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Government of India - Ministry of Railways  
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Lucknow – 226011

संख्या—एम.डब्ल्यू./CONTAINER/ISO/BG-Flat

दिनांक : 02.05.2024

**Principle Chief Mechanical Engineer**

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- (ii) पूर्व रेलवे, फेयरली प्लेस, कोलकाता— 700 001.
- (iii) उत्तर रेलवे, बड़ौदा हाउस, नई दिल्ली – 110 001.
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- (v) दक्षिण मध्य रेलवे, रेल निलायम, सिकन्दराबाद – 500 071.
- (vi) दक्षिण पूर्व रेलवे, गार्डेन रीच, कोलकाता – 700 043.
- (vii) पूर्वोत्तर रेलवे, गोरखपुर – 273 012.
- (viii) पूर्वोत्तर सीमान्त रेलवे, मालीगाँव, गुवाहाटी – 781 011.
- (ix) पश्चिम रेलवे, चर्चगेट, मुम्बई – 400 020.
- (x) पूर्व मध्य रेलवे, हाजीपुर – 844 101.
- (xi) पूर्व तटीय रेलवे, बीडीए रेंटल कालोनी, रेलवे काम्पलेक्स, चन्द्रशेखरपुरा, भुवनेश्वर—751023.
- (xii) उत्तर मध्य रेलवे, प्रयागराज— 211 001.
- (xiii) उत्तर पश्चिम रेलवे, जयपुर – 302 006.
- (xiv) दक्षिण पश्चिम रेलवे, हुबली – 580 023.
- (xv) पश्चिम मध्य रेलवे, जबलपुर – 482 001.
- (xvi) दक्षिण पूर्व मध्य रेलवे, आर ई आफिस काम्पलेक्स, बिलासपुर – 495 004.

**विषय :** New Documents (Technical Pamphlet no G-117) for safe operation of containers over Indian Railways/DFCCIL.

- सन्दर्भ :** i) Railway Board letter no. 2012/M(N)/951/35(E-3325701) dated 30.01.2024.  
ii) This office letter of even no. dt. 10.01.2024.  
iii) Railway Board letter no. 2019/M(N)/951/5 dt. 02.01.2024  
iv) Railway Board letter no. 2018/M(N)/951/5 (E. No. 3320030) dt. 12.03.2024  
v) This office letter no. MW/CONTAINER dt. 07.07.2022.

Railway Board vide ref (iii) above informed a case of train patting (BLCM Wagon) at BTTR station in BZA division on 29.12.2023. As per direction of MT/RS a team of officer comprising of Wagon Directorate/RDSO, JHSW & BZA was deputed for carrying of investigation of the subject. Vide letter at ref. (ii) the finding of committee was submitted to RB.

Railway board vide letter at ref. (i) above has advised RDSO to take necessary action to recommendations of committee, including following:

1. RDSO to Issue comprehensive guidelines, listing all the important technical and standard norms of international guidelines for safe tank container operation.

In compliance to RB guidelines (point 'e' of letter under ref. (i) above), following documents has been prepared

S.No.	Document No	Description	Remarks
1	G-117	TECHNICAL PROCEDURE/GUIDELINES FOR SAFE OPERATION OF CONTAINERS OVER INDIAN RAILWAYS/DFC NETWORK	In compliance to point 1 above for containers (including tank containers)

The above document is attached with the letter for ready reference and compliance at your end.

संलग्न —उपरोक्त

Digitally Signed by  
Satyendra Kumar  
Date: 02-05-2024 13:00:23  
Reason: Approved

(सत्येन्द्र कुमार)  
निदेशक/माल डिब्बा  
कृते महानिदेशक/माल डिब्बा

**प्रतिलिपि:**

1. EDME (Freight), Railway Board, Railway Bhawan, New Delhi-110001.
2. PED, CAMTECH, Gwalior.
3. MD. Centre For Railway Information Systems, Chanakyapuri, New Delhi - 110021
4. जी0जी0एम0 (मैकेनिकल), डेडीकेटेड फ्रेट कोरीडोर कारपोरेशन आफ इण्डिया लि0, नई दिल्ली—110 001.
5. अध्यक्ष एवं प्रबन्ध निदेशक, कोंकण रेलवे कारपोरेशन लिमिटेड, पोस्ट बाक्स नं0 9, बेलापुर भवन, सेक्टर—11, सी.बी.डी. बेलापुर, नवी मुम्बई—400 614
6. **List of Container Train Operator(CTO's)**
  - (i) Pipava Rail Corporation Ltd., 1st floor, Gate no-4, Jeevan Tara Building,5 Parliament Street, New Delhi-110 001.
  - (ii) Container Corporation of India Ltd. CONCOR Bhawan, C-3, Mathura Road, Opposite Apollo Hospital, New Delhi - 110 076.
  - (iii) Boxtrans Logistics (India) Services Pvt. Ltd., 8, Balaji Estate, 2nd Floor, Guru Ravidas Marg, Kalkaji, New Delhi-110019.
  - (iv) India Infrastructure & Logistics Pvt Ltd., 301 & 302, Building No. 16 & 17, 3rd Floor, DDA Community Center, Okhla Industrial Area, Phase – I, New Delhi - 110020.
  - (v) Adani Logistics Ltd., Adani Corporate House, Plot No. 83, Institutional Area, Sector-32, Gurgaon-122 001
  - (vi) Sical Multimodal and Rail Transport Ltd., SPIC House, 88 , Mount Road, Guindy Chennai-600032.
  - (vii) Gateway Rail Freight Ltd., 206-207, 2nd Floor, Southern Park, Saket District Centre, New Delhi-110017
  - (viii) M/s Arshiya Rail Infrastructure Ltd. M-6, First Floor, Uppal Plaza(Behind Apollo Hospital) Jasola District Centre, New Delhi-110025.
  - (ix) Container Rail Road Services Pvt. Ltd., First floor, Property no.-40, Okhla Industrial Estatae Phase III, New Delhi-110020.
  - (x) Innovative B2B Logistics Solutions Ltd., DLF Tower 9-B, 11th Floor, DLF Cyber City, Phase III, Sector-25 A, Gurgaon-122002
  - (xi) Trans Rail Logistic Ltd., M-2, Himland House, Karampura Commercial Complex, New Delhi -110015.
  - (xii) ETA Engg. Pvt. Ltd., Tower-A, Second Floor, First India Place, MG Road, Gurgaon-122002.
  - (xiii) M/s Worlds window Infrastructure & logistics Pvt. Ltd., E-40/3, Okhla Ind. Area, Phase-II, New Delhi-110020.
  - (xiv) M/s KRIBCHO, KRIBCHO Bhawan, 5th Floor, A-10, Sector-1, Noida-201301, Distt: Gautam Buddha Nagar (UP)
  - (xv) Hind Terminals Pvt. Ltd., 501 A & B, 5th floor, Salcon Aurum, Jasola District Centre New Delhi-110025..
  - (xvi) Central Warehousing corporation, Warehousing Bhavan,4/1, Siri Institutional Area, August Kranti Marg, Hauz Khas, New Delhi-100016.
  - (xvii) Fourcee Infrastructure Equipments Pvt. Ltd., 431, Laxmi Mall, Laxmi Industrial Estate, New Link Road, Andheri (West), Mumbai-400053.
  - (xviii) Reliance Infrastructure Engineering Pvt. Ltd.



