SPECIFICATION

FOR

40’×8’×9’6” TYPE

MGSS REEFER CONTAINER

SUPER FREEZER CONTAINER

INSULATION: POLYURETHANE

FLOOR RAIL: ALUMINUM

SIDE & ROOF PANELS: MGSS

SIDE &ROOF LINING：HGSS

DOOR LINING: HGSS

DOOR PANEL: MGSS

END FRAME: CORTEN

BASE FRAME: CORRUGATION SUBFLOOR

CONTENTS

SCOPE

This specification covers design, construction, materials, testing, inspection and performance requirements for 40’×8’×9’6” type refrigerated containers, manufactured by:

1. GENERAL

1.1 OPERATIONAL ENVIRONMENT

1.1.1 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 by sea (above or bellow deck) throughout the world and will range from -40°C (-40F Deg) to +80°C (176F Deg) without effect on the strength of basic structure. A mechanical refrigeration unit of a “one piece picture frame type” will be fitted to the front frame. The container is designed for long distance transportation of deep frozen, frozen in temperature of -60. deg.c.

1.2 REGULATIONS AND STANDARDS

1.2.1 ISO/TC-104

668 Dimensions and ratings (1995 edition)
6346 Coding, identification and marking (the third edition 1995)
1496/2 Specification and testing thermal containers (1996 edition)
1161 Specification of corner fittings (1990 edition/ Cor.1.: 1990)

1.2.2 TIR Requirements and Certificate: approved by classification society.

1.2.3 Timber Component Treatment and Certificate

There will be no exposed timber in the construction.

1.2.4 CSC Requirements and Certificate

In compliance with “international convention for safe containers”.

1.2.5 Classification Society

All Containers will be certified by classification society TBA

1.2.6 U.I.C. approved by classification society.

1.3 HANDLING

The containers will be constructed to be capable of being handled without permanent deformation which will render them unsuitable for use under the following conditions:

1.3.1 Lifting full or empty at top corner fittings by means of spreaders fitted with hooks, shackles or twist-locks.

1.3.2 Lifting full or empty at bottom corner fittings using slings with terminal fittings at sling angles of 30 deg. to the horizontal plane.

1.3.3 The thermal and performance test will be carried out according to ISO standard.

1.4 TRANSPORTATION

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

1.4.1 Marine :Nine high stacked (***every floor: 24,000kg,total:192,000kg)***, in the ship cell guide and four high stacked on the deck.

1.4.2 High-Way :On flat bed or skeleton chassis, secured by twist-locks or combination of twist-locks and front penetration pins at the four bottom corner fittings.

1.4.3 Rail-Road :COFC (Container-on-flatcar): secured by twist-lockers or equivalent. Double stacking on the train.
TOFC (Trailer-on-flatcar): secured to semi-trailer chassis.

2. DIMENSIONS & RATINGS

2.1 Dimensions (Installed unit)

Dimension	External (mm/inch)	Internal (mm/inch)
Length	12,192 0/-10 (40' 0/-25/64")	11,531 0/-10 (37' 9 31/32" 0/-25/64")
Height	2,896 0/- 5 (9'-6" 0/-3/16")	2,508 0/- 8 (8'- 2 47/64" 0/- 5/16")
Width	2,438 0/- 5 (8' 0/-3/16")	2,178 0/- 8 (7'- 1 3/4" 0/- 5/16")

2.2 Internal capacity 62.9m^3 (2,224 Cu.ft).

2.3 Door opening dimensions

Width	2,238 0/-5mm (7'-4 7/64" 0/-3/16")
Height	2,560 0/-5mm (8'-4 25/32" 0/-3/16")
Cargo access height	2,508 0/-5mm (8'-2 47/64" 0/-3/16")

2.4 Gooseneck tunnel

Length	3,174mm
Width	1,029mm (+3/0)
Height	120mm (0/-3)

2.5 Ratings

Max. Gross Weight	35,000kg (77,160LBS)
Tare Weight	4,800kg (10,580 LBS)
Tare Weight (incl. Unit 610kg)	5,410kg (11,930LBS)
Max. Payload	29,590kg (65,230LBS)

2.6 Insulation

Item	Thickness	Density
Roof	118mm	45~50kg/cu.m
Side walls	118mm	45~50kg/cu.m
Door panels	130mm	45~50kg/cu.m
Floor	95/153mm	45~50kg/cu.m
Corner		40kg/cu.m

2.7 Heat leakage value

U_{max} = *30 kcal / deg.c.hr*. at the mean wall temperature 283K (10 ℃) incl. cooling unit.

