MERCURY
CONTAINER TRADING

TECHNICAL SPECIFICATION

FOR

20' x 8' x 8'6" FLATRACK, collapsible

CONTAINER

MODEL NO	**: CX19-20FR02/1**
SPEC. NO	**: CX19-20FR03-S**
DATE OF ISSUE	**: June 2019**

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1. General

1.1 Scope

This specification will cover the design, construction, materials, testing and inspection performances of 20' x 8' x 8'6" flatrack containers.
The flatracks will be constructed with flat paneled end walls which fold on top of the floor such that the folded flatracks can be used as a platform flat. The walls are counterbalanced to enable manual erection and folding. the units folds 7 into an 8'6'' high module.

These containers specified herein will be manufactured at (hereinafter referred to ') under strict quality control by . and be approved by the classification society or agency.

1.2 Operational environment

The flatracks will be suitable for use on sea, road and rail as envisaged by ISO 3874: 1988 (E) and may not be carried on the lower level of double stack rail cars with laden containers above.

1.3 Standards and Regulations

The flatracks will be built generally in accordance with the following documents but varied according to agreed design criteria.

1.3.1 ISO Standards

1.3.1.1

ISO 668	-- Series 1 freight containers - Classification external dimensions and ratings - 2013(E)
ISO 1496	-- Series 1 freight containers - Specification and testing. part 5: Platform based containers with incomplete superstructure and folding ends.-2018
ISO 1161	-- Series 1 freight containers - Corner fittings Specification(Amd. 1990)
ISO 6346	-- Freight containers - coding, identification and marking - (E)-2012 Amd.

1.3.2 Certification

The flatracks will be constructed in accordance with the applicable standards and requirements set forth by the following societies:

1.3.2.1 C.S.C. Certification

All the containers will be certified and comply with the requirements of the "International Convention for the Safe Containers."

1.3.2.2 T.C.T. Certification

The Australian Plant Quarantine Regulation for Exposed timber in Freight Containers (TCT)

1.3.2.3 UIC certification

The International Union of Railways (UIC).

1.3.3 Classification society

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

1.4 Handling

The flatracks will be constructed to be lifted and handled by means of equipment which utilize the ISO castings for attachment.

a) When lifting the flat racks by means of the corner casting, the lifting forces must be applied strictly vertically through the top corner casting by means of a spreader fitted with twistlock mechanisms, hooks or shackles when the flat rack is in laden or unladen condition.

b) When lifting the flat racks by means of slings, the lifting slings must be by slings of the appropriate type at a sling angle of 45 degrees attached to the bottom corner castings.

c) Lifting, full or empty, at forklift pockets using forklift truck.

2. *Dimensions and Ratings*

The flatracks are built to the following dimensions and tolerances, but the reads must refer to the drawings to determine the shape of the flatrack and its suitability for cargo:

2.1 *External Dimensions*

Length :	6,058	(0, -6)	mm	(Base, bottom castings)
	6,068	max	mm	(Tare condition, top castings)
	6,048	min.	mm	(loaded to R, top corner castings)
Width:	2,438	(0, -5)	mm	(Base bottom castings)
Height:	2,591	(0, -5)	mm	(End frame erected)
Height:	370	(0, -3)	mm	(End frame folded)

Stack height: Folds 7 into 2,591mm (8'-6")+0,-5
Camber: 25 mm +5, -0 (after general assembly).

2.2 *Internal Dimensions*

Length:	5,918	(0, -6)	mm	(Between folding ends)
	5,622	(0,-6)	mm	(Between inner hinges at floor)
	5,632	(0,-6)	mm	(between corner posts)
Width:	2,192	(0, -5)	mm	(Over bottom side rail)
	2,226	(0, -5)		(between corner posts)
Height:	2,235	(0, -5)	mm	(Side rail to top castings)

2.4 *Forklift Pockets*

Width	:	360 mm
Height	:	120 mm
Centers :		2,050(±50) mm

2.5 *Tare Weight (Design Estimate)*

Tare Weight(±2%): 2,800 kg (6,170 lbs)

2.6 *Gross Weight*

Maximum Gross Wt.: 34,000 kg (74,960 lbs)

2.7 *Payload*

Maximum Payload: 31,200 kg (68,790 lbs)

2.9 *Stacking*

10 high at 24,000 kg (52,910lbs)MGW. or 7 high at 34000kg gross

2.10 *Lashing Bars*

Maximum allowable load : 5,000 kg

3. Materials

3.1 General

The following materials will be used in the construction of containers.

