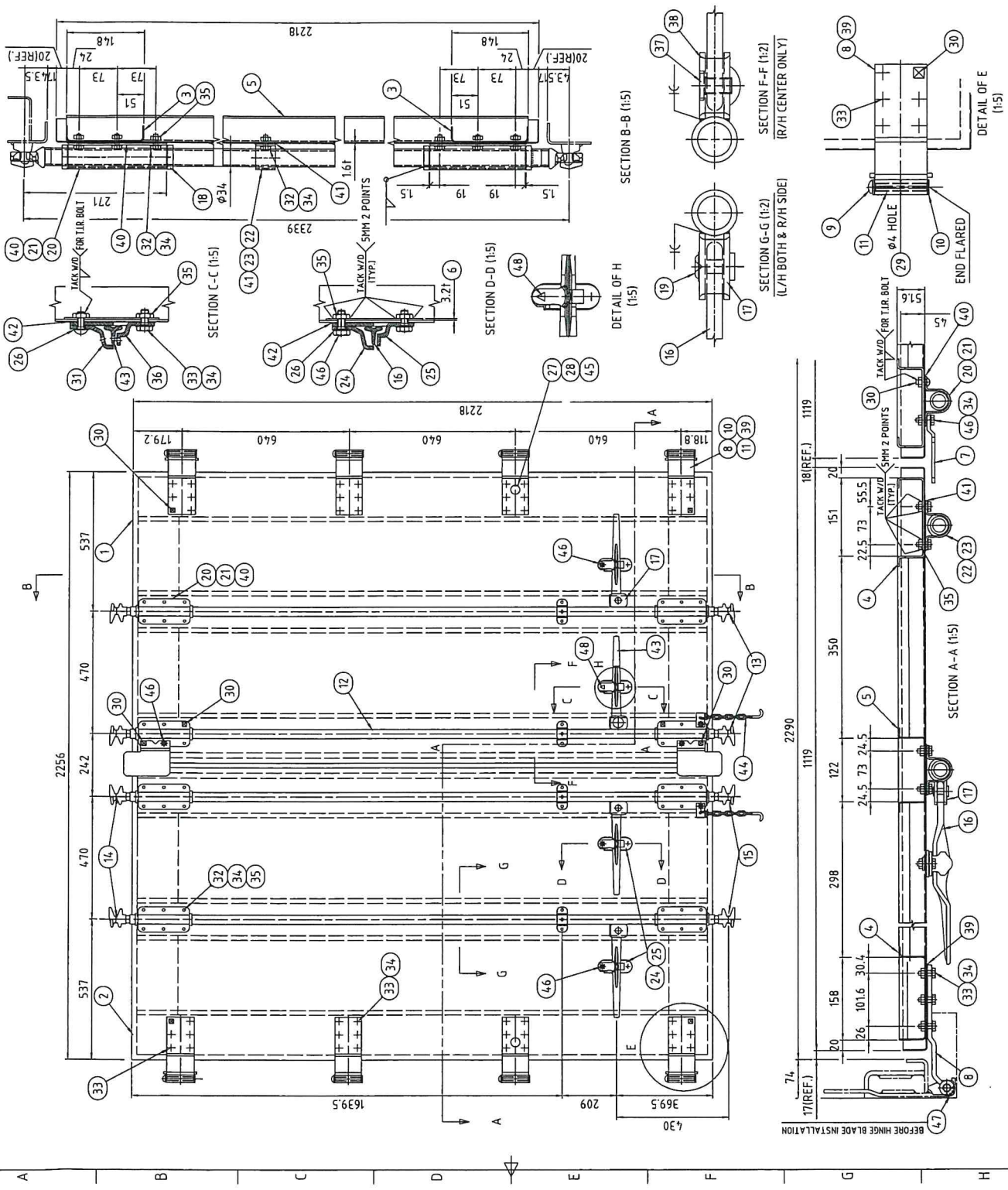
**TITLE INTEGRATED FRONT ASSEMBLY (INTEGRATED FRONT)**

APP'D	MARK./LIM	CUSTOMER NAME	MAGELLAN
VERIF'D	H.J.PARK	CONT. SIZE	20"
DESIGN	WILLIAM ZHOU	SCALE	1:10
DRAWN	X.D.KONG	DRWG NO.	MORI-2055-1421A-03
		DATE	2010-03-02
		FIG. NO.	SECTION