2.8 Air leakage value

Q_{max} = 3.0 m^3/hr. (incl. reefer unit max. 0.5m^3/hr.) measured at 250±10Pa without Transfresh curtain.

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

3. MATERIAL

3.1 Materials of main parts

Item	Part	Material	Note
1	Front corner post & inner Front top rail (header) Rear header outer & inner Front & rear header protector Rear corner post Top side rail Bottom side rail upper Bolster top plate Door sill & inner member Front sill & inner member Bottom side rail lower Bolster tunnel Gooseneck tunnel Load transfer member Sub-floor	CORTEN A	
2	Side & Roof & Door panel Hinge lug	MGSS	
3	Roof& Door lining Generator fitting nut Side lining Top angle cover	HGSS(BN4)	
4	Corner fitting	SCW49	
5	Front & rear lining	5052-H46/5052-H34	
6	Floor rail Flashing Side	6061-T6	
7	Door hinge	SS41	H.D.G.
8	Door lock	Forged steel	H.D.G.
9	Insulation tape	Electrolytic buffer of P.E.or P.V.C.	
10	Foam tape	Adhesive of P.V.C.	
11	Insulation foam	1) Rigid polyurethane foam 2) Blowing agent: cyclopentane	
12	Exposed sealer	Inner: special sealant service at -60℃ Outer: Silicon	
13	Hidden sealer	Butyl	
14	Rear corner post inner	SS50	
15	Door inner gasket	Special EPDM service at -60℃	
16	Foam adhesive(inside)	Special primer service at -75℃	

3.2 Properties of material

Material	Y.P. (kg/mm^2)	T.S. (kg/mm^2)
CORTEN A	35	49
M.G.S.S	19.5	36
TN4	21	53
SCW49	28	49
5052-H46	18	25.5
5052-H44	15	23
6061-T6	25	27
SS41	25	41
Forged steel	23	45
SS50	28	49

4. CONSTRUCTION

4.1 Refrigeration machinery

Model: **TK CRR-40DF**.

4.2 Base structure

Sub-floor : CORTEN A, 1.6mm corrugated type.
welded to the bottom side rail on one side of sub-floor.
Gooseneck tunnel : Corten-A, 4.0mm, one piece pressed hat section.
Load transfer member : Corten-A, 3.5mm, one piece pressed hat section.
Bolster : Corten-A, 4.5mm, bottom "U" section and Corten A, 4.5mm top plate to be welded together.

4.3 Flooring

Floor stringer : Aluminum I-shape stringer to be step-welded to aluminum floor board.
Floor board : Aluminum 6061-T6, 63.5mm high, extruded "T" section.
Automatically welded together against water and air leakage.

4.4 Front frame structure

Front corner post : Corten-A, 6mm outer and 4.5mm inner.
Two elements fabricated integral section.
Front top rail : Corten-A, 4.0mm header with 4.5mm double plate.
Front bottom rail : Corten-A, 4.0mm thick outer.
Two cone damage protectors are welded to both ends of the front bottom rail and corner castings.
Generator mounting : It is provided on front header and corner posts for clip on device type generator sets.

4.5 Rear frame structure

Rear corner post : Corten-A, 6.0mm thick outer and 10mm thick channel type inner with 6.0mm thick reinforcement.
Rear header : Corten-A, 4.0mm thick outer and 3.5mm inner with 4.5mm double plate.
Rear sill : Corten-A , 6.0mm thick outer and 4.0mm inner with four gusset behind the cam keeper..
The lower flange of the sill near to corner fitting is provided the channel shaped cut-outs for damage protection.