भारत सरकार – रेल मंत्रालय  
Government of India- Ministry of Railways

केवल कार्यालय उपयोग के लिए  
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**TECHNICAL PROCEDURE/ GUIDELINES FOR  
SAFE OPERATION OF CONTAINERS OVER INDIAN  
RAILWAYS/DFC NETWORK**

**TECHNICAL PAMPHLET No. G-117  
(Revision- First issue)  
April - 2024**

**ISSUED BY**



(माल डिब्बा निदेशालय)  
अनुसंधान अभिकल्प और मानक संगठन  
लखनऊ-226011

**RESEARCH DESIGNS & STANDARDS ORGANIZATION  
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## PREFACE

It goes to the credit of IR to have the foresight in the 1960s to realize the immense potential as well as benefits of cargo transported door-to-door through integrated intermodal arrangement. Containerized intermodal transport was thus started in India as far back as 1966-1967 by IR with the transportation of domestic cargo in, what were known as Indian Railway Standard (IRS), containers. IR inducted 4.5-ton and 5-ton containers for carrying intra-country cargo between metropolitan cities

The Container Corporation of India Limited (CONCOR), a wholly owned government company took over IR's infrastructure of inland container depots (ICDs) in 1988 and provided a single-window, one-stop service to shippers at dry ports for warehousing, customs clearance, consolidation, disaggregation and other terminal facilities as well as feeder 'last mile' road services. CONCOR also diversified into handling and carriage of intra-country freight in ISO containers.

In January 2006, in a landmark initiative to introduce competition in the container operations segment, the Ministry of Railways allowed the entry of private and public sector operators to obtain licenses for running container trains on the Indian Railways (IR) network. This initiative was the first significant move of its kind where private parties were allowed to make entry in the domain of railway operations with direct customer interfacing. The response to the policy was good and around 15 new entrants obtained licenses to run container trains.

The initial container operation started with IRS containers was later diversified with entry of standard ISO containers. With the growth of container operation and to cater growing requirement of industry, Railway Board has given sanction to carry special type of containers on various type of container wagons.

The aim of this document is to make aware the container train operators/logistic partners, ICD's operator, Zonal Railways and other stakeholders about the important standards/guidelines/standards/procedural orders issued by international agencies/Railway Board/RDSO which needs to be observed for ensuring safe container operation over IR/DFC network.

With the continual increase in container wagon fleet and diversification of container there has been rise in incident of welding failure, cracking of sub-assemblies, train parting and derailments. This document aims to bring awareness about the factors affecting the safe container operation. It is important that the stakeholders shall develop a frame work at their respective ends to ensure safe and follow the standard international and RDSO guidelines and continual efforts to ensure safe operation of containers over railway network of India.

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## **SECTION-A**

# **DESCRIPTION, SPECIFICATION AND GUIDELINES OF STANDARD CONTAINERS**

**1. History of containers**

Malcolm P. McLean, the “Father of Containerization”, used to say that he had the idea of rationalizing goods transport by avoiding the constant loading and unloading from one means of transport to another way back at the end of the 1930s at the port of Hoboken, when still operating as a small-scale hauler. To start with, McLean would load complete trucks onto ships, in order to transport them as close as possible to their destination. The development of standardized containers and trailers, moved by tractors, made it possible to ship just the trailers with the containers, so saving on space and costs. Later, the trailers were also left behind and the ships transported just the containers.

Since American standards could only be applied with difficulty to conditions in Europe and other countries, an agreement was eventually reached with the Americans after pain staking negotiations. The resulting ISO standards provided for lengths of 10’, 20’, 30’ and 40’. The width was fixed at 8’ and the height at 8’ and 8’ 6”. For land transport within Europe, agreement was reached on a 2.50 m wide inland container, which is mainly used in combined road/rail transport operations.

