TECHNICAL SPECIFICATION

For 53' x 8'-6 3/8"×9'6 1/2" Refrigerated Container
Weather-resistant high tensile Steel Frame / Aluminum Clad
Extruded Aluminum Cross-member & Top and bottom rail & Floor
Polypropylene-FRP side & roof & door lining & sub-floor/ Composite scuff Liner

Specification No. S-A53-05-972B Drawing No. A53-05GD-972B
Issue Date: Jun, 15th, 2021 Revised Date: Aug, 17th, 2021
Design：Toni Check： Henry Approve：Jim

Installed machinery:	CARRIER land-carriage type	
Standards:	AAR-M930-14	
Max. gross weight:	30,480 kgs	67,200 lbs.
Unit weight=730kg, Tank weight(aluminum)=50 kg,		
Tare weight (excl. Unit.Tank): approx.	**4,490 kgs**	**9,900 lbs.**
Tare weight (Incl. Unit)	5,220 kgs	11,510 lbs.
Tare weight (Incl. Unit, fuel tank)	5,270 kgs	11,620 lbs.
Max payload	**25,210 kgs**	**55,580 lbs**
Stacking test load (no offset):	22,860 kgs	50,400 lbs.
Floor Rating:	8,160 kgs	18,000 lbs.
Heat leakage rate:	56 kcal/ hr. x ℃（123B.T.U/hr.℉） incl. unit, 283 K MWT LBA blowing agent	
Internal length:	15,203 0/-10mm	49'-10 35/64"
Internal width:	2,480 +0/-10 mm	8'-1 5/8"
Internal height:	2,579 0/-10 mm	8'- 5 1/2"
Interior cube:	97.2m3	3433 CU.FT
When used as CSC containers:		
Max. Gross Weight	24,930 kg (54,960 LBS)	
Tare Weight (excl Unit&Tank&Fuel) incl. WPB	4,680 kg (10,320 LBS)	
Max. Payload	20,250 kg (44,640 LBS)	

Note: The tare weight and heat leakage value will be verified after prototype weigh and test.

1. GENERAL

1.1 OPERATIONAL ENVIRONMENT

The container is to be designed and manufactured for the carriage of refrigerated (frozen, chilled) foodstuffs and general cargo by land (on road or rail) and will range from -50°C (-60F Deg) to +50°C (120F Deg) without effect on the strength of basic structure. A mechanical refrigeration unit (THERMO KING or CARRIER land-carriage type) of a "one piece picture frame type" will be fitted to the front mounting frame.

1.2 REGULATIONS AND STANDARDS

1.2.1 ISO/TC-104
668 Dimensions and ratings (1993 edition)
6346 Coding, identification and marking (the third edition 1995)

1496/2 Specification and testing thermal containers (1996 edition)

1.2.2 AAR - Standard M-930-2014.

1.2.3 Timber Component Treatment and Certificate

There will be no exposed timber in the construction.

1.2.4 TIR Requirements and Certificate: approved by ____.

1.2.5 CSC Requirements and Certificate: In compliance with "international convention for safe containers". And all containers will be certified by_____.

1.3 HANDLING

The container will be constructed to be capable of being handled as wide top pick position (96 3/8" aperture centers) or side pin lift with proper handling equipment without permanent deformation which will render them unsuitable for use under the following conditions:

Lifting, full or empty, at top 40 foot intermediate fittings by means of spreaders fitted with hooks, shackles or Twist lock (any 40ft position).

Lifting empty by the side two at a time by an "Elme" style side pick.

When installed the WPB, the container can be handled as standard top pick position (89" aperture centers) full or empty at 40' top corner fittings by means of spreaders fitted with twist locks.(With a MGW of 24,930kg)

1.4 TRANSPORTATION

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

Road: On flat bed or skeleton chassis, secured by twist locks or equivalent ones at bottom corner fittings.

Rail: a) On the flat cars of special container cars secured by twist locks or equivalent ones at the bottom corner fittings.

b) Two (2) high stacked at the 40' intermediate frames.

Marine: With WPB installed, three (3) high stacked at the 40' position (Max. gross weight 24,930kg /container)

1.5 STACKING CAPABILITY

For domestic transportation, the container is designed to be capable of two (2) high loaded double stacking for rail car service and three (3) high loaded stacking for terminal operation with 40 foot ISO type containers as well as other domestic containers.