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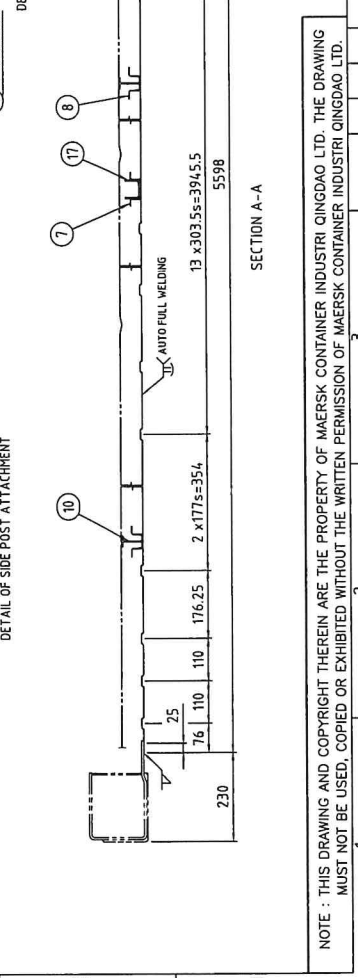
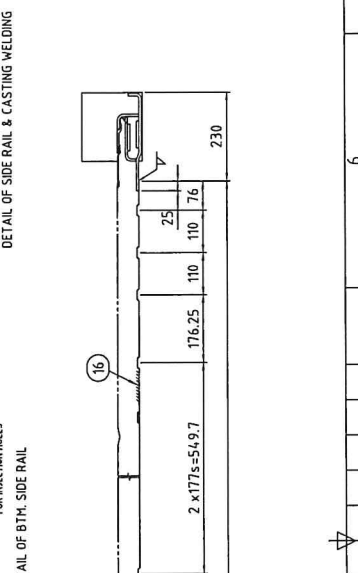
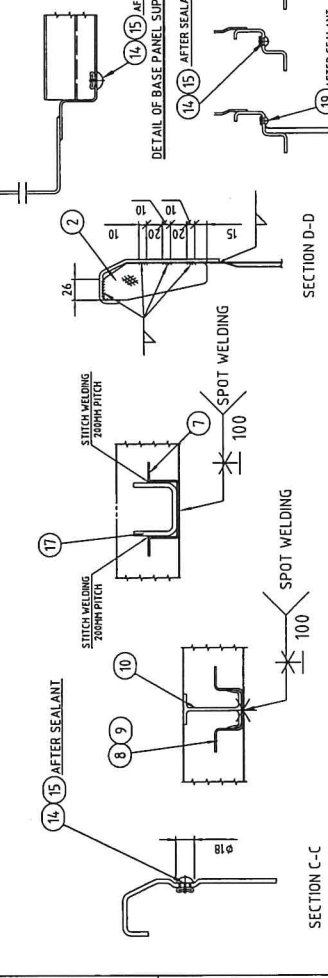
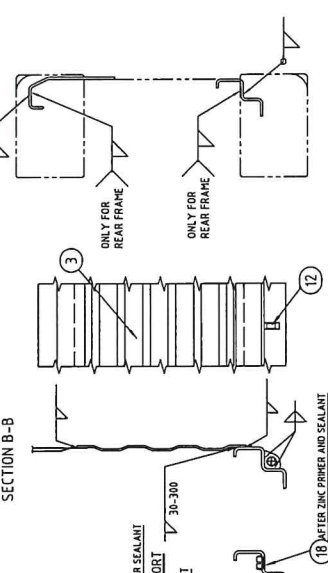
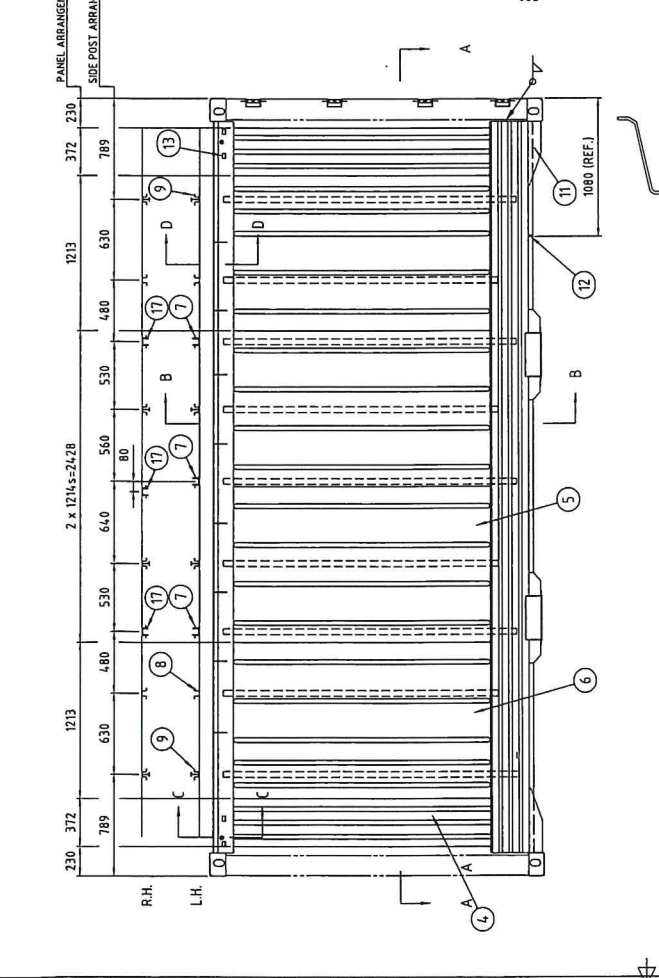
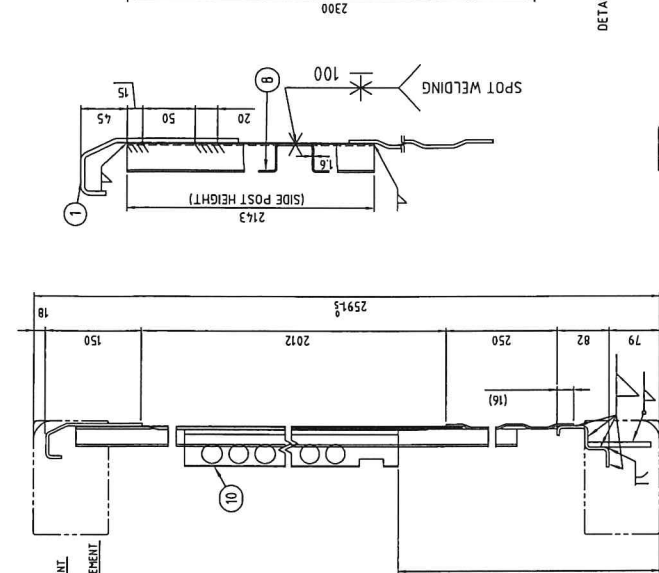




ITEM	DESCRIPTION	QTY
1	TIR BOLT (SUS304, M10 x 20LG)	
2	MS OR URETHANE SEALANT, WHITE	
3	HEX BOLT (H.D.G. STEEL, M10x29)	
4	MS OR URETHANE SEALANT, GREY	
5	TIE HOLDER (SS400-FILH)	
6	HANDLE-3 (WITH HOLE) (B7030/4M)	
7	GASKET, RETAINER PLATE	
8	GASKET, LARGE BRACKET	
9	GASKET, HINGE BLADE	
10	HANDLE HUB-2 (B7030/SH)	
11	BOLT (B4049S)	
12	HANDLE RETAINER PLATE (WITH HOLE)	
13	HEX NUT (CARBON STEEL, M10)	
14	PLANE WASHER (L6)	
15	HEX BOLT (H.D.G. STEEL, M10x28)	
16	HEX BOLT (H.D.G. STEEL, M10x22)	
17	HANDLE RETAINER LATCH (WITH HOLE)	
18	TIR BOLT (SUS304, M10 x 26LG)	
19	AVX GREASE	
20	TAPPING SCREW (H8 x 20LG)	
21	DOOR BUMPER (RUBBER)	
22	HANDLE RETAINER BUSH	
23	HANDLE RETAINER PLATE (WITHOUT HOLE)	
24	HANDLE RETAINER LATCH (WITHOUT HOLE)	
25	SMALL SPLIT BUSH	
26	SMALL BRACKET OUTER	
27	LARGE SPLIT BUSH	
28	LARGE BRACKET OUTER	
29	RIVET, 2/8" DIA. x 1 1/8" LG	
30	ANTI-TRACK RING	
31	HANDLE HUB-1	
32	HANDLE-1 (WITHOUT HOLE)	
33	CAM L.H.	
34	CAH R.H.	
35	SECURA CAH/R7022(H)	
36	LOCKING ROD ASS'Y	
37	HINGE BUSH (BRONZE)	
38	HINGE WASHER (SUS304)	
39	HINGE PIN (SUS304)	
40	HINGE BLADE (SS400)	
41	T.L.R. SLASH PLATE (SS490, GALV)	
42	RETAINER BACK PLATE (SPA-H)	
43	PANEL REINFORCEMENT, V/T "A" & "B" (SPA-H)	
44	PANEL REINFORCEMENT, H/V "A" & "B" (SPA-H)	
45	DOOR PANEL, L/H (MIG.S.S.)	
46	DOOR PANEL, R/H (MIG.S.S.)	

TITLE		Description	
Part No.	Qty	Part No.	Qty
REAR DOOR ASSEMBLY (INTEGRATED FRONT)			
APPROVED: MARK LIM			
CUSTOMER NAME: MAGELLAN			
VERIFIED: H.-J. PARK			
DATE: 20			
SCALE: 1:10			
PROJ. NO.: 2010-03-02			
DRAWN: WILLIAM ZHOU			
SECTION: 1			
DRWG. NO.: MORR-20SS-1421A-05			