The majority of containers used worldwide today comply with the ISO standard, with 20’- and 40’-long containers predominating.

**2. ISO Containers**

There are several basic types of ISO containers. Dry or cube containers are generally front loaded, completely enclosed and suitable for general-purpose transportation. Standard containers are 8’6” (2591mm) high. By contrast, extended height or high cube containers are 9’6” (2896 mm) high. Insulated or thermal containers are suitable for transporting chilled and frozen goods, as well as temperature-sensitive materials and products. Flat racks and platforms are ISO containers that are used to transport heavy machinery. They do not have side walls, but may have end bulkheads and are often collapsible. Open-top containers are shaped like a box and loaded from either the top or end. They are designed to carry heavy, tall or hard to load materials such as coal or grain. Tank containers are built to the same standard dimensions as other ISO containers, but are cylindrical vessels mounted in a rectangular steel framework. Typically, these containers are used to transport liquid or bulk materials.

External dimensions and ratings for (important) series 1 freight ISO containers

Freight container designation	length		Width(mm)	Height		Rating*
	mm	Ft.		mm	Ft.	Kg
1EEE/1EE	13716	45’	2438	2896/2591	9’6”/8’6”	30,480
1AAA/1AA	12192	40’				
1CCC/1CC	6058	20’				

**Table-1** (\*High ratings are permissible under certain conditions)

**Some Important facts about ISO Containers**

- Rating, R: The gross mass, R, of a Container denotes the maximum mass for Operation and the minimum mass for testing.

The symbol P denotes the maximum payload of the container

**P=R-T** (Where R is the rating; T is the tare.)

- ISO Series 1 freight Containers have a uniform width of 2438 mm (8 ft).The nominal lengths are listed in table 1.
- ISO has laid down ratings for all types of Containers, except that for particular traffic higher values are permissible for certain containers however the maximum gross mass I of ISO Containers does not exceed 30480 kg and that are tested and marked to these ratings.
- All containers shall be equipped with top and bottom corner fittings. The requirements and positioning of the corner fittings are given in ISO-1161.

**Note:** There are various types of containers which have length and width dimensions similar to those of ISO Series 1 containers but have ratings and/or heights in excess of those defined by International Standards.

### 3. IACS member certification

IACS stands for the International Association of Classification Societies. It is a non-governmental organization that comprises twelve classification societies from around the world. These societies work together to develop and promote standards for the design, construction, and maintenance of ships and other marine structures. Being an IACS member certified means that a classification society has been approved by IACS and is authorized to perform surveys and issue certificates for ships and other marine structures in accordance with the rules and regulations developed by IACS. This certification ensures that the classification society meets the high standards set by IACS and has the necessary expertise and resources to carry out its responsibilities in an effective and efficient manner. The current twelve members of IACS are:

1. American Bureau of Shipping (ABS)
2. Bureau Veritas (BV)
3. China Classification Society (CCS)
4. Croatian Register of Shipping (CRS)
5. DNV (DNV)
6. Indian Register of Shipping (IRClass)
7. Korean Register of Shipping (KR)
8. Lloyd's Register (LR)
9. Nippon Kaiji Kyokai (ClassNK)
10. Polish Register of Shipping (PRS)
11. Registro Italiano Navale (RINA)
12. Turk Loydu (TL)

The IACS member certification is important for several reasons:

- **Safety:** Offshore operations are often conducted in harsh and challenging environments, and the containers used in these operations must be designed, constructed, and maintained to high safety standards. IACS certification ensures that the offshore containers meet these standards and are safe for use in offshore operations.
- **Compliance:** Offshore operations are subject to a wide range of national and international regulations and standards. IACS certification ensures that the



offshore containers meet these regulations and standards, and that they are in compliance with the applicable safety and environmental requirements.

- **Quality:** IACS certification is a mark of quality and reliability in the maritime industry. Offshore containers that are certified by an IACS member classification society are known to be of high quality and to meet the highest standards of design, construction, and maintenance.
- **Market Access:** Many offshore operators require that offshore containers used in their operations be certified by an IACS member classification society. This certification is often a requirement for accessing certain markets and for securing contracts for offshore services.

#### **4. International Convention for Safe Containers (CSC), 1972**

Due to the rapid increase in the use of freight containers and the development of specialised container ships, in 1967 the International Maritime Organization (IMO) started a study of the safety of containerisation in sea transport. In December 1972 the International Convention for Safe Containers (CSC) was signed in Geneva. The aim of the convention was to ensure a high standard of safety for workers during handling and transportation of containers, and also to facilitate international trade by providing uniform international safety regulations. The CSC made the approval of new containers mandatory and was a welcome means of regulating the construction and safety of containers.

The convention set out procedures for the safety approval of new containers, to be enforced by the States party or organisations authorised by them. The evidence of approval, a Safety Approval Plate, was to be recognised by all when granted by a State party, a system which would allow the containers to move with a minimum of safety control formalities.

It is of interest to note that the CSC was not introduced for the safety of the cargo carried in containers, but for the safety of the persons working around them.

#### **CSC Safety Approval Plate**

The CSC Safety Approval Plate is a permanent, non-corrosive, fireproof plate, required to measure no less than 200mm x 100mm. It contains information about the country of approval, approval reference, date of manufacture, manufacturer's container identification number, maximum operating gross weight, allowable stacking weight for 1.8g4, transverse racking test load value, and may also indicate the end and side walls strength if required. The plate also has room for the month and year of the first examination of new containers and for subsequent examination dates.