3.2 Part specification

	Parts	Materials by JIS
1)	End wall panel Cross members End sills Fork lift pocket Stake pocket Headers	Anti-Corrosive Steel: CORTEN A, SPA-H, B480 or equivalent Y.S. : 35 kg/sq. mm T.S. : 49 kg/sq. mm
2)	Main beam Lashing Hoop Lashing bar Corner posts	Rolled high tensile steel: SM490A or equivalent Y.P. : 33 kg/sq. mm T.S. : 50 kg/sq. mm
3)	Corner Fitting	Casted weldable steel: SCW480 Y.S. : 28 kg/sq. mm T.S. : 49 kg/sq. mm
4)	Hinge plates	COMBINED MATERIAL
5)	Twistlock pocket outer angle Twistlock pocket inner angle	Structural steel: SS400 Y.S. : 25 kg/sq. mm T.S. : 41 kg/sq. mm
6)	Floor board	35 mm thick Softwood planks Swedish Redwood, Pinus Silvestris, Grade Fifth, with Australia treatment C.C.A. (copper, chromimum, arsenic) or AC-500 in accordance with A.Q.I.S. regulations

T.S. --- Tensile Strength

Y.S. --- Yield Strength

4. Construction

4.1 General

4.1.1 The container will be constructed with a base structure, two end frame with hinges, wooden flooring, ISO corner fittings at eight corners.

All steelwork will be built up by means of automatic and semi - automatic CO2 gas arc welding (MAG welding).

All the welds, even spots, should have full penetration without undercutting or porosity.

The internal bend radius of the pressed section of the steel will not be less than 1.5 time the thickness of the material being pressed.

4.2 Corner fittings

The corner fittings will be designed in accordance with ISO 1161 (Amd.2016) and manufactured at the works approved by classification society.
Top castings will have approximate 10 mm elongated top aperture to offset "toe - in" characteristics of the design"

4.3 Base Frame

The base frame will be composed of two (2) bottom side rails , a number of cross members, one pair forklift pocket ,which are welded together as a sub-assembly.

4.3.1 *Bottom side rail* Each bottom longeron is made of a high-strength steel beam with a height of 343mm.
Size: Top flange : 245x16.0mm (middle) ; 235x16.0mm (ends)
Bottom flange : 245x16.0mm.
Web : 6.0mm.

4.3.2 *Crossmember* The cross members are composed of totle 19pieces, 17 pieces pressed channel section and 2 pieces "Z" section pressed which are placed at certain center distance.
The quantity : 17+2=19 pieces
The shape : " C " section .
The dimension :122 x45x 45 x 4.0mm
The shape : " Z" section .
The dimension : 146 x45 x 45 x 4.0mm

4.3.4 *Forklift Pocket* One set of 4.5mmx120mmx364mm Corten steel forklift pockets will be incorporated into the base frame at 2,050 centers.

4.4 End Frame

Each end frame consists of one fixed part and one foldable part. Two parts are connected by two

hinges (with pin).

4.4.1 *Fixed part* Fixed part is welded together by two bottom corner casting, two outer hinges and a pressed "Z" shape steel.

4.4.2 *Foldable part* Foldable part is welded together by two top corner casting, corner post, top & bottom end rail and end panel.

