Organisation intergouvernementale pour les transports internationaux ferroviaires
Zwischenstaatliche Organisation für den internationalen Eisenbahnverkehr
Intergovernmental Organisation for International Carriage by Rail

INF. 7

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(English only)

RID: **12th Session of the RID Committee of Experts' standing working group**
(Video-conference, 24 to 26 November 2020)

Subject: **The UIC reference documents on heavy duty intermodal loading units (ILUs) and wagons**

Communication from the International Union of Railways (UIC)

This document provides, in addition to informal document INF.4, general information on the technical documentation that UIC manages in the field of combined transport. It is important to note that this documentation is not specific to the transport of dangerous goods. It concerns combined transport in general.

1/ Documentary architecture

The following UIC documents apply to the rail transport of Intermodal Loading Units (ILUs) other than semi-trailers:

- IRS 50596-6 *"Conditions for coding Intermodal Loading Units in combined transport, combined transport lines and wagons"*
  The first edition of the IRS was published on 1st July 2018.
- IRS 50592 *"Intermodal Loading Units (other than semi-trailers) for vertical transhipment and suitable for the carriage on wagons – Minimum requirements"*.
  The 2nd edition of the IRS will be published on 1st December 2020.
- IRS 50571-4 "Wagons for combined transport – Vertical transhipment – Characteristics".
  The 2nd edition of the IRS was published on 1st April 2020.

2/ Coding of Intermodal loading units and wagons to be used on specific routes

IRS 50596-6 applies to the coding of

- Semi-trailers
- ILUs other than semi-trailers which are designed for vertical transhipment
- Roller units which are designed for horizontal transhipment
- Semi-trailers on bogies

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- Combined transport wagons
- Combined transport lines.

It defines a coding system aiming to facilitate and streamline rail combined transport and ensuring the compatibility of ILUs + wagons with the permissible profile of CT routes.

IRS 50596-6 provides:
- the combined transport profiles to be used for coding CT lines and ILUs and for allocating the wagon compatibility code to CT wagons ( in case of ILUs other than semi-trailers),
- the characteristics of the reference wagons to be used for coding CT lines,
- the characteristics of the wagons to which the wagon compatibility code can be allocated.

In accordance with IRS 50596-6 Point 1.3, the provided coding system applies (inter alia) to ILUs for vertical transhipment other than semi-trailers which comply with the requirements set out in IRS 50592 and which are loaded on carrier wagons in accordance with IRS 50571-4.

3/ IRS 50592 ILU for vertical transhipment other than semi-trailers

IRS 50592 applies to Intermodal Loading Units (other than semi-trailers) intended for use in the international transport of goods by road and rail and which are suitable for vertical transhipment.
In particular:
Type 1: ISO containers (see dedicated part of the analysis),
Type 2: Class C ILUs (ref. EN 284),
Type 3: Class C stackable ILUs (CEN/TS 13853),
Type 4: Class C refrigerated ILUs (EN 12406),
Type 5: Class A ILUs (EN 452),
Type 6: Class A stackable ILUs (CEN/TS 14993),
Type 7: Class A refrigerated ILUs (EN 12410),
Type 8: Tank ILUs (EN 1432),
Type 9: Intermediate frames,
Type 10: ILUs not compliant with the above-mentioned types and having dimensions that allow them to be coded according to IRS 50596-6,
Type 11: ILU with a base width > 2600 mm,
Type 12: ILUs which due to their dimensions and MGW cannot be loaded on wagons marked with compatibility code C,
Type 13: Hybrid ILUs (ILUs which are not equipped with grappler arms groves,
Type 14: Non-standard ILUs which can be conveyed stacked.

3.1/ General requirements

IRS 50592 provides requirements for the above-mentioned ILU types referring to CSC (international convention for safe containers), RID (carriage of dangerous goods by rail) , ISO and EN standards (when available) on the following topics:
- classification,
- dimensions,
- tests,
- interface between ILUs and CT wagons
- markings
- ILUs certification.

3.2/ Heavy duty ILUs

The ILUs provided by BASF have a Maximum Gross Weight (MGM) higher than 36000 kg.

a/ Testing

IRS 50592 Point 5.1 provides the following requirements for ILUs which due to their MGM may not be freely loaded on CT wagons marked with the compatibility code 

The maximum gross mass (MGM) may be higher if the features of the wagon and the loading/ unloading equipment (as per loading diagram) allow.

Heavy-duty containers (MGM >36.000 kg) may only be conveyed on wagons with reinforced restraining devices (tested under maximum container weight against EN 12663-2).

These restraining devices may be spigots or other restraints/stoppers.

IRS 50592 Point 6 provides requirements on tests to be performed to prove the ability of ILUs to withstand longitudinal external stresses in dynamic conditions with an acceleration of 2 g.