#### **5. Certification of new containers**

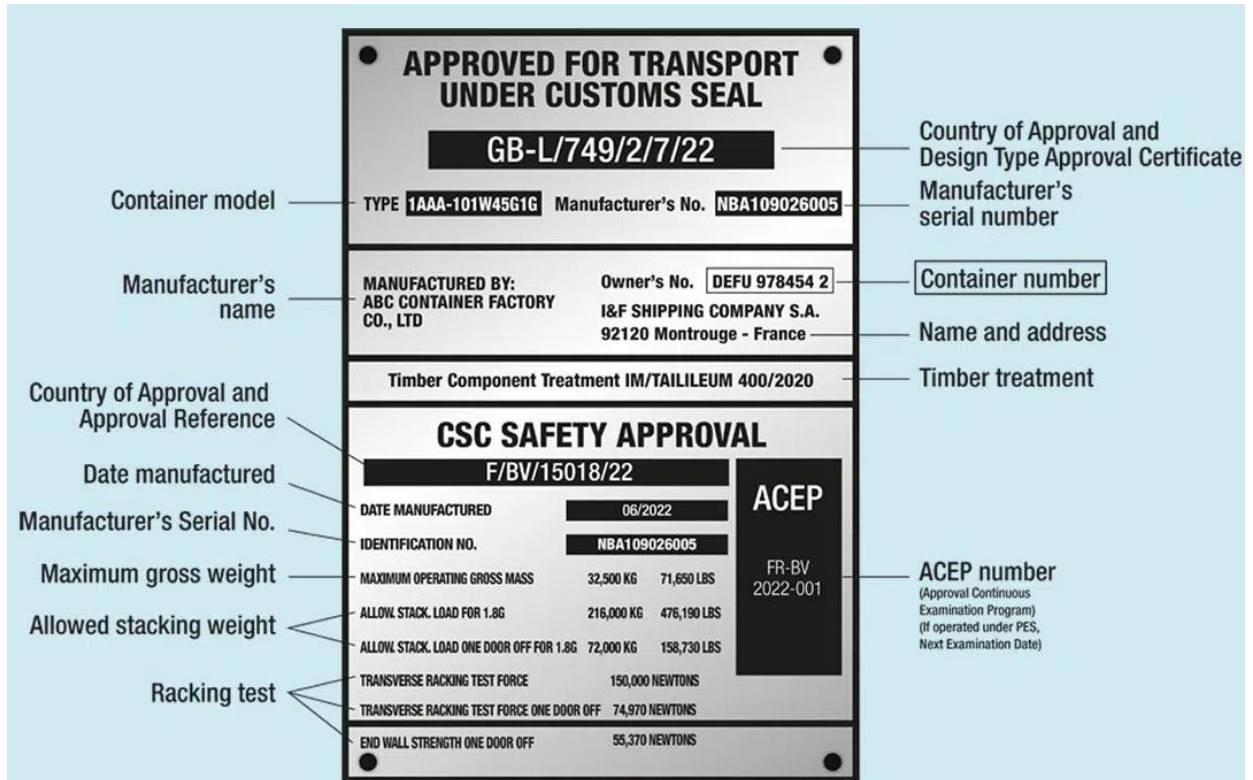
Certification, carried out by the Classification Societies to satisfy requirements of the CSC, will normally include:

- Factory approval (approval of production facilities for mass production to needed quality)
- Design type approval (review of drawings and specifications and testing of prototype)
- Survey of production units (verification of compliance with approved type during production)

- On line and final inspection (random verification of workmanship, production tests, and final inspection of each individual unit or of units selected at random)

Classification Societies will usually place a sticker with their logo on the container door, confirming that they carried out the initial certification of the container at the factory. The sticker is only a marketing element; it has no function in the approval or maintenance of the container. The all-important proof of compliance with the CSC is the Safety Approval Plate.

**Specimen of CSC Plate (may vary as per latest guidelines)**



**Figure-I (A typical layout of CSC plate-Refer IMO guidelines for complete details)**

**6. Guidelines by RDSO for containers to be loaded on container wagons**

- The container to be operated over Indian Railways should generally be conforming to the following ISO standards guidelines (other than the deviation in parameters agreed):

SN	Specification No.	Description
1.	<b>ISO 668 (latest)</b>	Series 1 freight containers – Classification, dimensions and ratings.
2.	<b>ISO 1161 (latest)</b>	Series 1 freight containers – Corner fittings – Specification.
3.	<b>ISO 1496-1 (latest)</b>	Series 1 freight containers – Specification and testing – Part 1: General cargo containers for general purpose.
4.	<b>ISO 1496-2(latest)</b>	Series 1 freight containers – Specification and testing – Part 2: Thermal containers
5.	<b>ISO 1496-3(latest)</b>	Series 1 freight containers – Specification and testing – Part 3: Tank containers for liquids, gases and pressurized dry bulk.

6.	<b>ISO 1496-4(latest)</b>	Series 1 freight containers – Specification and testing – Part 4: Non-pressurized containers for dry bulk.
7.	<b>ISO 1496-5</b>	Series 1 freight containers – Specification and testing – Part 5: Platform and platform-based containers.
8.	<b>ISO 6346 (latest)</b>	Freight containers – Coding, identification and marking.
9.	<b>ISO 3874 (latest)</b>	Series 1 freight containers – Handling and securing.
10.	<b>ISO 830 (latest)</b>	Series 1 freight containers – Vocabulary.