4.4.2.1 *Corner post*
Corner post is made of "工" beam, size of "工" beam is: 200 x 100 x 6 mm x 10mm

4.4.2.2 Top end rails and bottom end rails are pressed channel steel.
Size:
Top end rails : 200 x 65 x 6.0 mm
Bottom end rails: 200 x 65 x 6.0 mm

4.4.2.3 *End panel* End panel is made of steel plate 3 mm thick.

The end panel has 4 ribs and overall size is 2265x1651mm.

4.5 *Hinge Mechanism*

The hinge comprises a stub post through which passes a 60 mm wide hinge plate assembly which carries the corner post and is locked by a rotatable pin.

Each hinge assembly incorporates a top lift aperture plate having an ISO aperture and to which the interlocking twist lock is mounted.

4.5.1 The pivot pin will be of stainless steel, and be lubricated via-three machined annular grease grooves and holes formed in the hinge assembly, fed by grease nipples.

4.5.2 No part of the pin shall be welded to the post or base part of the hinges. The pins shall be removable.

4.5.3 When the hinge is in the folded position, there will be provided a top lift aperture suitable for receiving ISO twist locks and the twist lock of the flat rack itself.

4.6 *Twist locks*

The ISO style twist lock will be provided at each of the 4 corners. The twist locks will be permanently attached to the container and be able to be pivoted through a slot adjacent to the top lift aperture.
Twist locks shall have detent springs to hold them in the unlocked and locked positions.
Twist lock operation will be possible from both the end and side with one or other being performed by hand.

The twistlock shall have an operating torque of approximately 50 kg.cm", "Each twistlock shall be rated at 25 tons tension and 7.5 tons shear to withstand ISO racking forces acting on a stacked module of folded containers".

4.7 *Counterbalance Springs*

The end walls are counterbalanced to enable erection and folding. 2 counterbalance springs are fitted at each end and are mounted longitudinally in the base structure. These two springs work on each wall at the same time in each opening and folding condition.
The springs comprise of leaf spring. Springs must have 22 mm thick. For safety's sake the lifting and folding force normally takes 2 men.

4.8 *Cargo Lashing Systems*

4.8.1 *Stake Pockets* 4 pockets fitted per longitudinal side rail, each with an 85 mm x 85 mm internal dimension. Pockets are made of 5.0 mm thick SPA-H steel pressings welded to the outboard of the side rails and reinforced with 20 mm diameter lashing bars.

4.8.2 *Lashing Hoops*

Two 25 mm steel bar hoops are welded to each end sill. Three 25 mm steel bar hoops are welded to each bottom flange of the side rails , which are evenly allocated between stack pockets .

4.9 *Floor*

4.9.1 *The Floor Boards* The middle floor board will be softwood planking. This is treated with wood preservative containing " Chlordone " or equivalent according to the Commenwealth Department of Health, Australia. The short floor boards at the ends of the unit will be steel plates(corten A).

Softwood planking
thickness: 35 mm
width: 170mm
quantity : 27 pcs

4.9.2 *Arrangement and Fixing* The floor boards are longitudinally laid on the cross member. The floor boards are tightly secured to each cross member with countersunk self-tapping electro - zinc plated steel screws . These heads of the floor screws are countersunk below the level of the upper surface of the floor by 2±0.5 mm. And the holes for the floor screws will be drilled

to a diameter at least 1mm larger than that of the shank of the floor screw to allow for expansion.

Screws : M8 x 55(or 65) x φ16 head.

The part that goes through the cross member of tapping screw will be coated with exterior paint (Solvent paint is ok).

5. *Surface preservation*

5.1 *Surface preparation*

1) All steel components, prior to priming, will be shot-blasted to a SA2.5 standard surface by means of an automatic centrifugal shot surface cleaning machine. A weldable primer compatible to the paint system will be applied immediately to a thickness of 10 micron to preserve the surface integrity during the assembly process. After the container is assembled it is shot blasted again manually to clean all the welds and any other. Slag and spatter shall be removed by means of grinding or needle hammers. Contaminated area should be cleaned with proper cleaning agent prior to shot blasting.
2) All fasteners such as bolts/nuts, washers, and self-tapping screws are electro ZINC plated. (Thickness: 13Microns)

5.2 *Primer coating*

5.2.1 *Prior to assembly*

All steel surfaces will be coated with 10 microns thick two-pack polyamide cured zinc rich epoxy primer immediately after shot blasting, and then dried up in drying room.