For marine transportation, with WPB installed, the container is able to be three (3) high stacked at the 40' position (Max. gross weight 24,930kg /container).

Construction

1. Container Frame

End frames made from folded and welded sections of high-tensile weather-resistant steel (700Mpa grade steel for primary structure, the others no less than 340Mpa), welded to the upper and lower corner castings.

The front frame is equipped with a protection frame (would be painted) to accommodate the reefer unit.

Top and bottom rail are made of extruded aluminum profile. The rails are connected to the frames by wing plates.

The cross-members of floor are made of aluminum I-shaped sections connect to the bottom rails by clips and solid rivets.

The bottom frame is equipped with one piece of 6.0mm （15/64"）thick pressed hat section gooseneck tunnel, 79mm (3 7/64")high and 3170mm(10' 4 51/64") in length.

All materials are of high-tensile weather-resistant steel (CORTEN A or equivalent).

2. Flooring

1.2mm(3/64") thick PP-FRP over the cross-members and the gooseneck tunnel, 0.7 mm HGSS panel and 1.2mm (3/64") thick PP-FRP over the cross-member of the rear module.
Insulation of 76mm (3") in thickness polyurethane foam above the cross-members.
Top side is made of 34mm (1 11/32") Duct –duct aluminum floor reinforced by composite stringers.

3. Insulated side walls

Outer cladding made of 1.2mm (3/64") thick white aluminum plate riveted to side post and connect to top side rail and bottom side rail.
Insulation of 47mm (1 27/32") in thickness polyurethane foam.
Inner linings made of T1.5mm (1/16") PP-FRP, tensile strength min.280MPa longitudinally.
Composite scuff liner will be integrated with side lining, total thickness 5mm, 16" high from floor, whole surface of the scuff liner are heat fused with the side lining.

4. Insulated front wall

Outer cladding made of 0.8 mm (1/32") MGSS plate.
Insulation of 90mm (3 35/64") in thickness polyurethane foam.
Inner lining made of 1.0mm (3/64") aluminum plate.

5. Insulated roof

Outer cladding made of 1.0mm(3/64") thick die-stamped corrugated bare or pre-painted aluminum panels reinforced by 10 pieces of hat shaped bows and riveted to top side rails both rear and intermediate headers.
Insulation of 89mm (3 1/2") in thickness polyurethane foam reinforced by posts.
Inner lining made of T1.5mm (1/16") PP-FRP.

6. Insulated door

6.1 Outer panel made of a 1.2mm (3/64") aluminum sheet.
6.2 Insulation of 72mm (2 53/64") in thickness polyurethane foam.
6.3 Inner linings made of 1.5mm (1/16") PP-FRP.
6.4 Outer: E.P.D.M. "C" section double lips. Inner: E.P.D.M. "O" section.
6.5 Each door is equipped with 5 Aluminum hinges with stainless steel pins and brass bushes and with 2 hot-dip galvanized Saejin locking rods system, furthermore with 1 steel chain door retainer.
6.6 The door locking rod is to be fixed with stainless steel bolts and galvanized nuts.

7. Special features

The TSR made of special shape to hold the portable secure system.
One placard holder would be installed on rear door and side walls.
Two pieces of 2-core 16-gauge wires for two remote temperature sensors and one piece of 2-core 16-gauge wire for door sensor will be supplied.
An "E" type load lock track is installed as follows:
2- Row 16' in length from door end located approx 36" and 72" above the floor.
These E-tracks will recess the side lining.
Cargo net will be provided with track for retainer cable, this track will be surface mounted on the side lining.
The cargo net slider track will be crimped closed on each end after cargo net anti-theft cable is installed.
"Tiger Cool Express" will be stenciled in "black" color on the cargo net webbing, and the webbing has a rating of 6,000 lbs. with 3 year warranty.

8. Surface protection

End frames, rails and crossmembers are to be shotblasted acc. to Swedish Standard Sa 2.5.

Adhesive primer or Foam bond will be applied to the polyurethane contacting surfaces for good adhesion with polyurethane.