- b. The containers (including tank containers)r to be operated over IR/DFC shall have its base structure (including the positioning of load transferring member) in line with existing ISO norms/specification to ensure uniform distribution of load to wagon floor/carrying vehicles.**
- c. The testing and certification of containers shall be carried out by a member of association of classification societies. Similarly the containers shall be maintained as per standard norms/guidelines. All standard norms (applicable) of containers need to be strictly abided by.
- d. Similarly containers shall have approval plates as per international convention for safe containers (CSC) approval plate. The maintenance schedule shall be clearly marked on the containers.
- e. Corner post design and spacing (laterally, length wise and projection from bottom members) shall be in line with existing ISO norms to ensure fitment with existing locking arrangement of wagon.
- f. Stuffing of goods in the containers shall be done following the ISO and applicable norms of IMO or other recognized agencies.
- g. The gross wt. (goods + container self-weight) shall be as certified by the inspecting agency. Similarly the gross load shall not exceed from that laid for existing loading configurations (for a wagon).
- h. At time of commencement (first) of operation of any new container on wagons it shall be jointly inspected by CTO and Zonal railway that the container is loaded in line with specified combination and there is no infringement/restriction from any sub-assembly. Any issue shall be immediately reported to RDSO.

**Note:**

The details provided in this section (for ready reference) is based on data from internet survey and the standards/guidelines/norms in force at time of issue. It is advised to refer the latest guidelines, speed certificate or specifications applicable.

## **SECTION-B**

# **LOW PLATFORM CONTAINER WAGONS AND CONTAINER'S PERMITTED FOR OPERATION OVER IR/DFCCIL**

**1. Low platform container wagons**

The initial variant of container wagon (BFKI/BFKN) was of standard height (1269mm) from rail level. This resulted in infringement from MMD even with 8’6” high containers. This resulted in operation of these wagons as ODC.

Introduction of low platform container wagon type BLC (floor ht. 1009mm) resulted in massive transformation of containerisation over IR. These wagons enabled operation of both 8’6”/9’6” at 100 kmph on PAN India basis.

At present container flat wagon type BLC/BLCM/BLL/BLCS/BLSS are being utilised for transportation of containers over IR. Initial operation of containers was started with single stack containers over IR.,

Details of low platform container wagons operational over IR with ISO containers is given below

<b>Type of wagon</b>	<b>Stack</b>	<b>Axle load</b>	<b>Remarks (operation possible over)</b>
BLC	Single	20.32t	IR & DFCCIL
	Double	20.32t	WDFC and specified routes of IR.
BLCM	Double	22t	WDFC and specified routes of IR.
BLLA	Single	20.32t	IR & DFCCIL
BLCS	Single	22.9T	IR/WDFC/EDFC
	Double	22.9T/25t*	WDFC and specified routes of IR.
BLSS	Single	22.9T	IR & DFCCIL
	Double	22.9T/25t*	WDFC and specified routes of IR.

\*’ Designed axle load

**2. Important development in container movement over IR**

**a. Double stack container train operation over IR:**

Double-stack rail transport is a form of intermodal freight transport in which railway cars carry two stacking of intermodal containers. Introduction of Double stack container train has enabled to carry more containers/Rake in comparison to single stack trains and in turn sharp reduction in transport costs per container. This enhanced the carrying capacity of existing container wagons utilising the same infrastructure and operating cost. Double stacking of ISO containers was first introduced in Indian Railways around 2006-07 on BG Low platform container flat wagons BLC (A-Car and B-car) wagon.

**b. DSDC (Double stack Dwarf container) operation:**

In order to capture the lost traffic through new delivery model for domestic cargo, Indian Railways has introduced Double Stack Dwarf Container (DSDC) Services. First DSDC train was flagged off in July, 2018 from Western Railway’s Rajkot railway station on its maiden commercial run. These containers have 6’4” (1930 mm) high and 2600 mm wide and can run on electrified tracks in double stack configuration of dwarf containers.

Currently, ‘Low Density Products’, such as plastic granules, PVC polyester fabric, white goods, FMCG products, polyethylene, etc. are being transported mostly by road, but due to the low cost of transportation in dwarf containers, Railways now offers a more viable transport.

Presently, DSDC containers are successful operational on BLC/BLCM/BLL wagons.

**c. Operation of dwarf containers in Triple stack configuration:**

The operation of triple stack container over BG Low Platform Container Flat wagons was first mooted in year 2007-08, but due to some operational constrained, it could not be materialised then. Later it was felt by the ministry to incorporate the triple stack Dwarf Container operation over container wagons after introduction of DFC to cater more traffic and revenues for the Railways.

As of now, the operation of Dwarf container in Triple stack configuration has been introduced on BLCM wagons over WDFC route of DFCCIL.

**d. Gati Shakti Cube Containers**

RDSO has recently issued speed certificate and accordingly Railway Board has given permission for operation of Gati-Shakti Cube containers (Under PM Gati Shakti Project). Six such containers shall be placed over a frame attached to the wagon with existing twist locks. Cube containers shall engage with the flat base through locks.

The 2600mm(W)x 2730mm(H)x 2000mm(L) cube containers will enable farmers, small scale units, small business, industries etc. to book containers who does not require or have volume for standard high cube capacity containers.

**3. Non-ISO Container Operation (A paradigm shift in containerization over IR)**

Few types of Non-ISO containers have been given acceptance by Railway Board for operation on container flat wagons over IR/DFCCIL. These are given below:

1. 42' long Dwarf container operation on BLL/BLLM.
2. 12' high container operation on BLC/BLCM
3. Gati Shakti (Cube) container operation on BLC/BLCM
4. 1930 mm high Dwarf container in double stack on BLC/BLCM wagons
5. Triple stack Dwarf container operation on BLCM/BLCS
6. GGBS in tank containers
7. Cement fly-ash in tank containers

**Note:** The details provided in this section (for ready reference) is based on drawings/standards/guidelines /speed certificate/Railway Board sanction in force at time of issue. It is advised to refer the latest guidelines, speed certificate, sanction or specifications applicable.