6.4 Longitudinal stress test

This test is aimed at demonstrating that the ILU undercarriage is able to withstand longitudinal external stresses in dynamic conditions with an acceleration of 2 g. The test shall be conducted under the conditions of points 6.4.1 or 6.4.2.

6.4.1 Static longitudinal stress test

The ILU, with its load uniformly distributed so that its total mass equals 1 R, shall be immobilised longitudinally on rigid anchor points through the lower corner fittings of one of its ends. The ILU shall be subject first to a compressive, then to a tensile longitudinal force of 2 R (1 R per side), which shall be applied on the lower apertures of the lower corner fittings at the other end of the ILU.

6.4.2 Dynamic longitudinal stress test

The ILU is to be uniformly loaded to 1 R with a material filling as much of the available interior space as possible. It is then to be positioned centrally on a carrying wagon. The stationary carrying wagon shall then be subject to an impact produced by an 80 t wagon until an acceleration of 2 g can be measured on the corner fittings, using a low-pass filter at 16 Hz and allowing for a response time of 70 milliseconds. This test shall be conducted in both operating directions so that both pairs of corner fittings can be tested.

b/ markings

On wagons carrying Heavy duty containers (MGM >36.000 kg), the loading diagram for the restraining devices (tested to a more exacting standard as above) must be shown. The size of the diagram must be at least ISO 216 *A4.*

Markings

Heavy-duty containers are marked with the following codification plate:

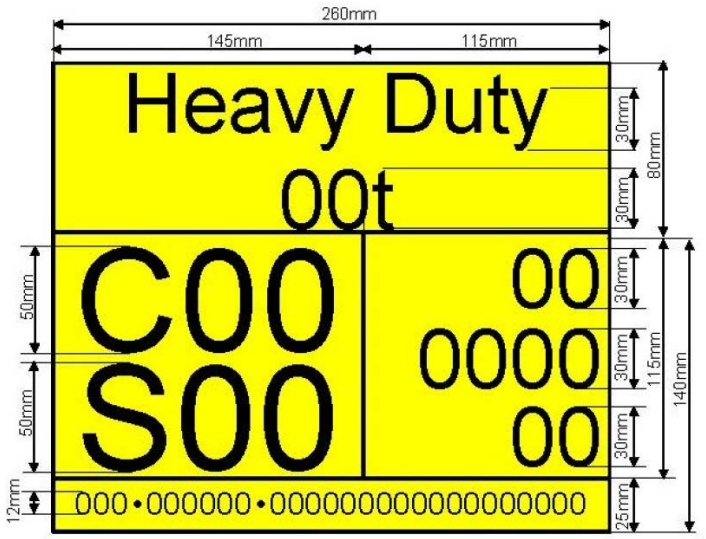


Figure 1 Havy duty plate according to new edition of IRS 50592 (1/12/2020)

3.3/ tests specific to tank ILUs designed for dangerous goods

IRS 50592 Point 6.16 (new edition numbering) provides the following requirements on tests to be performed to prove the ability of Tank ILUs to withstand longitudinal external stresses in dynamic conditions with an acceleration of 2 g (the underlined part applies to tank ILUs designed for the transport of Dangerous Goods).

6.16 Additional tests for tank ILUs

For tank ILUs intended for the carriage of dangerous goods, the test stress value as per points 6.4.1 and 6.4.2 - page 20 is 2 R.

6.16.1 *Longitudinal stresses - dynamic testing*

The tank ILU shall be loaded to a maximum of 97 % of its capacity with water or another suitable fluid. For the test it shall be loaded such that the total mass comprising the tank and its contents shall be 1 R.

However, if the stresses resulting from the filling procedure differ from the stresses required for approval (total mass) of the tank swap body (see Terms and definitions - page 5), the acceleration or deceleration to be attained shall be adjusted using the following formula:

G	=	*Acceleration 2 g*
R	=	*Maximum gross mass*
G1	=	*Modified acceleration*
R1	=	*Reduced maximum gross mass*

G1 = (G x R)/R1

***NB:** G = 2 g*

2 g ≤ G1 ≤ 6 g

During the test the unit shall rest with its 4 lower corner fittings or lower side beams on the wagon

and on the corresponding securing spigots on a flat surface.

The longitudinal axis of the tank unit shall be horizontal at the moment of impact. Forces shall only be transmitted via the two lower openings of the two lower corner fittings located on the same side as the impact.

The tank ILU shall be positioned centrally on a carrying wagon. The stationary carrying wagon shall then be subject to an impact produced by an 80-t wagon until an acceleration of 2 g can be measured on the securing devices with a low-pass filter at 16 Hz. This test shall be conducted in both operating directions.