NO.	DATE	REVISION RECORD	BY	VERIFY



DETAIL OF SIDE PANEL POST INSTALLATION

DETAIL OF SIDE RAIL & CASTING WELDING

DETAIL OF BTM. SIDE RAIL

DETAIL OF SIDE POST ATTACHMENT

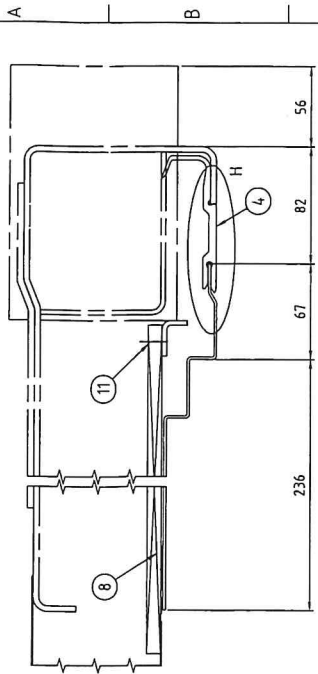
19	4	BLIND RIVET (SUS., 1/4" DIA., 9MM GRP)
18	2	FOAM PLUG "B"
17	6	SIDE POST MAIN A REINFORCEMENT (SPA-H, 4.51)
16	A/R	FOAM ADHESIVE
15	18	FOAM PLUG "A"
14	18	TLR RIVET (BARK-08W04)
13	8	SEAL VENEER SUPPORT
12	2	TIE HOOK
11	4	SIDE PROTECTOR
10	8	SIDE STRINGER (P.V.C.)
9	4	SIDE POST MAIN C (SPA-H, 1.61)
8	8	SIDE POST MAIN B (SPA-H, 1.61)
7	6	SIDE POST MAIN A (SPA-H, 1.61)
6	4	SIDE PANEL MAIN B (H.G.S.S. 1.01)
5	4	SIDE PANEL MAIN A (H.G.S.S. 1.01)
4	2	SIDE PANEL END (H.G.S.S. 1.21)
3	2	BTM. SIDE RAIL UPPER
2	16	TOP SIDE RAIL GUSSET
1	2	TOP SIDE RAIL (SPA-H)

**SIDE WALL ASSEMBLY  
(INTEGRATED FRONT)**

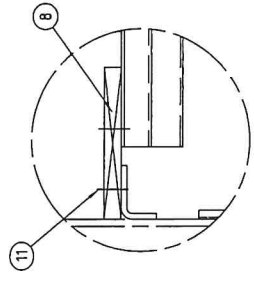
APP'D	MARK. LIM	CUSTOMER NAME	MAGELLAN
VERIFIED	H.J.PARK	CONT. SIZE	20'
DATE	2010-03-02	SCALE	1:25
DESIGN	WILLIAM.ZHOU	PROJ. NO.	102010
DRAWN	Z.YU	DRWG. NO.	MORI-20SS-1421A-06



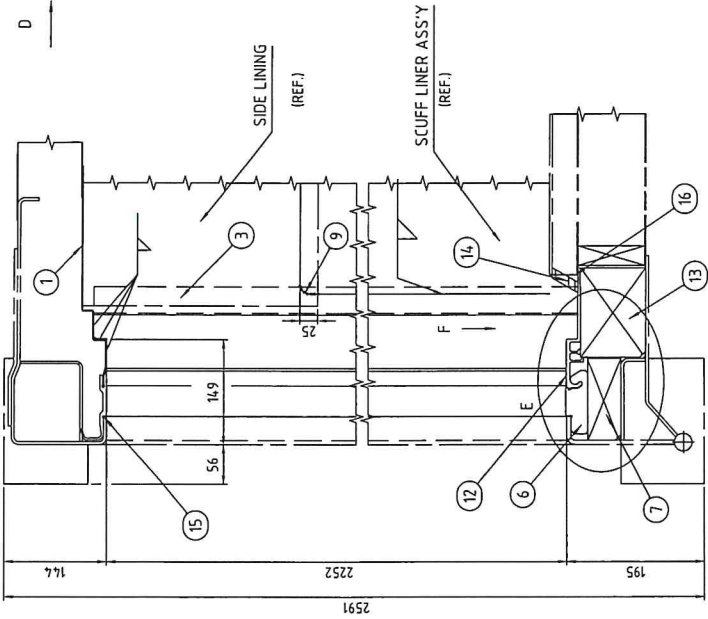
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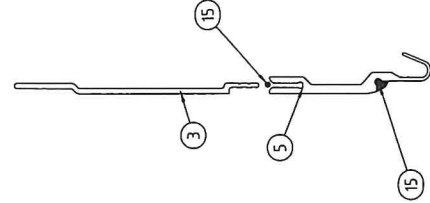
SECTION C-C (1:2.5)



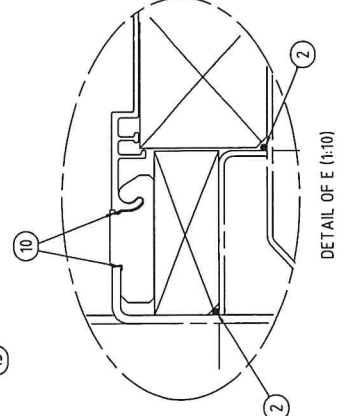
VIEW OF D (1:2)



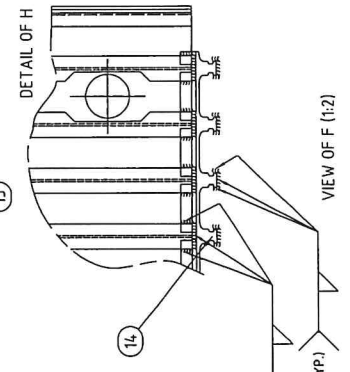
SECTION A-A (1:5)



DETAIL OF G

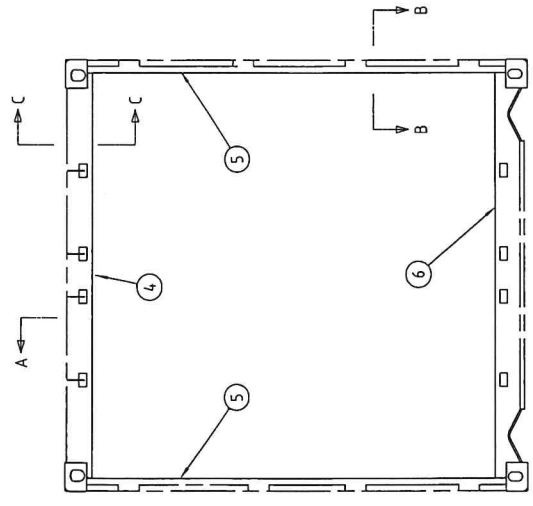


DETAIL OF E (1:10)

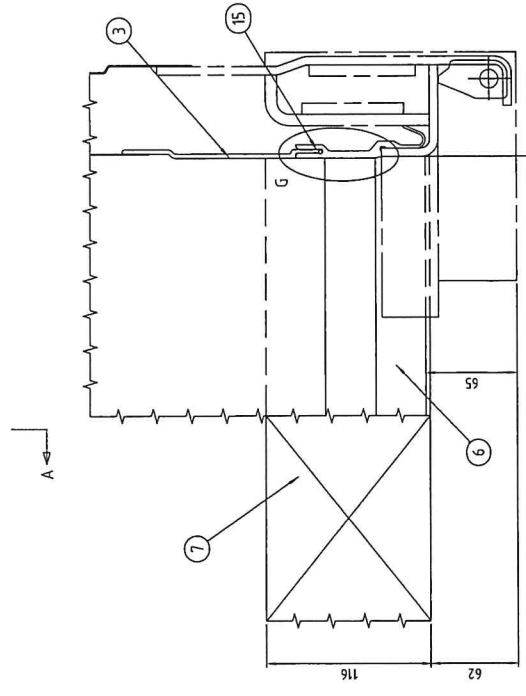


DETAIL OF H

VIEW OF F (1:2)



SECTION B-B (1:2.5)



SECTION A-A (1:5)