## **SECTION-C**

# **GUIDELINES FOR SAFE HANDLING/LOADING OF CONTAINERS ON WAGONS**

**1. Safe handling of Container**

**a. General**

- i. Containers are designed for intermodal transport. They are capable to be transferred from one mode of transport to another by rolling or lifting. A freight container can be carried on a road vehicle, on a railway wagon, on an inland barge or on a seagoing vessel.
- ii. When Containers are handled, it should be ensured that all handling devices such as lifting appliances and internal movement equipment are in good condition and suitable for the intended purpose.
- iii. On completion of handling, Containers should be secured to the means of transport as appropriate for the specific transport mode.
- iv. Containers which is leaking cargo or obviously unsafe for further transport should not be loaded onto a means of transport.

**b. Transfer by lifting**

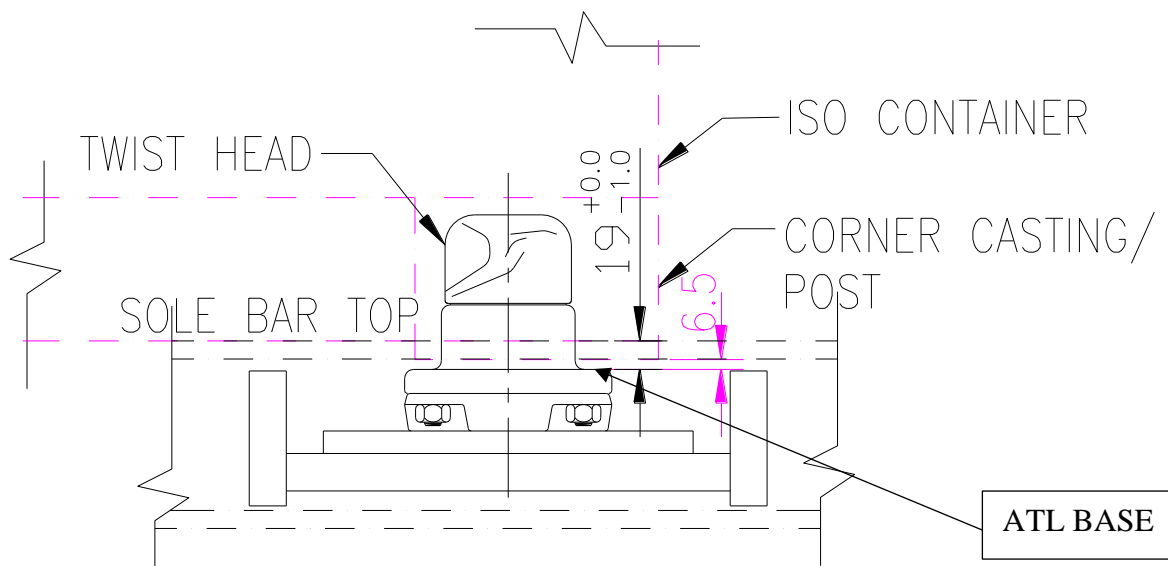
- i. Before lifting a Container, the handling staff should ensure that the lifting equipment is safely attached to the Containers and that all securing, fixing and lashing devices have been released.
- ii. For lifting of freight containers refer to ISO 3874.
- iii. The most appropriate method to lift a freight container is the use of a top lift spreader. The spreader is locked by twistlocks to the top corner fittings of the freight container. This method can be used for all freight container sizes fitted with top corner fittings, in an empty or packed state.
- iv. Freight containers should be moved within a terminal area only by use of suitable equipment, such as van carriers, reach stackers or trailers. Trailers should be so constructed that the freight containers are supported by their corner fittings. For operation within the designated terminal area, tie down devices are not required, provided that the freight container is correctly loaded on the trailer and prevented from moving horizontally. Therefore, trailers which are not equipped with twistlocks should be fitted with substantial corner plates or other restraints of sufficient height to retain the freight container in position.

**2. Guidelines for inspection/maintenance of automatic twist lock/Locking devices fitted on container wagons**

The following guidelines will facilitate staff in inspection/maintenance of locking devices fitted in container flat wagons:

- a. Inspect the wagon and see if all the Automatic Twist Locks/ locking devices are in place (if there is any deficiency, provide a new Automatic Twist Lock and weld the same after correct positioning as per RDSO drawing for locking arrangement for a wagon.
- b. CTO's official/Field staff/staff at ICD/loading terminal should ensure container corner casting is not resting on locking assembly base plate. As per design the ATL/locking device base plate is dim. 19 +0.0,-1.0 mm from sole bar/floor and is strictly maintained at all lock positions (Fixed/Foldable). In general there shall be a gap of 6.5mm between corner post bottom and locking device base plate as per figure.-II