5.2.2 *After assembly*

1) All weldments will be shot blasted to remove all welding fluxes, spatters, burnt primer coatings caused by welding heat, and other foreign materials.
   Then all blasted weldments will be coated with zinc rich epoxy primer.
2) All of assembled container will be coated again 30 microns with zinc rich epoxy primer and again 40 microns epoxy primer prior to top coating.

5.3 *Top coating*

After drying of primer, exterior of container will be coated again with high build Acrylic top coating.

5.4 *The total dry film will be* ***(microns)***:

Solvent paint system:

Paint Name:	DFT (μ)
Zinc rich primer	10
Zinc rich primer	20
Epoxy primer	40
Acrylic coating coat	40
Total:	110

or

Waterborne paint system:

Paint Name:	DFT (μ)
1st shop primer	10
Waterborne Epoxy zinc primer	20
Waterborne Epoxy middle coat	40
Waterborne Acrylic top coat	40
Total:	110

NOTE:

1. Paint is not applied to the wooden floor.
2. The paint system and supplier will be submitted to customer's approval in advance before production

6. *Marking*

6.1 *Arrangement*

The container will be marked in accordance with ISO, UIC, TCT, CSC and TIR requirements, owner's marking specifications and other required regulations.

6.2 *Materials*

1) Decal : - Self-adhesive, high tensile PVC film for seven (7) years guarantee without peeling off, tenting or colour fading.

2)Certification plate : 18-8 type stainless steel plates to be chemically etched by acid and treated by enamel.

6.3 *Specifications*

1) Identification plates such as consolidated data plate consisting of CSC, TIR and TCT will be riveted on the end sill by stainless steel rivets. The entire periphery except underside will be caulked with sealant.

2) The owner's serial numbers and manufacturer's serial numbers will be stamped into the top plane of rear lower-left corner fitting.

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7. *Testing and Inspections*