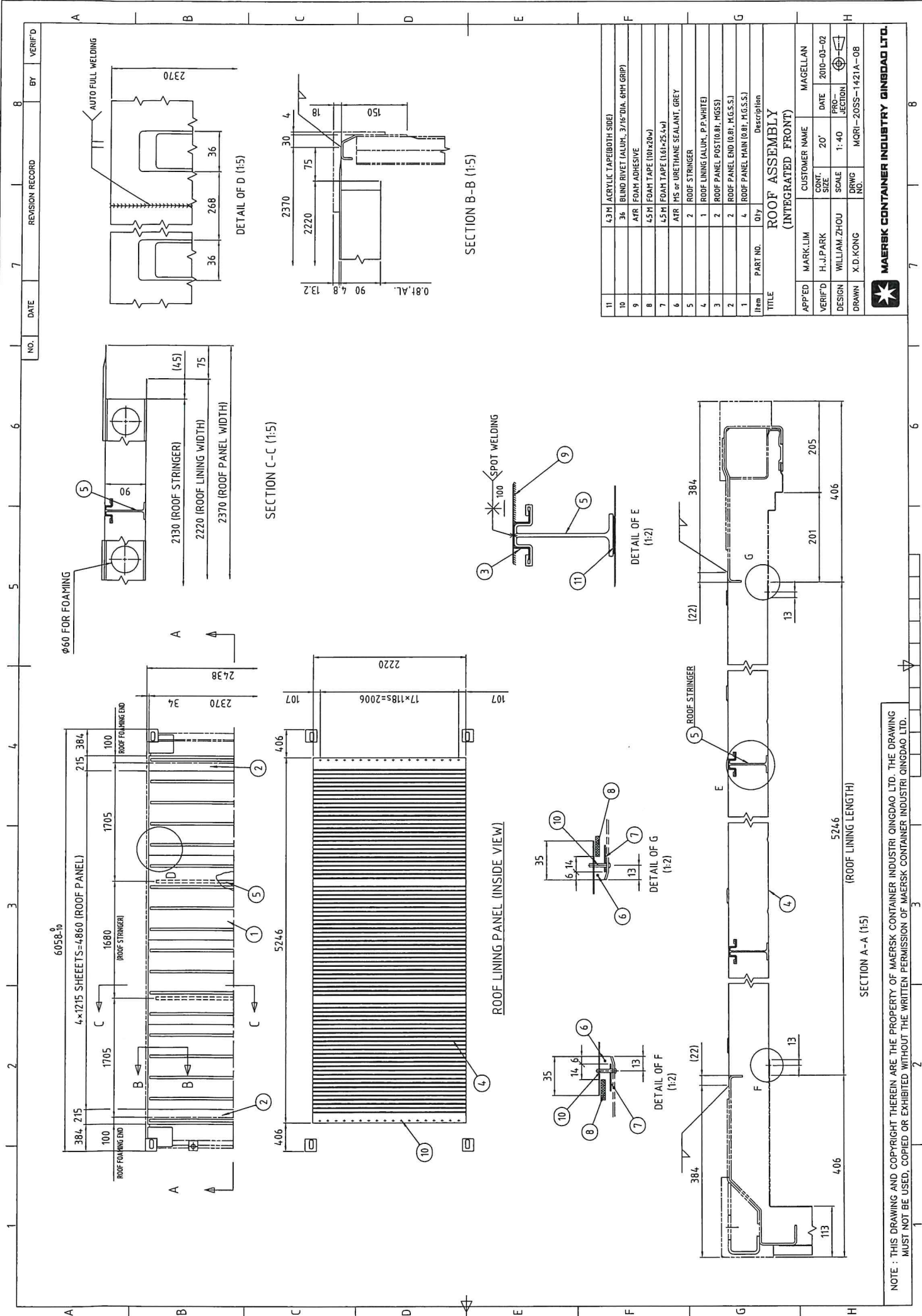
Item	Part No.	Qty	Description
2	PATCH		
ATR	HS or URETHANE SEALANT, WHITE		
7	T-BOARD PROTECTOR (ALUM)		
1	REAR SILL FILLER "B"		
1	REAR SILL GUTTER (ALUM)		
6	DRIVE SCREW		
ATR	TEROSTAT 937 SEALANT, WHITE		
ATR	HS POLYMER, GREY		
2	ROOF SEAL VENEER		
1	JAMB SILL FILLER "A"		
1	REAR SILL BLOCK (P.V.C.)		
2	REAR JAMB POST (P.V.C.)		
1	REAR JAMB HEADER (P.V.C.)		
2	LINING SUPPORT (ALUM)		
2	ATR BUTYL SEALANT		
1	REAR TOP ANGLE (ALUM)		

APPROVED	MARK/LIN	CUSTOMER NAME	MAGELLAN
VERIFIED	H.J.PARK	CONT. SIZE	20'
DESIGN	WILLIAM.ZHOU	SCALE	1:20
DRAWN	Z. YU	DRWG NO.	MORI-2055-1421A-07