**Figure-II**

- c. Refer G-100 for instruction for inspection & maintenance of Automatic Twist Locks (ATL) devices fitted on broad gauge low platform container flat wagons.
- 3. Crane Operator Guidelines for loading & unloading containers on low platform container wagons utilizing automatic locks.**
- a. Container Loading:**
- i. The operation of the automatic locks in securing ISO containers to the wagon begins with placement of the container by the loader. The container is positioned so that the bottom apertures of the four corner fittings are above the twist locks twist heads. The container is then lowered down. The weight of the container causes the twist head to rotate and the corner fittings slide past the twist head, which rotates back in place thus engaging the corner fitting.
  - ii. The loader should be trained to recognize that the container has seated over the twist head and has engaged the corner fitting.
- b. Container Unloading :**
- i. The operation of the automatic locks in unloading the ISO containers begins with the loader attaching to the container. As the lift is made upward; the corner fitting engages the underside of the twist head. Once the proper lifting force range is reached at a corner of the container, the twist head will rotate and that corner will release. If the container lift is level and straight up vertically, the locks tend to release all four corners close to simultaneously.
  - ii. The loader should be trained to lift the container as close to level and vertical as possible. If the container is not level during lifting, one or more of the locks may stay engaged with the container while one or more of the locks may release from the container. This situation may add to and make it difficult to maintain the container level. When the lift of the container is not level, the corner-fitting aperture

will unevenly engage the underside of the twist head. This will tend to pry the twist head off of the twist lock device instead of allowing the twist head to rotate about its axis and release the container.

- iii. If such a situation arises wherein one or more lock remains engaged while lifting container, the crane operator should lower the container and re-engage the 4 corner of the container back onto the 4 twist locks. The crane operator may then make adjustments and re-lift the container level and straight up vertically so that the twist locks may release all four corners simultaneously.
- iv. If re-lift attempts are unsuccessful it may be due to a damaged aperture opening in the corner fitting of the container. Lower the container onto all 4 twist locks. Shift or slide the container horizontally slightly while it is resting on the twist locks so an undamaged surface in the aperture opening will align with the twist head contact surfaces. Re-lift the container level and straight up vertically removing the container from the wagon.
- v. Lifting the container in tilted condition will result in higher release forces which could lead to damage to wagon and efforts should be made to eliminate this situation with straight vertical lifting of the container.
- vi. One supervisor/inspecting person (ICD/Loading point authority) shall be assigned for ensuring proper locking/un-locking of containers. He shall guide the crane driver during loading unloading of rakes. It shall be ensured that wagon is not lifted with container. In case any wagon is lifted, the supervisor shall alert the crane operator in this regard and ensure that the wagon's (all wheels lifted) are again placed properly on rails. It needs to be ensured that the centre pivot (top) has properly seated in the bottom pocket (on bogie bolster) in case of wagon lifted with container.
- vii. The supervisor shall ensure that all side /end doors of containers are properly locked before despatch of a rake to avoid opening en-route. Similarly if containers are opened or changed en –route than above has to be again ensured.

**Note:** Use of crane with steel ropes/sling for lifting containers is fraught with risks due to human error, like:

- Non-application of equal force at all locking points.
- Accidental falling of containers on under frame.
- Derailment of wagon due to failure of locks to get released at all locking positions.
- High risk of ATL/brackets damage etc.

**Hence, it is recommended that all loading/ unloading points/ ICD's (Inland Container Depots) handling container wagons should strictly use only Dedicated Reach Stacker Trucks for container handling.**

## **SECTION-D**

# **GUIDELINES FOR SAFE OPERATION OF CONTAINERS OVER INDIAN RAILWAYS /DFCCIL NETWORK**

### Guidelines for safe operation of containers

A container (ISO/Non-ISO) during its movement from manufacturing/loading point to destination point involves various intermodal modes (i.e. road/rail/sea/air) while passing through ICD's/ports. During the operation it goes through handling/loading/un-loading at various points. To ensure safe operation of containers over IR network following are emphasized:

- Maintaining high level of safety of human life during handling, stacking and transportation of containers.
- Understanding the requirement for operation of container in domestic and international sphere.
- Abiding by the safety norms which are recommended by international bodies and being observed globally.

However, safety norms/guidelines have already been laid down in various standards, for purpose of information and abidance; few important points are highlighted hereunder for safe container operation over Rail network:

CTO's/ICD's undertaking operation of container or Private operators having ICD's/loading point needs to ensure following:

1. The container to be operated over Indian Railways should generally be conforming to the ISO standards as per Section-A.
2. Container (particularly tank containers) shall have its base structure (including the positioning of load transferring member) in line with the existing ISO specifications to ensure uniform distribution of load over wagon floor/carrying vehicles.
3. The testing and certification of containers shall be carried out by a member of association of classification societies. Similarly the containers shall be examined/maintained as per standard norms. All standard norms of containers need to be strictly followed.
4. Observance of guidelines of **International Convention for safe containers** (CSC) relating to safety requirements for the structural design, inspection and maintenance of cargo containers, including following:
  - 4.1. It shall be ensured that the existing container as well as new containers (proposed to be operated over IR) shall generally be approved and maintained in accordance with the relevant provisions for approval of existing containers (set out in Annex-I) of CSC guidelines.
  - 4.2. A Safety Approval Plate conforming to the specifications set out in the appendix (Annex-I) of CSC guidelines shall be permanently affixed to every approved container at a readily visible place, adjacent to any other approval plate issued for official purposes, where it would not be easily damaged.
  - 4.3. CTO/Leasing firm undertaking operation of container on container wagons (over IR) shall be responsible for ensuring that the container is in safe condition. Container can either follow a periodic examination programme (PEP) or a continuous examination programme (ACEP).
  - 4.4. The interval from the date of manufacture to the date of the first examination shall not exceed five years or as specified. Subsequent examination of new

containers and re-examination of existing containers shall be at interval of not more than 30 months or as specified. All examinations shall determine whether the container has any defects which could place any person in danger.