8.1 Exposed surface (except understructure and door panel)					
1st primer:	Zinc rich primer	30	microns	(For Corten parts)	
2nd primer:	Polyamide epoxy primer	40	microns		
3rd top:	polyurethane	50	microns		
	Total (D.F.T.)	120	microns		
8.2 Inside surface (insulation foam contact area)					
A) Inside front & rear frame:	Polyamide epoxy primer			30	microns
B) Inside for stainless steel & AL:	Adhesive primer or foam bond.			20	microns
8.3 Understructure coating					
1st primer:	Zinc rich primer	30	microns	(For Corten parts)	
2nd primer:	Polyamide epoxy primer	40	microns		
3rd top:	BITUMEN	150	microns		
	Total (D.F.T.)	220	microns		
8.4 Corner fittings contrasting marking					
For 40ft position Corner fittings, top surface & side surface of top corner fittings & side surface of bottom corner fittings to be painted with Blue RAL 5005					
Note:	Color of top coating is of white (RAL 9010).				
	Supplier of paint is Kansai, KCC, Hempel or Dowill.				

9. Markings

All the markings are made of self-adhesive calendered vinyl film (use 3M material).

Owner's logo will be shown on side walls.

AAR and data plates made of 0.7mm thick stainless steel AISI 304.

10. Testing

This container will be tested and certified by inspectors nominated by the owner.

10.1 Proposed criteria table for general prototype

Item	Test Load and Method
When used as domestic containers, as per AAR M930 standard.	
(R=30480kg, T=5270kg, P=25210kg)	
10.1.1 Stacking (at 40' position)	22,860 kg/post Offset: 38mm longitudinally 25mm laterally Internal load: R-T
10.1.2 Lifting from top(at 40' position)	Internal load: 2R-T(vertical)
10.1.3 Front end Wall Strength (without bulkhead)	0.4P Uniform Load by Air Bag
10.1.4 Rear end Wall Strength	0.4P Uniform Load by Air Bag
10.1.5 Side Wall Strength	0.3P Uniform Load by Air Bag

10.1.6	Roof Strength	170kg (375LBS) (305×610mm)
10.1.7	Longitudinal Restraint (at 40' position)	R/side Internal load: R-T
10.1.8	Longitudinal Restraint (at 53' position)	R/side Internal load: R-T
10.1.9	Transverse Restraint (at 40' position)	0.3R/side Internal load: R-T
10.1.10	Longitudinal Racking (at 40' position)	0.5R/side Internal load: Nil
10.1.11	Concentrated cargo loading	19,780kg(3mX1.2m) balance load 2(R-T-9890kg)
10.1.12	Floor deflection	Internal load: R-T
10.1.13	Straddle lifting	N/A
10.1.14	Waterproofness	As per AAR
10.1.15	Air tightness Test	Internal pressure: 250±10Pa
10.1.16	Heat leakage test	As per ISO 1496-2
10.1.17	Lifting from top(fatigue)	Internal load: R-T(vertical), (3970kg/post vertical) 50 cycles
10.1.18	Floor rating(fatigue)	8160kg (50 cycles)
10.1.19	Transverse Racking(fatigue)	0.15R(0.35R vertical) 50 cycles

When used as CSC containers, as per ISO1496-2 standard.

(R=24930kg, T=4680kg, P=20250kg)

10.1.20	Stacking (at 40' position,3high loaded)	22,437 kg/post Offset: 38mm longitudinally 25mm laterally Internal load: 1.8R-T
10.1.21	Lifting from top(with WPB)	Internal load: 2R-T(vertical)
10.1.22	Front end Wall Strength (without bulkhead)	0.4P Uniform Load by Air Bag
10.1.23	Rear end Wall Strength	0.4P Uniform Load by Air Bag
10.1.24	Side Wall Strength	0.6P Uniform Load by Air Bag
10.1.25	Roof Strength	300kg (300×600mm)
10.1.26	Longitudinal Restraint (at 40' position)	R/side Internal load: R-T
10.1.27	Transverse Racking (at 40' position)	35KN Internal load: Nil
10.1.28	Longitudinal Racking (at 40' position)	75KN Internal load: Nil
10.1.29	Floor rating	7260kg
10.1.30	Air tightness Test	Internal pressure: 250±10Pa

10.1.31	Heat leakage Test	As per ISO 1496-2
10.1.32	Water tightness Test	As per ISO 1496-2

10.2 CSC Abbreviated Structural Test for batch production.

10.2.1	Stacking (at 40' position,3high loaded)	22,437 kg/post Offset: 38mm longitudinally 25mm laterally Internal load: 1.8R-T
10.2.2	Lifting from top(with WPB)	Internal load: 2R-T(vertical)
10.2.3	Floor rating	7260kg
10.2.4	Air tightness Test	Internal pressure: 250±10Pa
10.2.5	Heat leakage Test	As per ISO 1496-2

10.3 AAR testing for batch production:

No AAR test need to be performed.