4.6 Door assembly

Door panel : Rear door is composed of 1.6mm thick, MGSS panel and corrugated stainless steel inner lining with polyurethane insulation reinforced by beams.
Locking T.I.R. slam plate to be fitted to right hand door and vertically central.
A door holder of nylon rope is provided on each door and a rope hook is fitted on each bottom rail to retain the door from closing.
Door lining :BN4, 0.7mm thick, 9mm high standing ribs corrugation panel.
Door locking gear : Saejin, Haihang or equivalent with secure cam/keeper
Hinge assembly : Hinge blade -7mm, hot dip galvanized SS41.
Hinge pin and washer – 12.7mm dia. SUS304.
Hinge bush – bronze.
Door frame: : Extruded aluminum and heat insulation sheet
Door gasket: : Outer: EPDM "C" section, Inner: EPDM "O" section
Door fastener : Door hardware including door hinges assembly to be fastened w
stainless steel bolts and nuts.

4.7 Side panel assembly

Top side rail : Corten-A, 4.0mm thick, cold rolled steel profile.
Bottom side rail : Corten-A, 4.0mm upper and Corten-A, 4.5mm lower with 3.5mm thick stiffener.

Upper reinforced by angle section stiffener and lower roll formed z-section.

Side panel :MGSS, 1.0mm end and middle & 0.8mm thick main panels butt-welded together to form one panel by automatic TIG welding.

Side lining :BN4,0.7mm, with 4mm depth inverted small die-stamped corrugations.

Side post : CORTEN A,4.5, 3.0mm & 1.6mm thick, pressed hat section to be spot-welded to side panel.

Side stringer :MGSS, 0.8mm thick, pressed hat section to be spot-welded to side lining.

4.8 Roof panel assembly

Roof panel : MGSS, 1.0mm end and 0.8mm main corrugated panels butt-welded together to form one panel by automatic TIG welding.

Roof bow : CORTEN A , 1.6mm thick, pressed hat section to be spot-welded to roof panel.

Roof lining : HGSS, 0.7mm thick, with small corrugations, Automatically butt-welded together to form one piece.

4.9 Additional attachment

1) Lashing bar: Four lashing bars to be installed between two floor tees on each side.

Safe working load of 1,000kgs.

2) Power cable retainer: Seven sets of stainless steel hooks are to be installed at the left hand bottom side rail.

4.10 Corner fitting

JIS SCW 49 or equivalent quality, designed in accordance with ISO/1161.

4.11 Unit mounting

The unit mounting to be designed in accordance with the reefer machinery manufacturer's mounting requirement.

4.12 Edge covers

All inner edges are covered by aluminum or HGSS, heat insulation panel(service at -75℃) sections, all sealed and riveted or glued to the inner lining.

All differed materials will be insulated by polyethene film (one side adhesive) to avoid galvanic corrosion

All foaming injection holes should be on the side with sunk inward portion for securing rivet without sealant.

5. PRESERVATION

Surface preparation and painting work shall be accordance with Qingdao CIMC Special Reefer Container Manufacture Co., Ltd.(QCSC) Painting Procedures.

5.1 Surface preparation

5.1.1 Prior to assembly

1) Contamination (oil, water, etc.) will be removed prior to shot blasting and painting.
2) All steel components will be shot blasted to Swedish standard Sa 2.5 to remove rust, mill scale etc..
3) Sharp edges to be removed from all steel parts.
4) Locking rod assemble which are welded with gear cams, bars, handles and door hinges are hot dip galvanized (thickness: min.75 microns).

5.1.2 Polyurethane contact surfaces

Foam adhesive will be applied to the Aluminum contact surfaces for good adhesion with PU.

5.1.3 After assembly

1) All contamination (oil, water, etc.) will be removed prior to shot blasting and before painting.
2) All MGSS parts will be sweep blasted with non-metallic media.