- 4.5. Before loading of Container, a systematic check shall be carried out to ensure that the container is fit for loading and no modifications to the container has been done. However, in case of any modification to the containers, the owner of an approved container (that has been modified in a manner resulting in structural changes) shall notify the Administration or an approved organization duly authorized by it of those changes for recertification.
5. Stuffing of goods in the containers shall be done as per the ISO standards and applicable norms of IMO or other recognised agencies. It has to be ensured that the placements of goods are being done in containers uniformly (as per ISO/IMO guidelines).
6. There shall be provision of corner posts (for locking) to ensure proper fitment with existing locking arrangement on wagon.
7. Crane operator guidelines for loading & unloading containers on container flat wagons utilizing Twist lock to be followed as per Annexure-1 of RDSO document no G-100- (Technical pamphlet for instruction for inspection & maintenance of automatic twist locks (ATL) devices fitted on container flat wagons).
8. The gross wt. of containers (goods + self-wt.) shall not exceed the permissible rating. Similarly combined gross wt. of all containers shall not exceed permissible pay load capacity of wagon.
9. If the CTO's are having their own containers and being used for domestic/EXIM operation then the details of all such containers with maintenance schedule has to be properly maintained and made available for audit.
10. It is expected that CTO's/ ICD's operators have the latest copies of all relevant standards/specification/hand books/speed certificates/guidelines issued by RB & RDSO. It is also required that concerned staff are kept abreast with the latest guidelines issued by concerned authorities (i.e. ISO/IMO) and Railway Board/RDSO.
11. The hoarding/chart to display loading chart of container wagons in single/double stack with various type of containers can be placed suitably to make aware the concerned officials. It is advised to make suitable logarithm/excel plan for easy sorting of containers as per loading chart (speed certificate of wagons).
12. RDSO has issued document (Technical pamphlet no. **G-118**) for inspection/repair-maintenance of container wagon type BLC/BLCM/ and BLCS and **G-103** for BLL wagon. Failure of container wagon during operation shall be attended as per guidelines of these documents.

## **SECTION-E**

# **INSPECTION, MAINTENANCE AND AUDIT OF CONTAINER FACILITIES**

**Framework for CTO's/DFCCIL/Zonal Railway for ensuring safe operation of containers over Indian railway/DFCCIL routes**

Committee of Divisional officer of Mechanical, operating & commercial departments should jointly inspect container sidings/ICD at regular intervals for ensuring availability and observance of following:

- a. Working condition of all machinery and infrastructure required for safe loading, unloading of container on wagons.
- b. If CTO's has deputed suitable official and supervisor to monitor safe loading of container on wagons.
- c. Availability of all relevant ISO/IMO guidelines/standards and. Availability of RDSO speed certificate and Railway Board guidelines pertaining to safe containers to be ensured
- d. Mechanism to check that containers (especially tank containers) carried/ loaded on wagons are as per RDSO guidelines.
- e. Mechanism to prevent overloading of containers and wagon.
- f. In case of double stack container operation is carried from an ICD/loading point it has to be ensured that loading of containers is being done as per loading chart (in speed certificate of the wagon) issued by RDSO.
- g. Audit of domestic/EXIM containers owned by the CTO's/ICD's/Leasing party including periodic maintenance schedule.

**Note-**

The above guidelines is for ready reference and updating Zonal Railways/DFCCIL about key aspects, standards, guidelines for ensuring safe container operation. However Zonal Railwys/DFCCIL can prepare than own procedural order in similar lines for ensuring safe container operation over their territories. (South Western Railway vide document no. C.450/CONCOR/JPO/Vol. VII Dt. 08.06.2023 has issued JPO guidelines in this reference).

## References drawn:

SN	Specification No./Document	Description
1.	ISO668(latest)	Series1freightcontainers–Classification, dimensions And ratings.
2.	ISO1161(latest)	Series 1 freight containers -- Corner fittings Specification.
3.	ISO 1496-1 (latest)	Series 1 freight containers – Specification and testing – Part 1: General cargo containers for general purpose.
4.	ISO 1496-2(latest)	Series 1 freight containers – Specification and testing – Part 2: Thermal containers
5.	ISO 1496-3(latest)	Series 1 freight containers – Specification and testing – Part 3: Tank containers for liquids, gases and pressurized dry bulk.
6.	ISO 1496-4(latest)	Series 1 freight containers – Specification and testing – Part 4: Non-pressurized containers for dry bulk.
7.	ISO 1496-5	Series 1 freight containers – Specification and testing – Part 5: Platform and platform-based containers.
8.	ISO 6346 (latest)	Freight containers – Coding, identification and marking.
9.	ISO 3874	Series 1 freight containers – Handling and securing.
10.	MSC.1/Circ.1497(2014)	IMO/ILO/UNECE code of practice for packing of cargo transport units (CTU code)
11.	RDSO letter no. MW/Container dt. 07.07.2022	Guidelines for safe operation of containers over Indian Railways network
12.	G-100	Technical pamphlet for instruction for inspection & maintenance of Automatic Twist Locks (ATL) devices fitted on broad gauge low platform container flat wagons
13.	RDSO letter no. MW/Container dt. 14.12.2023	Addressing the gaps noticed in the safe operation of Container trains on Indian Railways-Value of unevenness for bottom 20' containers in double stack; loading has been worked out as 5t.
14.	Technical pamphlet no. G-118 & G-103	Guidelines for inspection/repair-maintenance of container wagon type BLC/BLCM/ BLL and BLCS(A-Car & B-Car) wagon.
15.	RB letter no. 2018/M(N)/951/ (E. No. 3320030) dt. 12.03.2024	Loading of tank containers on Container Flat wagons.