11. GUARANTEE

Refer to the warranties outlined in the Purchase Order.

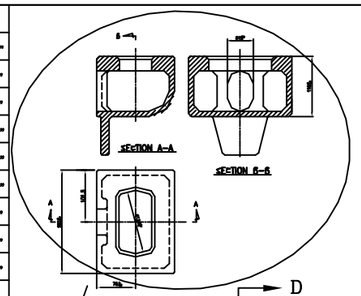
Any damages caused by mis-handling, mis-securing, mis-loading, impact and any accidents relating from bad practices are excluded.

12. REVISION

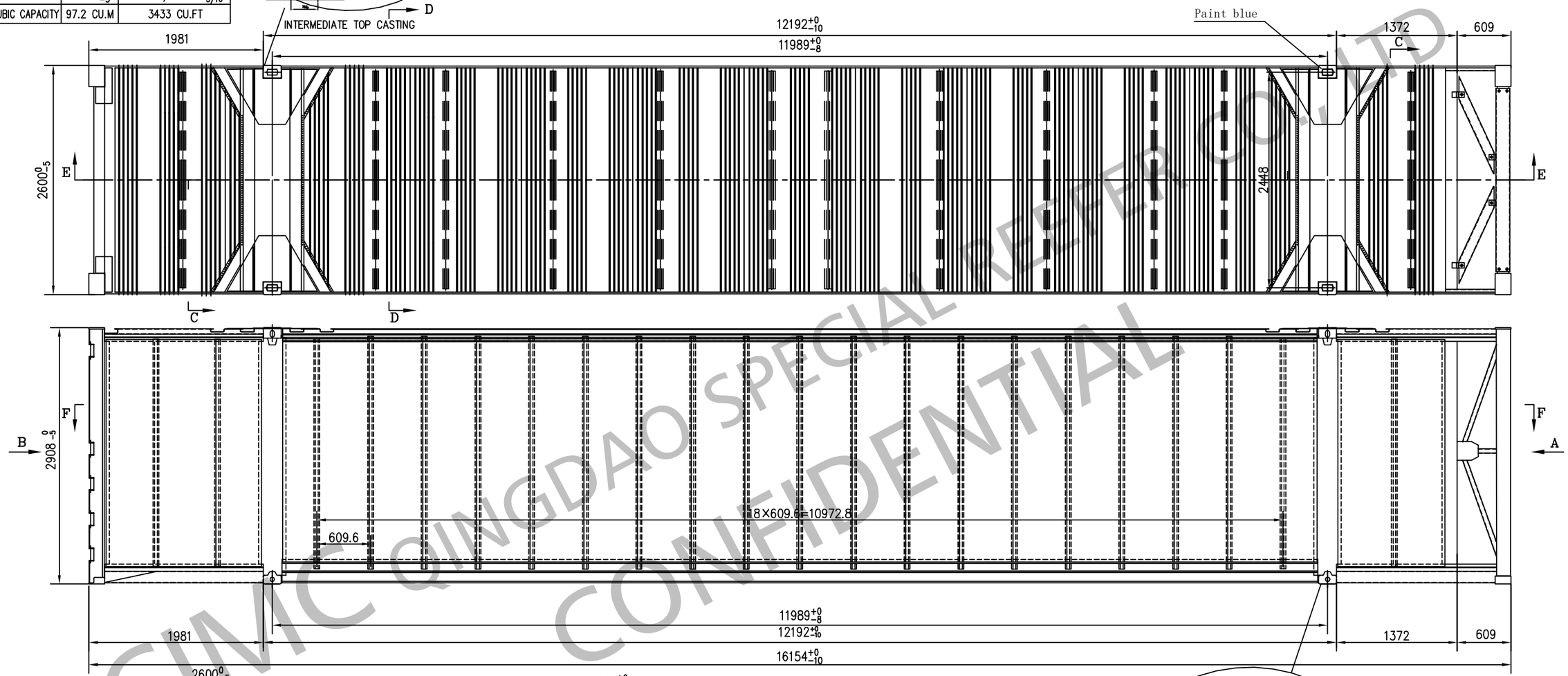
Spec. Item	Ref. Dwg. No.	Description	Date	Designer
/	A53-05GD-972B	Add the description about CSC	2021.07.22	Toni
/	A53-05GD-972B	Revise the CSC Tare weight	2021.08.17	Toni