3) Surface treatment for painting will be done, blasting on welding seam line and all welding slag, spatters and other foreign matters will be removed.

5.2. Painted surface

All steel parts shall be painted as follows:

5.2.1 Outside surface (except door panel)

1st primer: Zinc rich primer	30microns (For Corten parts)
2nd primer: Zinc phosphate epoxy primer	40microns
3rd Top primer: Acrylic resin	50microns
Total (D.F.T.)	*90/120microns*

5.2.2 Inside surface (insulation foam contact area)

A) Inside front & rear frame: 20microns of polyamide epoxy primer.
B) Inside for stainless steel: 20microns of primer.
C) Inside for AL: foam adhesive.

5.2.3 Door panel

1st primer: Zinc phosphate epoxy primer	30microns
2nd primer: Polyurethane	60microns
Total (D.F.T.)	90microns

5.2.4 Under coating

A) CORTEN A parts

1st primer: Zinc rich primer (for corten parts)	30microns
2nd primer: polyamide epoxy primer	40microns
3rd top coat: Tectyl 121B/ Dinotrol 4941K	150microns
Total (D.F.T.)	220microns

B) Stamping on rear corner castings
After stamping, zinc rich primer (30microns) and top coat (30microns) shall be applied onto each stamping.

5.2.5 Top coat color: white (RAL 9010).

5.2.6 Paint supplier:

6. MARKINGS

6.1 Lettering

Each container shall be marked in accordance with ISO requirements, owner's marking specifications and/or other regulations.

6.2 Materials

The material of all decals is PVC film with permanent adhesive and having a minimum 7-years life.

6.3 Consolidated data plate

The certification plates of timber treatment, CSC and TIR approval shall be of stainless steel, engraved in permanent manner, and riveted with stainless steel rivets.

6.4 Stamping on rear corner castings

Owners prefix, container serial number and check digit to be stamped in 10mm high letter/numbers into the upper face of the lower, left-hand corner casting. Manufacturer's prefix and production number to be stamped in 10mm high letter/numbers into the upper face of the lower right-hand casting.

7. TESTING & INSPECTION

7.1 Prototype container

A prototype container need not to be built if one of the first containers out of the series serves as a prototype container. This container will be tested and certified by inspectors nominated by the owner.

7.2 Production line of container

Every container is manufactured under effective quality control procedures to meet the specified standards.
After completion all container dimensions will be checked and door operation checked.

7.3 Proposed criteria table for general prototype

	Item	Test Load and Method
7.3.1	Stacking	Load: 86,400 kg/post Offset: 38mm longitudinally 25mm laterally Internal load: 1.8 R-T
7.3.2	Lifting from top Corner fittings	Internal load: 2 R-T (vertical)
7.3.3	Lifting from bottom Corner fittings	Internal load: 2 R-T (30deg)
7.3.4	Floor Strength	7,260kg (16,000LBS)
7.3.5	Restraint	R: 30,480 kg/side Internal load: R-T
7.3.6	End Wall Strength	0.4P Uniform Load by Air Bag
7.3.7	Side Wall Strength	0.6P Uniform Load by Air Bag
7.3.8	Roof Strength	300kg (660LBS) (300×600mm)
7.3.9	Racking (transverse)	150kN
7.3.10	Racking (longitudinal)	75kN
7.3.11	Air-tightness Test	Internal pressure: 250±10Pa
7.3.12	Thermal Test In compliance with ISO 1496-2	

Note: R: Max gross weight.

P: Max payload.

T: Tare weight.

8. GUARANTEE

8.1 Paint guarantee

5 years, except as otherwise stated in purchase order, and based on standard “RE 3” of the “European degree of rusting standards”. Normal wear / tear, or corrosion caused by fish oil, animal and vegetable oils, strong solvents, impact and accident is excluded.

The warranty shall be applied to all kinds of faults or failures affecting more than 10% of the painted surface and partial or total repainting shall be assured for the container(s) at manufacturer’s expense.