7.1 *Testing*

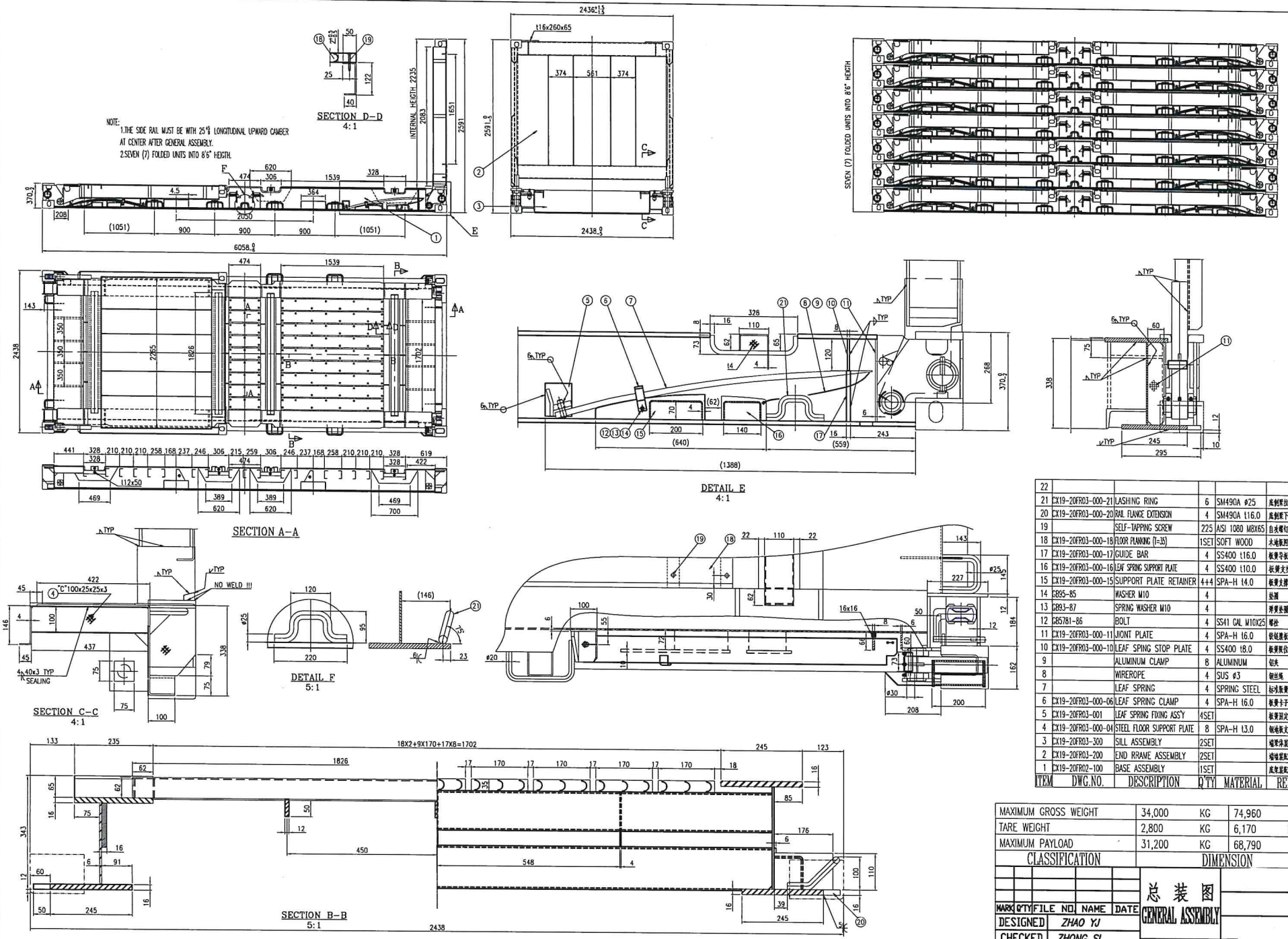
7.1.1 *Prototype testing*

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

	Test items & loads	Test methods
A)	Stacking Internal load : 1.8R-T Test load: 97,200kg/post	Hydraulic cylinder load will be applied to each corner post through top corner fittings. Time duration : 5 minutes
B)	Lifting (from top corner fittings) Internal load : 2R-T	Lifting vertically. Time duration : 5 minutes
C)	Lifting (from bottom corner fittings) Internal load : 2R-T	Lifting 30 degree to the horizontal. Time duration : 5 minutes
D)	Restraint (longitudinal) Internal load : R-T Test load : 2R(R/ Each Side)	Hydraulic cylinder load will be applied to the bottom side rails. in compression then in tension Time duration : 5 mins
E)	Floor strength Test load : 2×3,630 Kgs	Use of a special truck. Total contact area: 284 sq. cm Wheel width : 180 mm Wheel centre : 760 mm
F)	Wall strength (end) Test load : 0.4(R-T)=0.4P	Compressed air bag will be used. Time duration : 5 mins
G)	Rigidity (transverse) Test load : 150 KN (15,240 kgf)	Hydraulic cylinder load will be applied to the header rail through top corner fittings.
H)	Rigidity (longitudinal) Test load : = 50 KN (5,100 Kgf)	Hydraulic cylinder load applied either separately or simultaneously to each of top corner fittings on one end of the container in lines parallel both
I)	Fork pocket lifting	Internal load =1.6R-T Lifting by horizontal bars, Bar length :1,828mm
K)	Stacking at folded position Test load : 97,200 kgf/post	The container in tare with end walls folded shall