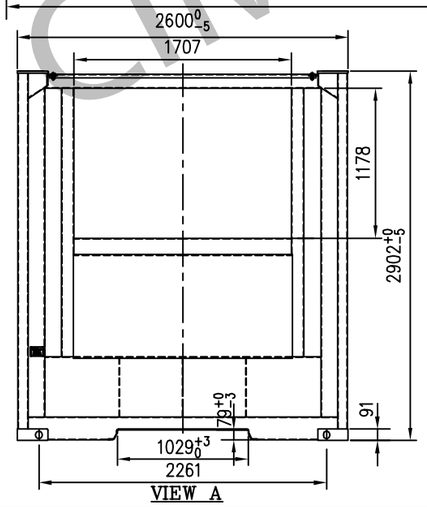
R&D of Qingdao CIMC Special Reefer

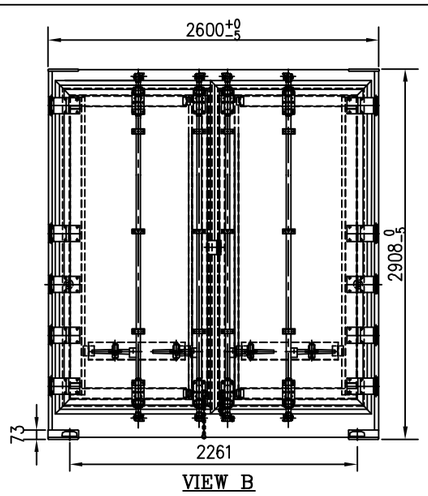
CLASSIFICATION		DIMENSION	
EXTERNAL	LENGTH	16154 $^{0}_{-10}$	53' $^{0}_{-25/64"}$
	WIDTH	2600 $^{0}_{-5}$	8'-6 3/8" $^{0}_{-3/16"}$
	HEIGHT	2908 $^{0}_{-5}$	9'-6 1/2" $^{0}_{-3/16"}$
INTERNAL	LENGTH	15203 $^{0}_{-10}$	49'-10 35/64" $^{0}_{-25/64"}$
	WIDTH	2480 $^{+0}_{-10}$	8'-1 5/8" $^{0}_{-25/64"}$
	HEIGHT	2579 $^{0}_{-10}$	8'-5 1/2" $^{0}_{-25/64"}$
DOOR OPENING	WIDTH	2455 $^{0}_{-5}$	8'- 21/32" $^{0}_{-3/16"}$
	HEIGHT	2574 $^{0}_{-5}$	8'-5 11/32" $^{0}_{-3/16"}$
CARGO ACCESS HEIGHT		2570 $^{0}_{-5}$	8'-5 3/16" $^{0}_{-3/16"}$
INTERNAL CUBIC CAPACITY		97.2 CU.M	3433 CU.FT