8.2 Decal guarantee

7 years

8.3 Other guarantee

All containers (except gaskets, sealant, adhesive, heat insulation panel and insulating foam) are guaranteed by the manufacturer against any defects or omissions in construction, poor workmanship, defective materials within **1** years after delivery.

Delamination caused by mishandling, missecuring, misloading, impact, accident, fire or acid spillage are not covered by this warranty.

A manufacturing defect is established if

(a)The adhesion primer or foam bond between the METAL and the foam is separating from the METAL. (primer remains on the foam)

(b) The adhesion primer or foam bond is separating within itself (primer remains on the METAL and the foam)

(c) The adhesion primer or foam bond is separating from the foam (primer remains on the METAL without a foam cell layer on its surface)

The warranty shall be applied to delaminations if the structural integrity is compromised by more than 3sq. meters (as per latest version of IICL dated June, 2005, page 31), as long as neither the length nor the width of the affected area exceeds 1.73 meter.

Any damages caused by mis-handling, mis-securing, mis-loading, impact and other natures of ancient are excluded.

Those materials that need tolerance low temperature , such as gaskets, sealant, adhesive , heat insulation panel and insulating foam, the manufacturer don’t supply quality and using time guarantee.

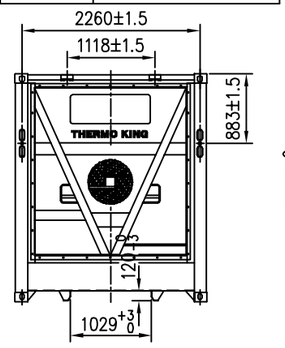
9. REVISION

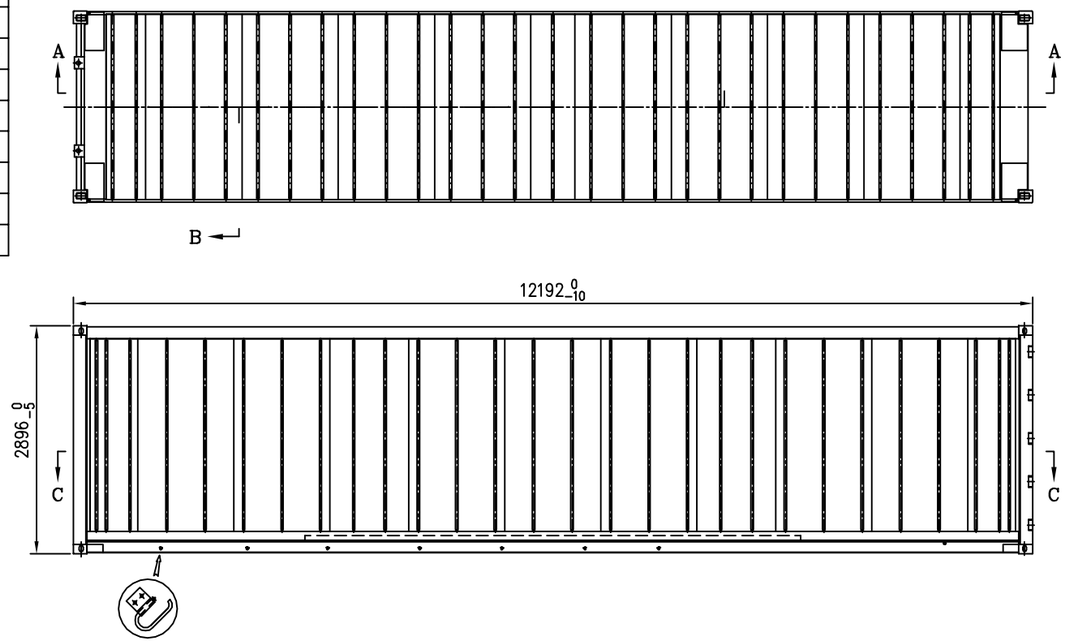
Spec Item	Relation drawing No.	Description	Date	Designer