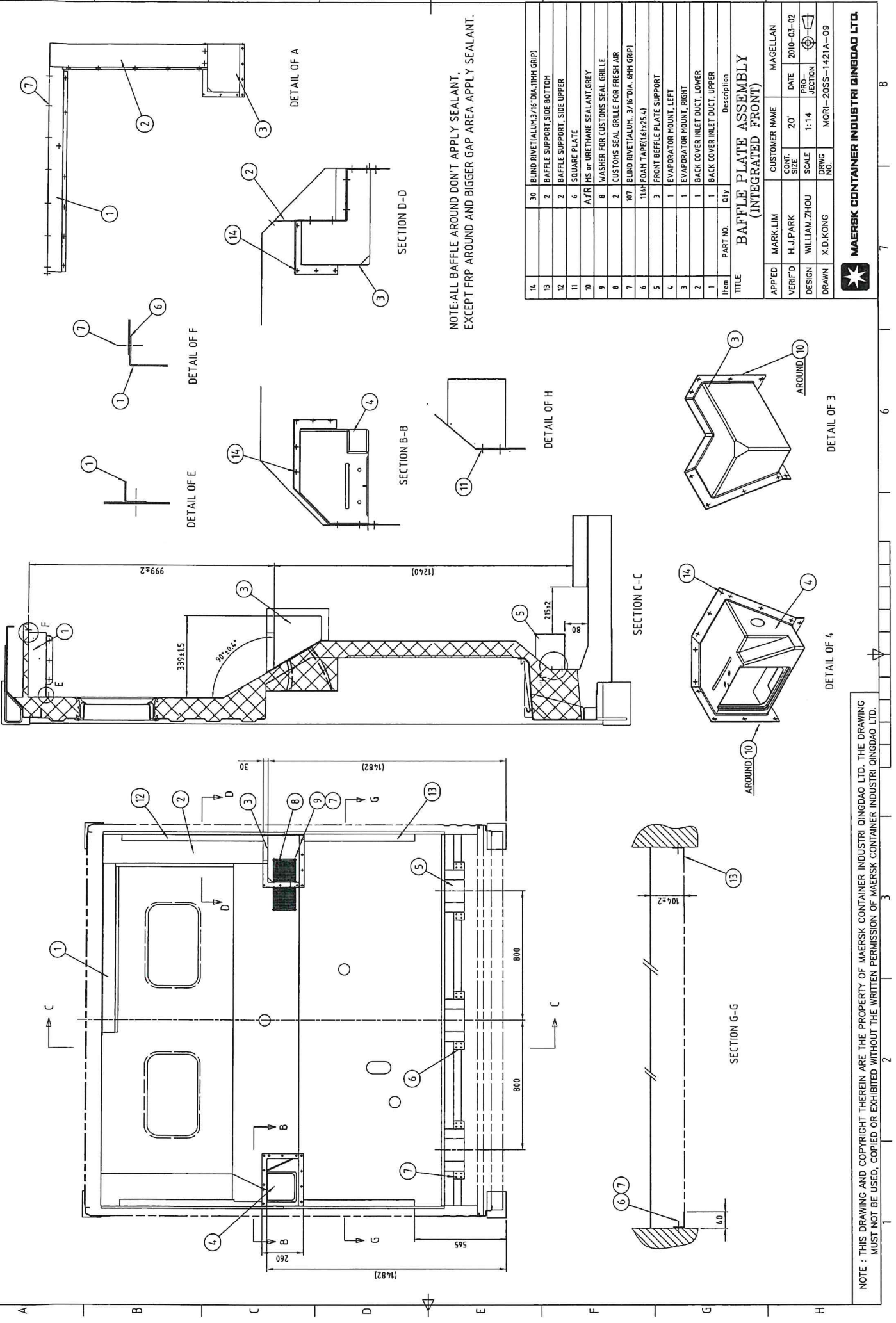


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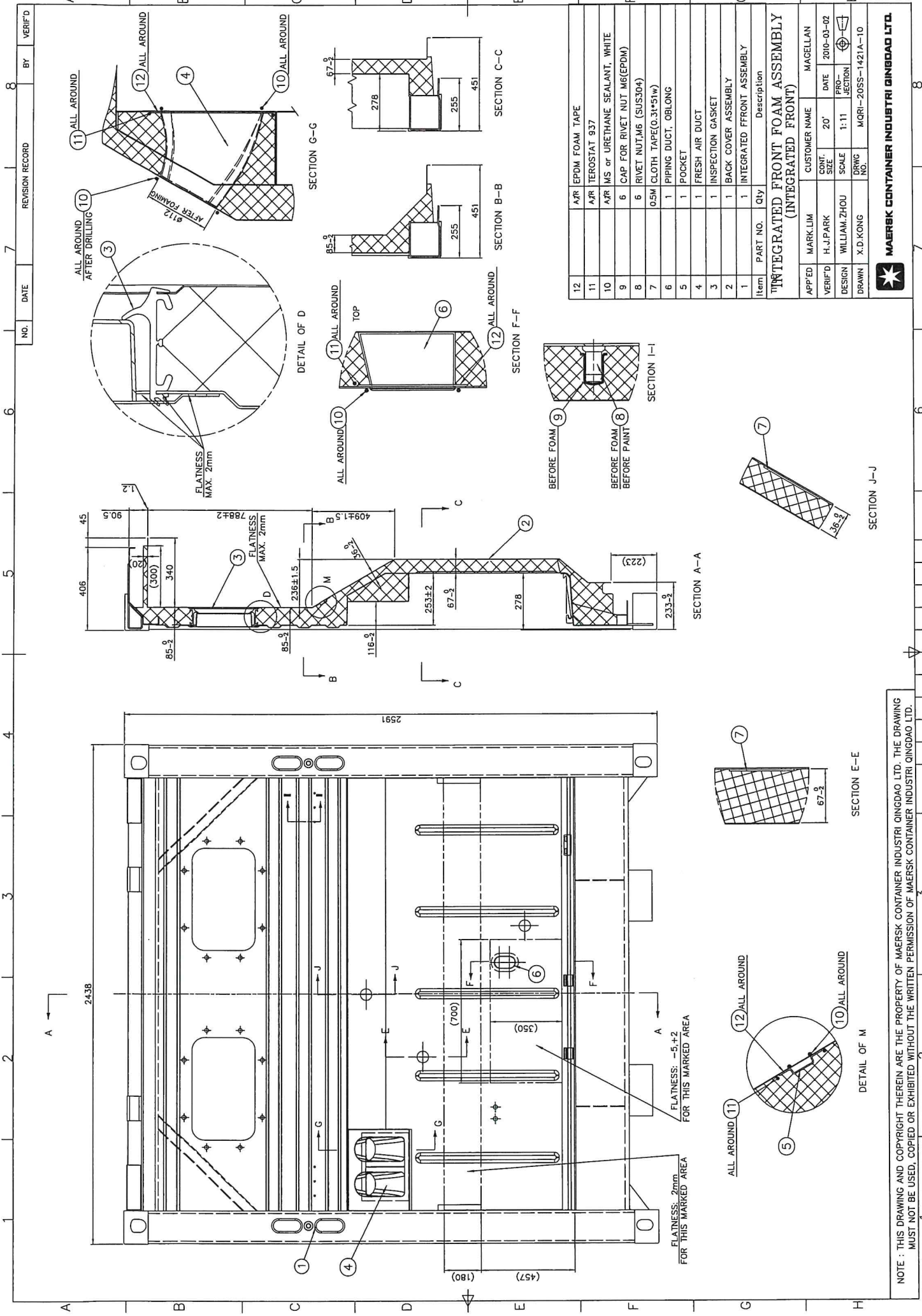




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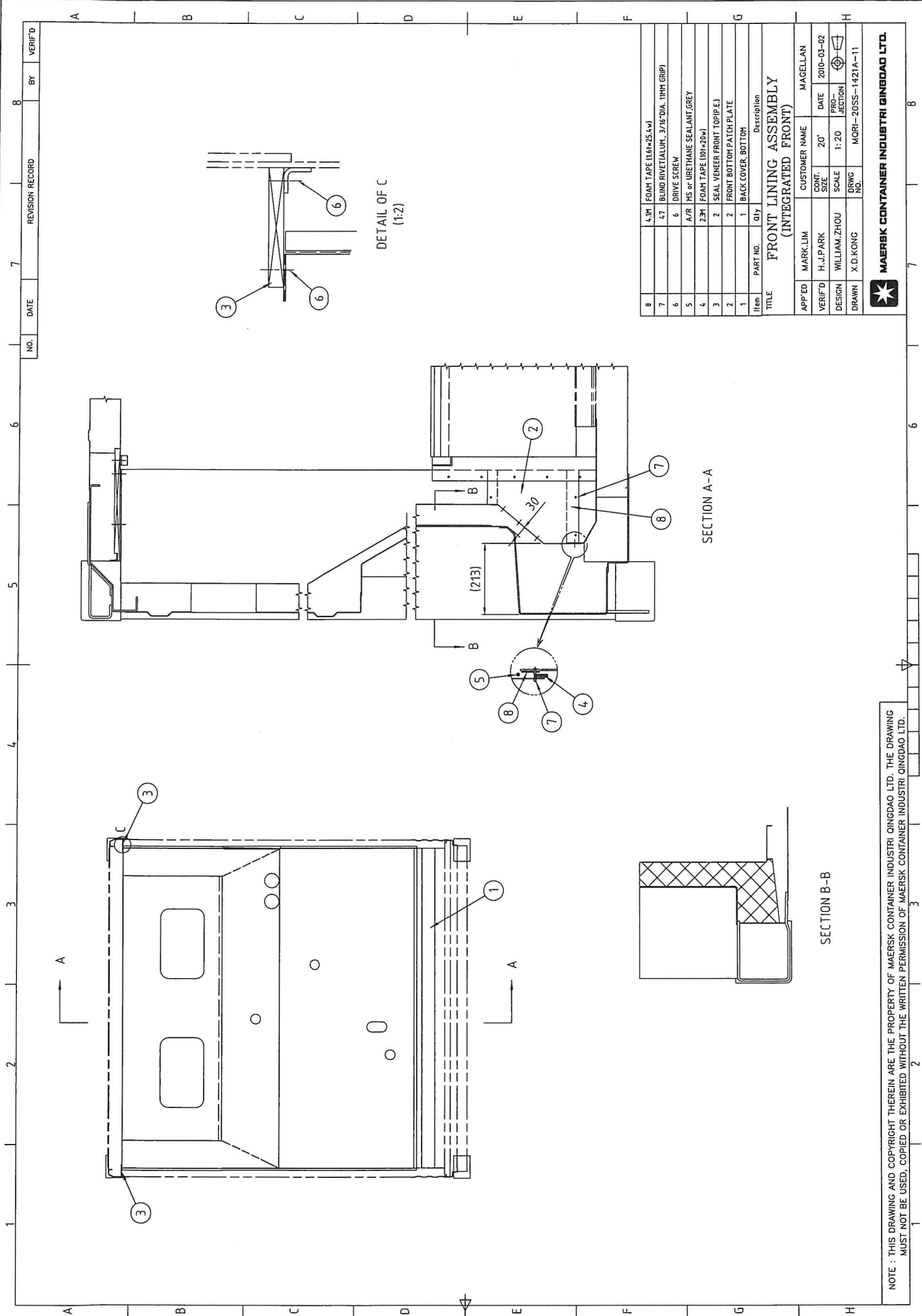
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MAERSK CONTAINER INDUSTRI QINGDAO LTD.