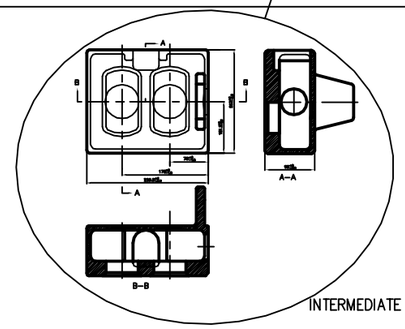


When used as CSC containers			When used as domestic containers			
MAX GROSS WEIGHT	24930 KGS	54960 LBS	MAX GROSS WEIGHT		30480 KGS	67200 LBS
TARE WEIGHT (±2%) EXCL.UNIT&TANK&FUEL INCLUDING WPB	Ⓐ 4680 KGS	10320 LBS	TARE WEIGHT (±2%)	EXCL.UNIT & TANK	4490 KGS	9900 LBS
				INCLUDING UNIT (730KG)	5220 KGS	11510 LBS
				INCLUDING TANK (50KG AL)	5270 KGS	11620 LBS
MAX PAYLOAD	Ⓐ 20250 KGS	44640 LBS	MAX PAYLOAD		25210 KGS	55580 LBS
STACKING TEST LOAD	22437 KGS	49470 LBS	STACKING TEST LOAD		22860 KGS	50400 LBS
FLOOR RATING	7260 KGS	16000 LBS	FLOOR RATING		8160 KGS	18000 LBS
HEAT LEAKAGE (283K M.W.T.)	56 kcal/hr. °c	123 B.T.U/hr. °F	HEAT LEAKAGE (283K M.W.T.)		56 kcal/hr. °c	123 B.T.U/hr. °F