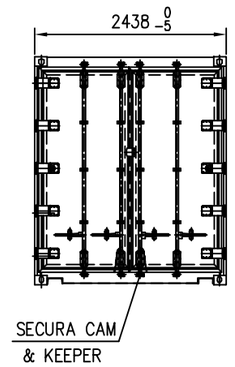
CLASSIFICATION		DIMENSION	
EXTERNAL	LENGTH	12192 $^{0}_{-10}$	40' $^{0}_{-25/64"}$
	WIDTH	2438 $^{0}_{-5}$	8' $^{0}_{-3/16"}$
	HEIGHT	2896 $^{0}_{-5}$	9'-6" $^{0}_{-3/16"}$
INTERNAL	LENGTH	11531 $^{0}_{-10}$	37'-9 31/32" $^{0}_{-25/64"}$
	WIDTH	2178 $^{0}_{-8}$	7'- 1 3/4" $^{0}_{-5/16"}$
	HEIGHT	2508 $^{0}_{-8}$	8'-2 47/64" $^{0}_{-5/16"}$
DOOR OPENING	WIDTH	2238 $^{0}_{-5}$	7'-4 7/64" $^{0}_{-3/16"}$
	HEIGHT	2560 $^{0}_{-5}$	8'-4 25/32" $^{0}_{-3/16"}$
CARGO ACCESS HEIGHT		2508 $^{0}_{-5}$	8'-2 47/64" $^{0}_{-3/16"}$
INTERNAL CUBIC CAPACITY		62.9CU.M	2224 CU.FT

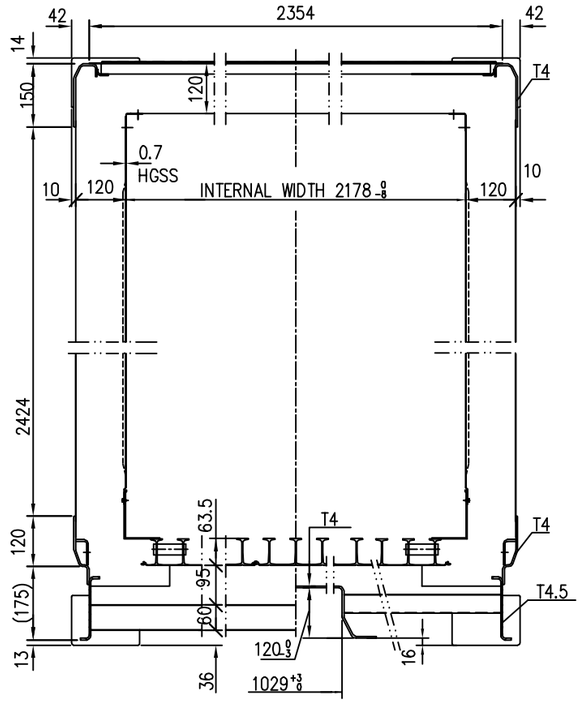
MAX GROSS WEIGHT (INDICATED)		35000 KGS	77160 LBS
TARE WEIGHT (±2%)	EXCLUDING UNIT	4800 KGS	10580 LBS
	INCLUDING UNIT (UNIT: 610KG)	5410 KGS	11930 LBS
MAX PAYLOAD		29590 KGS	65230 LBS
STACKING TEST LOAD		86400 KGS	190480 LBS
FLOOR STENGTH		7260 KGS	16000 LBS
HEAT LEAKAGE (283K M.W.T.)		30 kcal/hr.°c	66 B.T.U/hr.F
AIR LEAKAGE (1" WGP)		3 CU.M/hr.	106 CU.FT/hr.

The heat leakage value and tare weight will be verified after the prototype test.