NO.	DATE	REVISION RECORD	BY	VERIFIED
8				
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1				



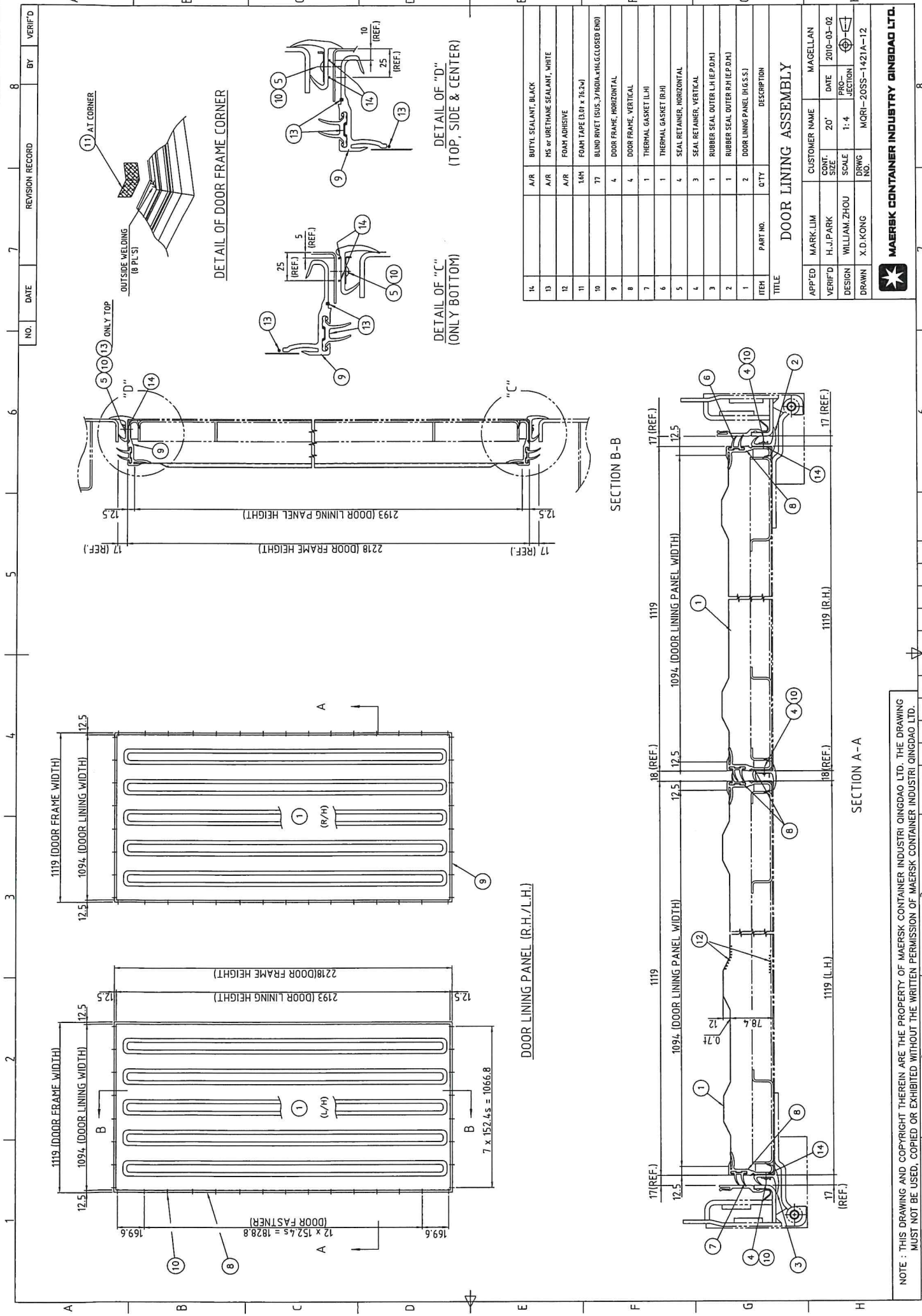
NO.	DATE	REVISION RECORD	BY	VERIF'D
8				
7				
6				
5				
4				
3				
2				
1				

8	4.1M	FOAM TAPE (161x25.4w)
7	.47	BLIND RIVET (ALUM. 3/16 DIA. 11MM GRIP)
6		DRIVE SCREW
5	A/R	MS or URETHANE SEALANT (GREY)
4	2.3M	FOAM TAPE (101x20w)
3		SEAL VENEER FRONT TORQUE
2		FRONT BOTTOM PATCH PLATE
1		BACK COVER, BOTTOM

Item	Part No.	Qty	Description
TITLE			
FRONT LINING ASSEMBLY (INTEGRATED FRONT)			
APP'D	MARK LIM	CUSTOMER NAME	MAGELLAN
VERIF'D	H. J. PARK	CONT. SIZE	20'
DESIGN	WILLIAM ZHOU	SCALE	1:20
DRAWN	X. D. KONG	DRWG. NO.	MOPI-2055-1421A-11