The same test shall be performed for tank swap bodies intended for the carriage of dangerous goods, albeit with an initial acceleration of 3 g. The modified acceleration shall be determined in accordance with the limit conditions 3 g ≤G1 ≤6 g.

In accordance with IRS 50592 Points 5.3.1 and 5.3.2, Tank ILUs intended for the carriage of dangerous goods listed in RID/ADR shall comply with the provisions of those documents. The prescriptions of the present IRS shall also be complied with, so long as they do not contradict RID/ADR.

4/ The carrier wagons (CT wagons)

IRS 50571-4 specifies the principal characteristics of CT wagons which are suitable for the conveyance of ILUs which are designed for vertical transhipment and are compliant with the requirements provided by IRS 50596-5 (semi-trailers) and IRS 50592 (containers and ILUs other than semi-trailers).

4.1/ General basic requirements

IRS 50571-4 Point 1 provides the following general basic requirements which apply to all types of CT wagons:

***1.1**: Wagons must comply with the version of the Wagons TSI in force at the time the order to develop/build the wagons was made.*

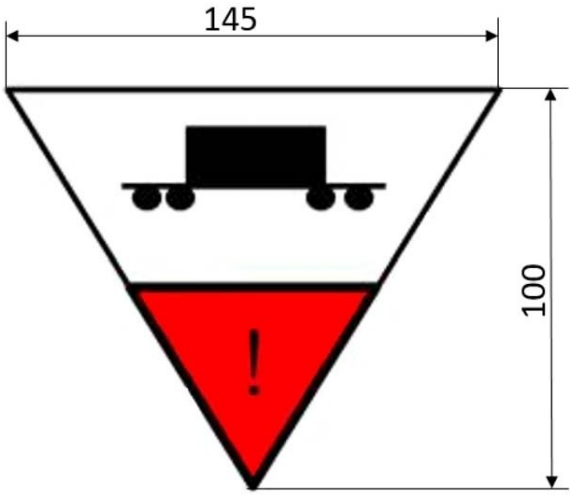
***1.2:** In deviation from UIC Leaflet 530-1, point 2.1.1 (see Normative references - page 4), these wagons may be built to withstand pressure stresses of:*

- *1.200 kN on the auto-coupler bolt*
- *600 kN on each side buffer, in accordance with ERRI B 12/RP 17 and EN 12663-2 (see Normative references).*

***1.7:** In order to avoid damage to the loading unit or load, care is to be taken when shunting loaded wagons.*

***1.7.1:** The wagons shall not buff other wagons unbraked and must be protected against being buffed by other unbraked wagons. The buffing speed must not exceed 6 km/h (Empty wagons are not subject to this restriction).*

***1.7.2:** If the loaded wagon must be protected from bumping, it must be marked as defined in Appendix F - page 24.*



Empty combined transport wagons are not subject to this operating restriction.

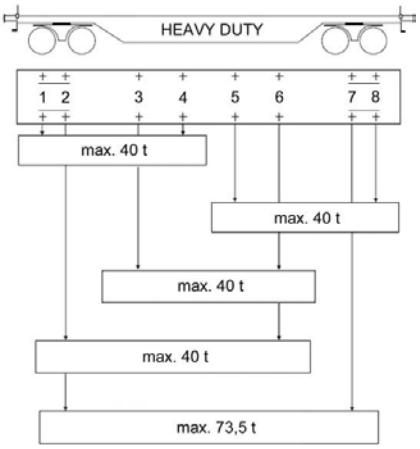
<u>Remark not to be discussed in RID</u>: BASF's aim is to have wagons and ILUs that can be used in shunting yards without been protected against bumping. So, the don't to have paragraph 1.7.2 used.

4.2/ CT wagons for conveyance of heavy duty ILUs

IRS 50571-4 Point 2 provides specific requirements on markings to be applied to CT wagons which are suitable for the conveyance of heavy duty ILUs.

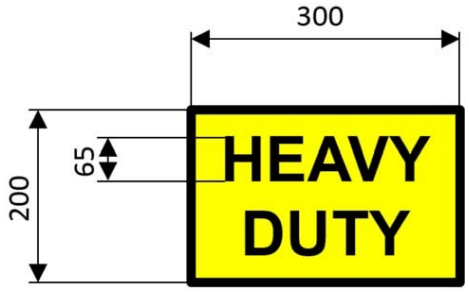
a/ loading diagram

2.8: An additional loading diagram (at least A4 size) must be affixed on the solebar of wagons fitted with spigots for carriage of heavy-duty containers in accordance with IRS 50592. The position of the spigots for heavy-duty containers must be marked separately (see Appendix E.1 - page 23).



b/ "heavy duty" pictogram

These wagons must be labelled with the "Heavy Duty" pictogram beside to the wagon compatibility code in accordance with Appendix E.2 - page 23.


300
65
200
HEAVY
DUTY