



**OTIF/RID/CE/GTP/2020/11**

31 October 2020

Original: German

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

**Subject:** Revision of the requirements concerning protection of the tank against the  
overriding of buffers (TE 22/TE 25)

**Discussion document from the International Union of Wagon Keepers (UIP)**

**Description of the problem**

1. In the 1990s, penetration of the ends of tank-wagons was very often caused by the overriding of buffers, as these mostly occur in shunting operations (as established by the working group on tank and vehicle technology).
2. As a result, rules to reduce the likelihood of buffers overriding were included in RID, in addition to rules to reduce the effects of overriding buffers. In particular, special provisions TE 22 (energy absorption elements/crash buffers) and TE 25 (protection against the overriding of buffers) should be mentioned in this respect. Reference should also be made to the requirement for a minimum distance of 300 mm between the headstock and the tank, which has been taken over from UIC leaflet 573.
3. From the present perspective, some questions arise in connection with these requirements. These questions have already been discussed in the Joint Coordinating Group of Experts (JCGE).
4. The majority of these requirements are intended for the part of the regulations that deal with wagon technology, which, in principle, is subject to the rules of the TSI/ATMF. However, the latter do not contain any such rules. Consequently, it has already been agreed in the JCGE that the rules in RID should be reduced to protective aims and that the manner in which these aims is achieved and specified should be dealt with in the TSI or the standards they refer to.
5. These requirements were not introduced as an overall coordinated block, but were introduced at different times. However, the question that arises today is whether this subject

could be dealt with holistically and hence replace a less significant measure (e.g. 300 mm distance) with a more significant measure (e.g. protective shield).

6. In view of the Russian wagons operating in the Baltic states and the efforts to harmonise with SMGS, rather for political reasons the requirement for energy absorption of 800 kJ for wagons with an automatic coupling device has been reduced to 135 kJ. As the introduction of automatic coupling devices is now being discussed in Europe, it should be pointed out that, not only are no comparable requirements defined in this respect, but the damage-causing operating mechanisms are mounted completely differently to wagons fitted with buffers.
7. In the final analysis, all these requirements were only brought in for tank-wagons. They were not introduced for tank-container transport, the argument being that tank-containers have a lower volume and a full supporting frame, etc. Following the introduction of extra-large tank-containers, the question is whether, in order to ensure equal treatment, some of these rules should be taken over for tank-containers or only for extra-large tank-containers, or whether other protective mechanisms should be defined.
8. In the discussion in the JCGE, UIP said it was prepared to submit a preliminary proposal for a solution for the holistic regulation of these requirements in RID.

### **Approach to the solution**

9. With regard to their safety impact, the current RID requirements can be classified:
  - a) 300 mm distance (historically introduced for all wagons to mitigate the effects of overriding buffers) or use of C buffers on gas tank-wagons;
  - b) Measures to reduce the risk of overriding buffers, e.g. by means of crash buffers in TE 22 or else, to some extent, by means of “intercepting devices” in TE 25 (a);
  - c) Measures to reduce the effects of overriding buffers on the tank, as specified in TE 25 (b) to (e) (protective shield, sandwich cover, increased end wall thickness, etc.).
10. In line with a stepped approach like this, the requirements could be reordered as follows:
 

Level 1: 300 mm distance or, alternatively, use category C buffers (75 kJ energy absorption).

Level 2: (Replacement for TE 22) Measures that are suitable to reduce the risk of buffers overriding, as is currently achieved by means of crash buffers according to TE 22 or intercepting devices according to TE 25 (a), for example.

Level 3: (Replacement for TE 25) Measures that are suitable to reduce the damage caused by the overriding of buffers, which, in principle, can never be ruled out. The classic solutions here would be the protective shield or else strengthened tank ends or sandwich covers.
11. Such a stepped approach, combined with the concurrent statement that a higher level measure has a compensatory impact for a lower level, would not change anything with regard to the safety level that currently exists for tank-wagons, but would have the advantages described below.
12. For tank-wagons, a manufacturer could decide whether the 300 mm distance could be compensated for by other measures, e.g. crash buffers or protective shields.

13. As a result, for wagons with an automatic coupling device, energy absorption of 800 kJ would no longer need to be discussed – a rate that such couplings cannot provide anyway. Instead, in light of experience from the USA and the SMGS states, either safe interception of both halves of the coupling would have to be demonstrated (level 2), or protective shields (level 3) would also have to be mounted.
14. For the carrying wagons of tank-containers/extra-large tank-containers, which cannot even be fitted with TE 22 crash buffers because of their reduced strength requirements (F2 in accordance with EN 12663), compensation by means of stronger tank ends or protective shields would be possible.
15. What is still open and new is the question to be discussed separately as to whether a requirement for a 300 mm distance has any effect at all (this was raised by BASF in the risk assessment) and should be withdrawn entirely.
16. Another new idea is also to replace this 300 mm by C buffers (or also long-stroke buffers, as can often be found on container carrying wagons).

#### **Amendment proposal (preliminary draft for discussion)**

17. Reword or delete 6.8.2.1.29 (300 mm distance):

To be discussed depending on further decisions concerning extra-large tank-containers.

Alternative 1: Delete this requirement completely, as it cannot be implemented in states with a smaller loading gauge or in container transport and constitutes a disadvantage for tank-wagons compared with tank-containers.

Alternative 2: If the requirement for 300 mm distance is kept, the first replacement measure C buffers/long-stroke buffers or level 2 or 3 (see paragraph 10) should also be approved universally.

18. Rewording of TE 22:

“In order to reduce the extent of damage in the event of a collision shock or accident, each end of tank-wagons for substances carried in the liquid state and gases or battery-wagons shall be capable of absorbing at least 800 kJ of energy by means of elastic or plastic deformation of defined components of the subframe, or suitable measures must be taken to reduce the risk of the tank being penetrated in the event of a collision shock.”

The requirements of this special provision are deemed to be met if:

- = Crashworthy buffers (energy absorption elements) that conform to clause 7 of standard EN 15551: 2009 + A1:2010 (Railway applications – Railway rolling stock – Buffers) are used and if the resistance of the wagon body satisfies the F1 requirements of standard EN 12663-2: 2010 (Railway applications – Structural requirements of railway vehicle bodies – Part 2) or
- A distance (distance between the headstock and the tank end) of at least 1000 mm is provided or tank-containers (or only extra-large tank-containers) are loaded onto longer carrying wagons or
- Devices to protect against the overriding of buffers in accordance with special provision TE 25 (a) are mounted (this requirement would have to be described in EN standards or TSI) or

- The tank ends are protected by a measure according to special provision TE 25 (b) to (e) (protective shield, sandwich cover, increased wall thickness of the tank ends)."

19. Rewording of TE 25:

"Shells of tank-wagons shall also be protected against the overriding of buffers, derailment or other stresses occurring as the result of an accident by at least one measure according to special provision TE 22 and also by one of the following measures:

- = Increasing the wall thickness of the tank ends by at least 6 mm (mild steel) more than the minimum wall thickness according to Chapter 6.8;
- = Sandwich cover for tank ends *(take over the current paragraph (c) unchanged);*
- = Protective shield at each end of the wagon *(transfer current paragraphs (d) and (e) to standards or TSI).*

The requirements are deemed to be met if a protective shield according to XXX is used at each end of the wagon."

20. The UIP requests that this proposal be discussed. If there is agreement in principle, corresponding amendments to the parts of the regulations that deal with wagon technology (TSI and the standards referred to) would have to be drafted, in addition to the final wording for RID.

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