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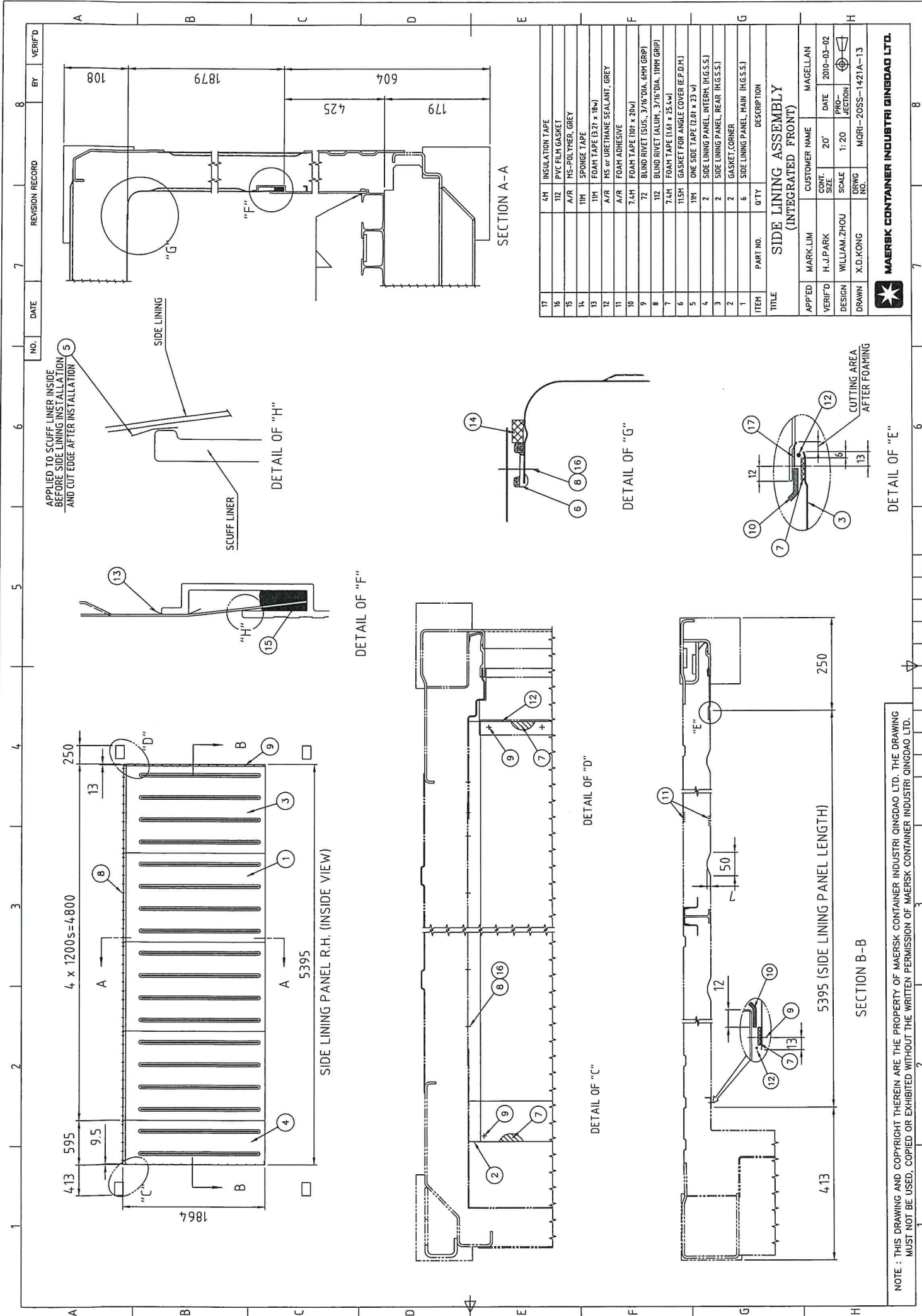
NO.	DATE	REVISION RECORD	BY	VERIFD

ITEM	PART NO.	Q-TY	DESCRIPTION
14	A/R	1	BUTYL SEALANT, BLACK
13	A/R	1	M5 or URETHANE SEALANT, WHITE
12	A/R	1	FOAM ADHESIVE
11	16M	1	FOAM TAPE (3.0" x 76.2")
10	77	1	BLIND RIVET (SUS. 3/16 DIA. x 1/2" CLOSED END)
9	4	1	DOOR FRAME, HORIZONTAL
8	4	1	DOOR FRAME, VERTICAL
7	1	1	THERMAL GASKET (L/H)
6	1	1	THERMAL GASKET (R/H)
5	4	1	SEAL RETAINER, HORIZONTAL
4	3	1	SEAL RETAINER, VERTICAL
3	1	1	RUBBER SEAL OUTER L.H. (EPDM)
2	1	1	RUBBER SEAL OUTER R.H. (EPDM)
1	2	1	DOOR LINING PANEL (ING.S.S.)

TITLE			
DOOR LINING ASSEMBLY			
APP'D	MARK/LIM	CUSTOMER NAME	MAGELLAN
VERIFD	H.J.PARK	CONT. SIZE	20'
DESIGN	WILLIAM.ZHOU	SCALE	1:4
DRAWN	X.D.KONG	DRWG NO.	MORI-20SS-1421A-12

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NO.	DATE	REVISION RECORD	BY	VERIFIED
17				
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ITEM	PART NO.	QTY	DESCRIPTION
4H			INSULATION TAPE
11Z			PVC FILM GASKET
A/R			MS-POLYMER, GREY
11H			SPONGE TAPE
11M			FOAM TAPE (3.21 x 18W)
A/R			MS or URETHANE SEALANT, GREY
A/R			FOAM ADHESIVE
7.4H			FOAM TAPE (10F x 20W)
7Z			BLIND RIVET (SUS., 3/16" DIA., 6MM GRIP)
11Z			BLIND RIVET (ALUM., 3/16" DIA., 11MM GRIP)
7.4H			FOAM TAPE (1.61 x 25.4W)
11.5H			GASKET FOR ANGLE COVER (EPDM)
11H			ONE SIDE TAPE (2.01 x 23 W)
2			SIDE LINING PANEL, INTERM. (HG.S.S.)
2			GASKET CORNER
6			SIDE LINING PANEL, MAIN (HG.S.S.)

APPLIED	MARK/LIM	CUSTOMER NAME	MAGELLAN
VERIFIED	H.-J.PARK	CONT. SIZE 20'	DATE 2010-03-02
DESIGN	WILLIAM.ZHOU	SCALE 1:20	PRO-JECTION
DRAWN	X.D.KONG	DRWG NO. MQRI-20SS-1421A-13	

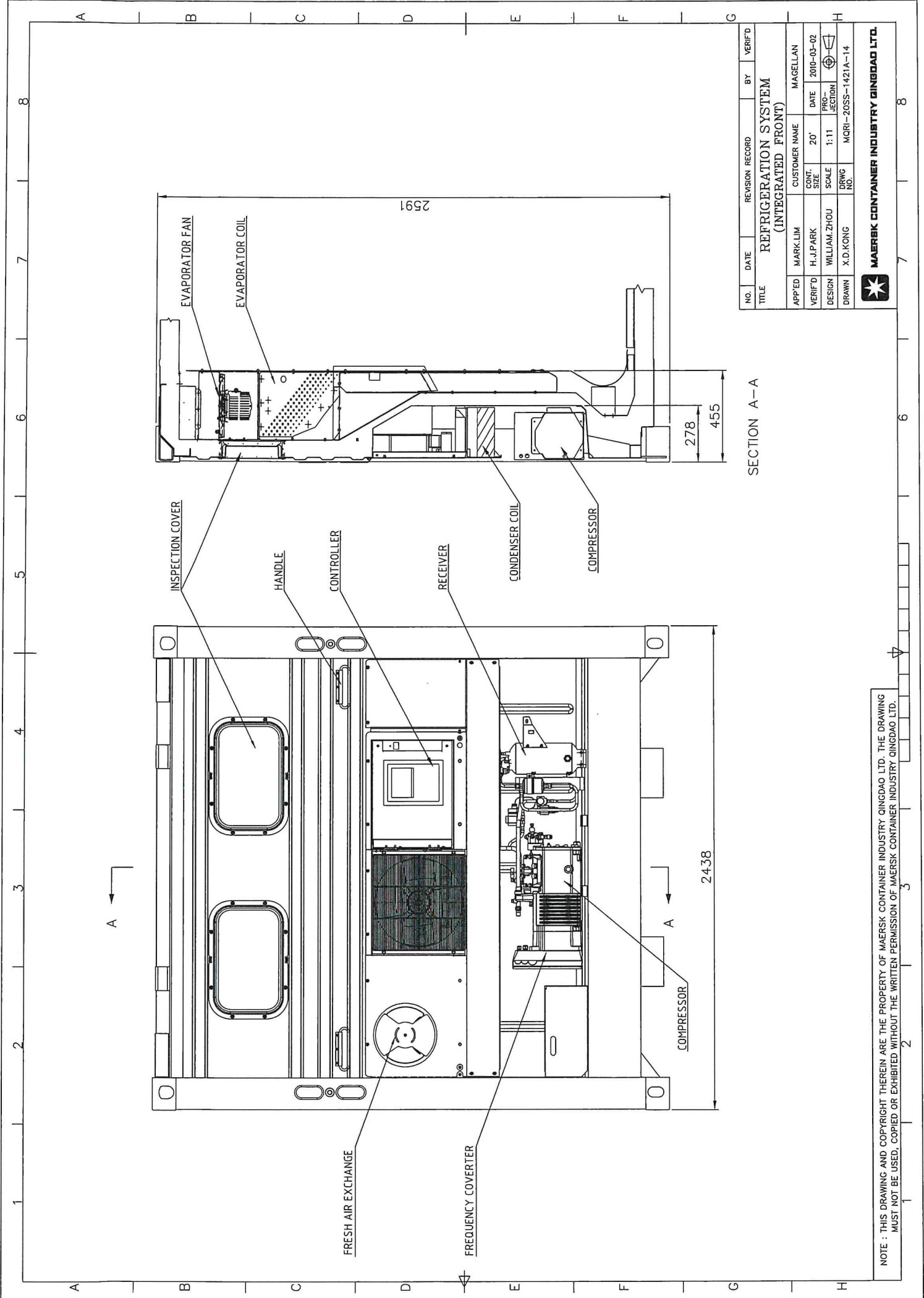
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MAERSK CONTAINER INDUSTRI QINGDAO LTD.