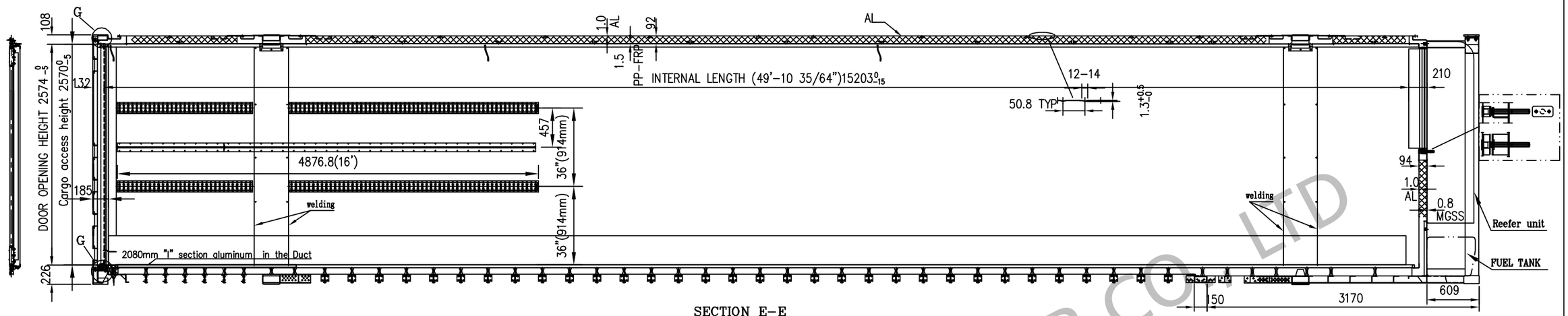
INTERMEDIATE BOTTOM CASTING

ISSUE	DATE	DESIGNED	CHECKED	APPROVED
A	2021.08.17	Toni		

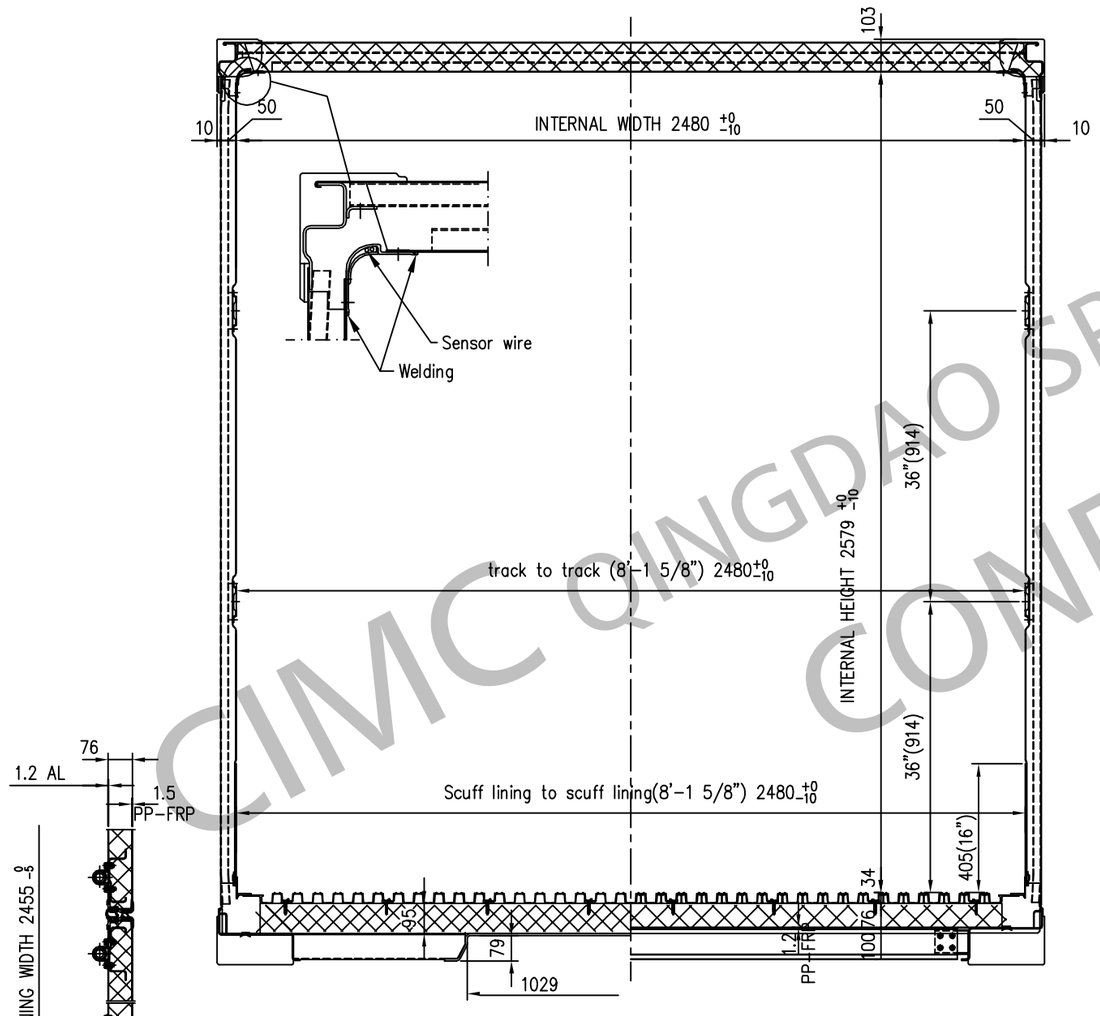
CHINA INTERNATIONAL MARINE CONTAINERS (GROUP) LTD.

TITLE: 53'x8'6 3/8"x9'6 1/2" Reefer GENERAL ARRANGEMENT

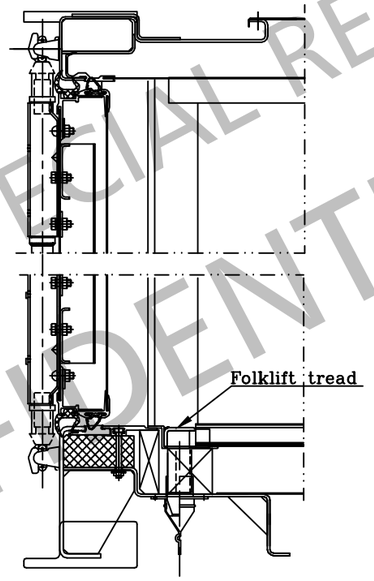
OWNED	Tiger Cool			SCALE	1 : 50	QTY.	1
DESIGNED	Toni	DATE	2021.06.15	DWG. NO.:	A53-05GD-972B1		
CHECKED	Henry	DATE	2021.06.15				
APPROVED	JIM	DATE	2021.06.15	SHEET	1 OF 2 SHEETS		