		be placed on four level pads, A vertical foce shall simultaneousle applied to each pair of top end fitting via test in the same direction by 25.4mm laterally and 38mm longitudinally
L)	Lifting of an interlocked pile by the top Test load: 25,000kg/twistlock	The container in tare with end walls folded shall be placed on four level pads and secured from vertical movement through the bottom apertures of all four bottom corner fitting by devices the same or similar to its integral interlocking devices. A total tensile load of 100,000kg shall be applied through all four stub posts top corner fitting via its integral interlocking device. Time: duration 5 mins
M)	Top lifting when folded	Internal load 2R-T
N)	Lifting stub post Test load: 31,250 kgf per post	Lifting vertically from top lifting apertures of the corner stub posts when end wall folded. Time: duration 5 mins
O1)	Concentrated load	Internal load :1.8P'-T, (P'=20,000kg) A concentrated load over the center 2 meters the base. Lifting deflection to be within ISO limits. Time: duration 5 mins
O2)	Concentrated load	Internal load :2P'-T, (P'=20,000kg) A concentrated load over the center 2 meters the base. No excessive permanent deformation that will render it unsuitable for use. Time: duration 5 mins
P)	Heavy duty lashing test Test load: 7500kgf	Pull in any direction typical of in-service lashing direction. Time: duration 5 mins

* Note: **R** Maximum Gross Weight
R' Concentrated Load
T Tare Weight
P Maximum Payload



ITEM	DWG.NO.	DESCRIPTION	QTY	MATERIAL	REMARK
22					
21	CX19-20FR03-000-21	LASHING RING	6	SM490A ø25	底侧梁拉环
20	CX19-20FR03-000-20	RAIL FLANGE EXTENSION	4	SM490A t16.0	底侧梁下翼板加宽板
19		SELF-TAPPING SCREW	225	AISI 1080 M8X65	自攻螺钉
18	CX19-20FR03-000-18	FLOOR PLANKING (T=35)	1SET	SOFT WOOD	木地板组
17	CX19-20FR03-000-17	GUIDE BAR	4	SS400 t16.0	板簧导板
16	CX19-20FR03-000-16	LEAF SPRING SUPPORT PLATE	4	SS400 t10.0	板簧支撑板
15	CX19-20FR03-000-15	SUPPORT PLATE RETAINER	4+4	SPA-H t4.0	板簧支撑板固定板
14	GB95-85	WASHER M10	4		垫圈
13	GB93-87	SPRING WASHER M10	4		弹簧垫圈
12	GB5781-86	BOLT	4	SS41 CAL M10X25	螺栓
11	CX19-20FR03-000-11	JIONT PLATE	4	SPA-H t6.0	铰链座板连接板
10	CX19-20FR03-000-10	LEAF SPING STOP PLATE	4	SS400 t8.0	板簧限位板
9		ALUMINUM CLAMP	8	ALUMINUM	铝夹
8		WIREROPE	4	SUS ø3	钢丝绳
7		LEAF SPRING	4	SPRING STEEL	标准板簧
6	CX19-20FR03-000-06	LEAF SPRING CLAMP	4	SPA-H t6.0	板簧卡子
5	CX19-20FR03-001	LEAF SPRING FIXING ASS'Y	4SET		板簧固定组件
4	CX19-20FR03-000-04	STEEL FLOOR SUPPORT PLATE	8	SPA-H t3.0	钢地板支撑
3	CX19-20FR03-300	SILL ASSEMBLY	2SET		端梁体装配图
2	CX19-20FR03-200	END RRAME ASSEMBLY	2SET		端墙架配图
1	CX19-20FR02-100	BASE ASSEMBLY	1SET		底架装配图

MAXIMUM GROSS WEIGHT	34,000	KG	74,960	LBS
TARE WEIGHT	2,800	KG	6,170	LBS
MAXIMUM PAYLOAD	31,200	KG	68,790	LBS
CLASSIFICATION	DIMENSION			

MARK	QTY	FILE NO.	NAME	DATE
DESIGNED			ZHAO YJ	
CHECKED			ZHONG SL	
APPROVED			DAVID XU	

总装图
GENERAL ASSEMBLY
2019.06.21