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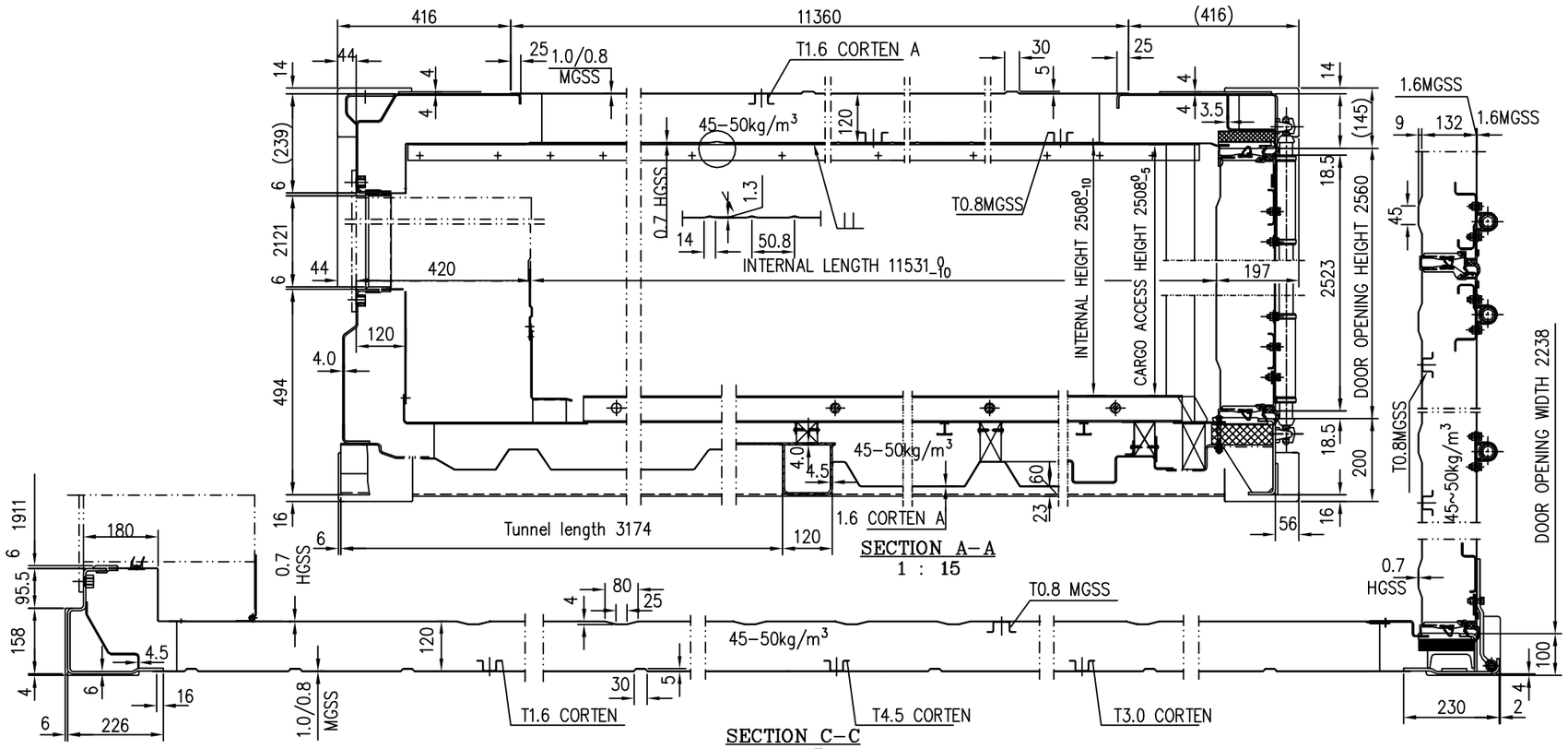

SECTION A–A
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SECTION C–C
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					TITLE:	40'x8'x9'6" SUPER REEFER GENERAL ARRANGEMENT			
					OWNED BY			SCALE 1:80	QTY. 1
					DESIGNED BY	TJH	DATE 2018.02.28	DWG. NO.: S4H-05GD-000A	
					CHECKED BY		DATE		
ISSUE	DATE	DESIGNED	CHECKED	APPROVED	APPROVED BY		DATE	SHEET 1 OF 1 SHEETS	