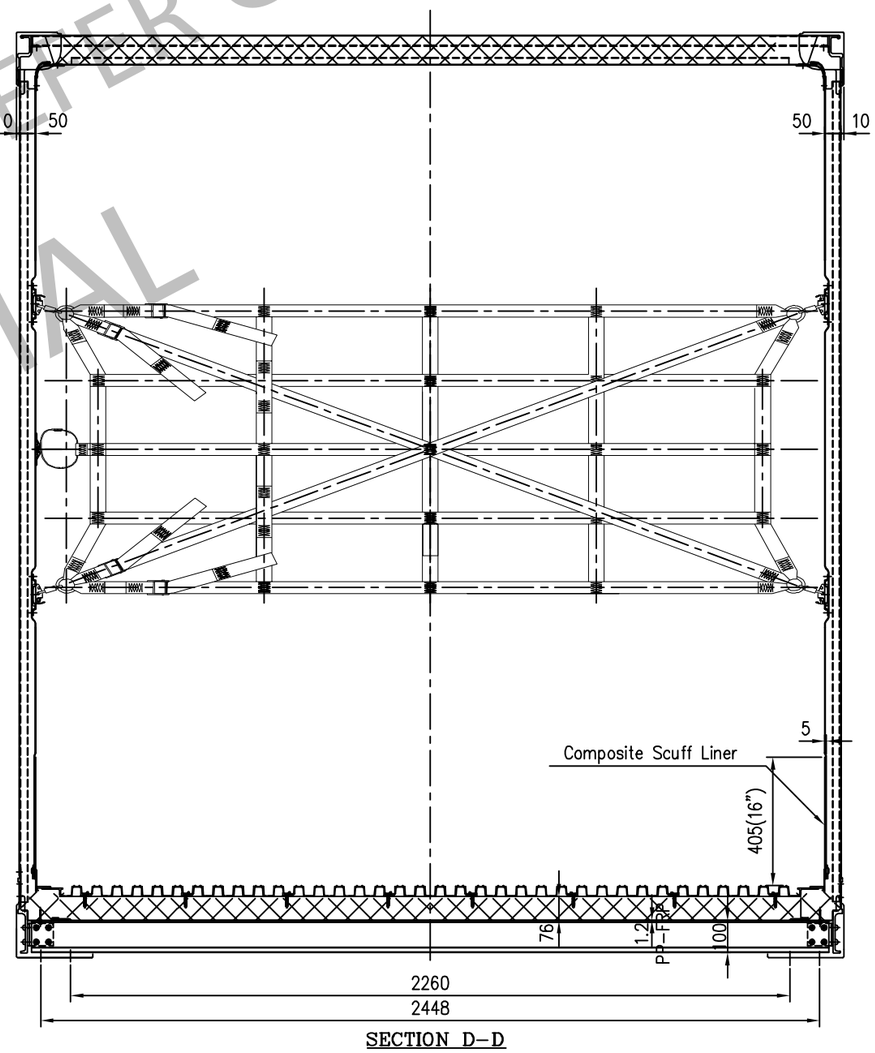
SECTION E-E



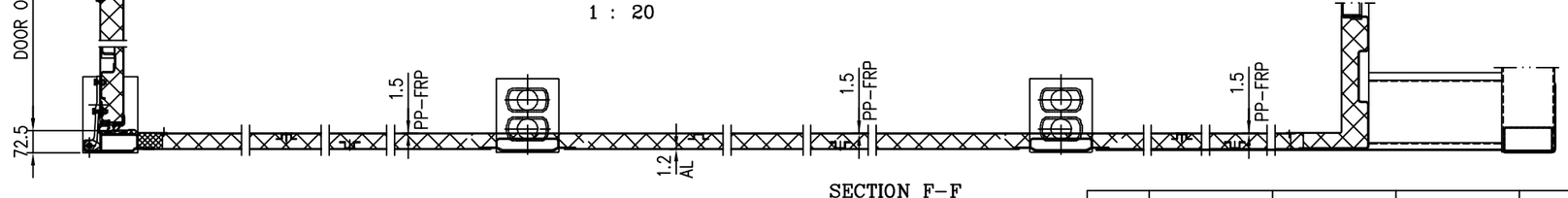
SECTION C-C
1 : 20



DETAIL G
1 : 10



SECTION D-D
1 : 20



SECTION F-F
1 : 20

CHINA INTERNATIONAL MARINE CONTAINERS (GROUP) LTD.

TITLE: 53'x8'6 3/8"x9'6 1/2" REEFER GENERAL ARRANGEMENT

OWNED	Tiger Cool			SCALE	1 : 50	QTY.	1
DESIGNED	Toni	DATE	2021.06.15	DWG. NO.:	A53-05GD-972B2		
CHECKED		DATE					
APPROVED		DATE		SHEET	2 OF 2		SHEETS

ISSUE	DATE	DESIGNED	CHECKED	APPROVED