SECTION B-B

SECTION A-A

DETAIL OF "E"  
 DETAIL OF "F"  
 DETAIL OF "G"  
 DETAIL OF "H"  
 DETAIL OF "D"  
 DETAIL OF "C"  
 DETAIL OF "E"



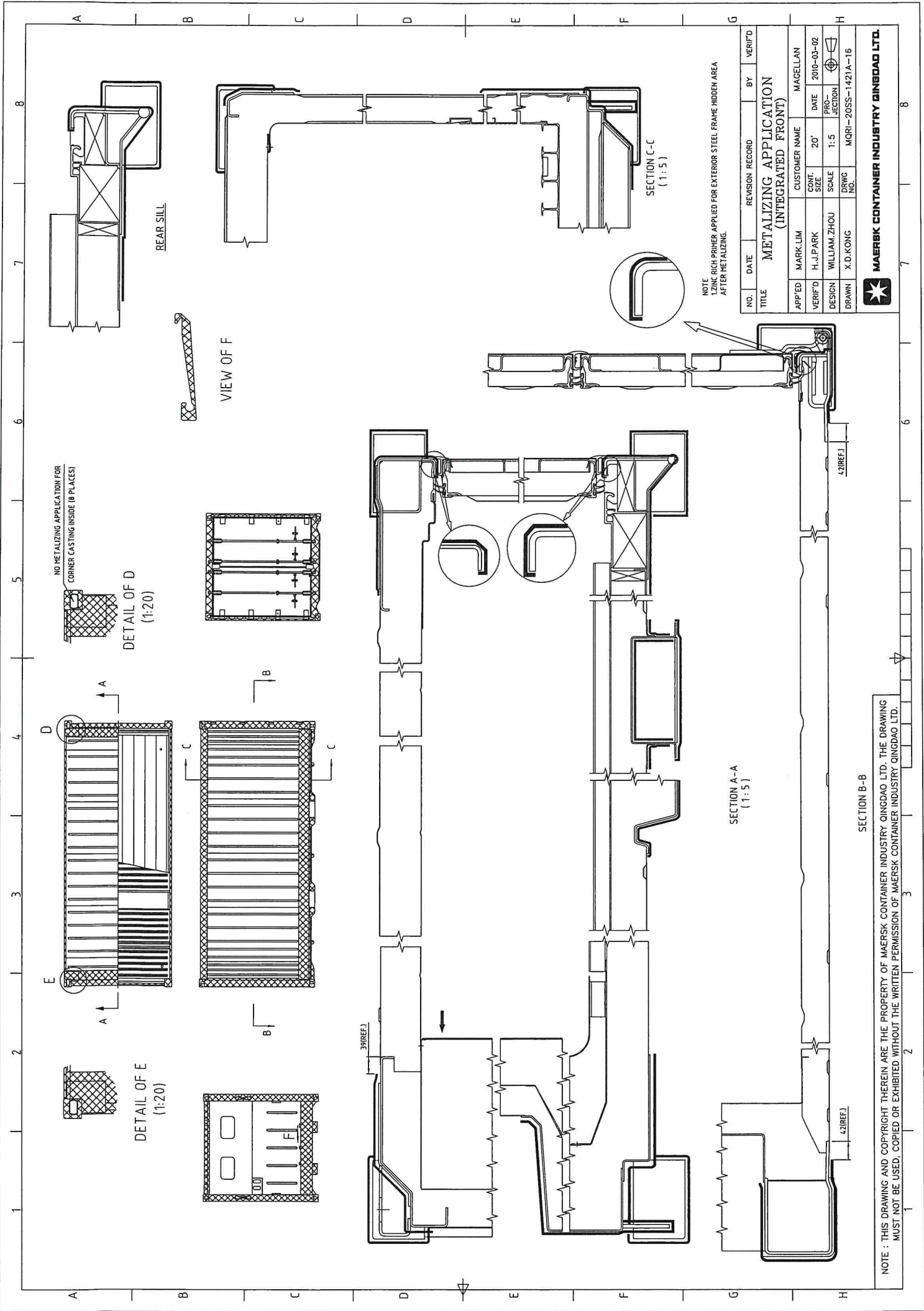
NO.	DATE	REVISION RECORD	BY	VERIFD
TITLE REFRIGERATION SYSTEM (INTEGRATED FRONT)				
APP'D	MARK LIM	CUSTOMER NAME	MAGELLAN	
VERIF'D	H. J. PARK	CUSTOMER SIZE	20'	DATE 2010-03-02
DESIGN	WILLIAM ZHOU	SCALE	1:11	PRO-JECTION
DRAWN	X. D. KONG	DRWG. NO.	MQRI-20SS-1421A-14	

SECTION A-A



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NO METALIZING APPLICATION FOR CORNER CASTING INSIDE (8 PLACES)

DETAIL OF D (1:20)

DETAIL OF E (1:20)

REAR SILL

VIEW OF F

SECTION C-C (1:5)

SECTION A-A (1:5)

SECTION B-B

NOTE: ZINC RICH PRIMER APPLIED FOR EXTERIOR STEEL FRAME HIDDEN AREA AFTER METALIZING.

NO.	DATE	REVISION RECORD	BY	VERIFD
TITLE <b>METALIZING APPLICATION (INTEGRATED FRONT)</b>				
APP'D	MARK.LIM	CUSTOMER NAME	MAGELLAN	
VERIFD	H.J.PARK	CONT. SIZE	20'	DATE 2010-03-02
DESIGN	WILLIAM.ZHOU	SCALE	1:5	PRO-SECTION
DRAWN	X.D.KONG	DRWG NO.	MQRI-20SS-1421A-16	

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