

## Economic Commission for Europe

### Inland Transport Committee

#### Working Party on the Transport of Dangerous Goods

Joint Meeting of the RID Committee of Experts and the  
Working Party on the Transport of Dangerous Goods

14 March 2018

### Report of the Working Group on Tanks

1. The Working Group on Tanks met from 12 to 14 March 2018 in Bern on the basis of the mandate from the RID/ADR/ADN Joint Meeting, under the chairmanship of Mr. Arne Bale (United Kingdom) Mr. Kees de Putter (Netherlands) as secretary. The relevant documents were submitted to the plenary session and transferred to the Working Group for consideration.

2. The Working Group on Tanks, consisting of 31 experts from 13 countries and 6 non-governmental organizations, dealt with the following official and informal documents:

*Documents:*

- ECE/TRANS/WP.15/AC.1/2018/6 (Poland)
- ECE/TRANS/WP.15/AC.1/2018/8 (United Kingdom)
- ECE/TRANS/WP.15/AC.1/2018/9 (UIP)
- ECE/TRANS/WP.15/AC.1/2018/11 (France)
- ECE/TRANS/WP.15/AC.1/2018/12 (France)
- ECE/TRANS/WP.15/AC.1/2018/13 (France)

*Informal documents:*

INF 6. (France)	INF. 24 (UIC)
INF. 9 (France)	INF. 32 Rev1 (France)
INF. 10 (Netherlands)	INF. 36 (Germany)
INF. 11 (United Kingdom)	INF. 40 (France)
INF. 17 (UIC)	INF. 41 (United Kingdom)
INF. 19 (OTIF)	

#### **Item 1: ECE/TRANS/WP.15/AC.1/2018/6 (Poland) – Qualification of welding procedures – Welding according to 6.8.2.1.23.**

3. Standard EN ISO 15614-1:2017 contains two levels to prove the ability of a manufacturer to perform welding. Level 1 is based on ASME while Level 2 is the original contained in previous versions of the standard. Level 2 is the more severe and is to be used when no level is specified by legislation or contract. For the Pressure Equipment Directive and Simple Pressure Vessel Directive of the EU level 2 is mandatory by the European annexes of the standard. Poland in its document asks for clarification which level applies to tanks of RID/ADR.

4. It was said that while level 1 contains provisions to include the weld filler material, level 2 is more comprehensive in the tests to be performed on the weld test plate and therefore more expensive. However both levels give sufficient proof that the welding procedures are adequate. EN 12972:2018 allows level 1 to be used for portable tanks. However several experts were reluctant at this stage and preferred level 2.

5. As manufactures and repair shops already had to comply with the previous version of the standard, where requirements at level 2 applies, no problems are foreseen if an immediate decisions is not taken. It was therefore decided to await a comparison document by France for consideration at a future session.

**Item 2: ECE/TRANS/WP.15/AC.1/2018/8 (United Kingdom) – Templates for Chapter 6.8 tank plates.**

6. The proposal by the United Kingdom, prepared on behalf of the group, reconsidered the information given on a tank plate and included examples of tank plates for tanks of 6.8 in RID/ADR.

7. However some experts had second thoughts and questioned the added value as there seemed to be no problems with current tank plates. The limited available space on road tank vehicles was mentioned, as was the different needs for information between tank-vehicles, tank-wagons and tank-containers and the cost for industry to adapt. For tank plates for tank wagons standard EN 12561-1 is available which, although not referenced in RID, was said to be generally used. Also EN 12972 was mentioned, containing examples of tank plates. It was also said that the UK document contained examples, so that in practice deviating layouts could be used, although this would be no different to the tank plates in Chapter 6.7.

8. Several experts suggested reconsideration of the subject. It was also felt that a standard, such as EN 12561-1 for tank wagons, would be a good basis. As EN 12561-1 is specific for tank wagons it was suggested that a unique standard for tank plates could be developed by CEN/TC 296.

**Item 3: ECE/TRANS/WP.15/AC.1/2018/9 (UIP) – 6.8.2.1.23: Welding on tanks.**

9. The UIP proposes to amend 6.8.2.1.23 in order to make it clear that although for new tanks the competent authority is the correct party for approval of welding procedures, for modification or repair an inspection body would be the appropriate party.

10. It was felt that the proposed wording in paragraph 7 of the document did not expressed clearly the different parties involved for new tanks and repair or modification of existing tanks. It was decided to introduce two separate sentences addressing the manufacturer, and the maintenance or repair shop.

**Proposal 1: Replace the first sentence of the first paragraph of 6.8.2.1.23 with the following:**

*“The ability of the manufacturer to perform welding operations shall be verified and confirmed by either the competent authority or by the body designated by this authority.*

*The ability of the maintenance or repair shop to perform welding operations shall be verified and confirmed by the inspection body according to 6.8.2.4.5.*

**Item 4: ECE/TRANS/WP.15/AC.1/2018/11 (France) – Use of austenitic-ferritic stainless steels for the construction of tanks in accordance with 6.8.5 of RID/ADR.**

11. Based on document INF 13 of the Autumn 2017 session of the Joint Meeting, austenitic-ferritic stainless steel was introduced in 6.8.5.1.2.(a) for RID/ADR 2019. However the proposed lower temperature limit of -40 °C was placed in square brackets as further consideration was needed if this would be sufficient for refrigerated liquefied carbon dioxide. In document 2018/11 France proposes to amend the lower temperature limit to -60 °C.

12. It was said that a drop in pressure in the tank due to a significant leak the temperature could reach -60 °C and that therefore this temperature was justified. Several experts were concerned as not all austenitic-ferritic stainless steels could be used down to this temperature. Although it would be allowed to go down to -60 °C this should always be proven by a material test required by 6.8.5, so that it would not present a problem.

The question was raised if standard EN 10028-7 could be used as this would only go down to -40 °C. It was decided that although an additional material report for the lower temperature was required, the tank plate could just state EN 10028-7 for the shell material.

**Proposal 2: Amend the entry for austenitic-ferritic stainless steel in 6.8.5.1.2 (a) for RID/ADR 2019 to read:**

*"– austenitic-ferritic stainless steels, down to a temperature of -60 °C"*

**Item 5: ECE/TRANS/WP.15/AC.1/2018/12 (France) – Application of EN 13094:2015 to gravity-discharge tanks and INF 9 (France)**

13. For RID/ADR 2017 it was accepted that maximum working pressure does not apply to gravity discharge tanks according to 6.8.1.14(a) to prevent incorrect determination of test pressure for the shell and its compartments. However due to circumstance a revision of standard EN 13094 has not been published in time for RID/ADR 2019 to take this amendment into account.

14. As this leads to an incompatibility between the standard and the regulations it is proposed to introduce a guideline on how to apply EN 13094:2015 in relation to RID/ADR 2017 and 2019. The proposal for the guideline received general approval from the experts. It was felt that to link the two a note in column 2 of the table of 6.8.2.6.1 was needed.

**Proposal 3: Introduce a note in column 2 of the table of 6.8.2.6.1 of RID/ADR 2019 for EN 13094:2015 to read:**

*"NOTE: see also the guideline on the UNECE website."*

**Proposal 4: Introduce a new guideline on the UNECE website under "UNECE > Transport > Areas of work > Dangerous Goods > legal instruments and recommendations > ADR > Guidelines, to read:**

**Application of EN 13094:2015 in order to comply with ADR 2017 and 2019.**

The European standard EN 13094 specifies requirements for the design and construction of metallic gravity-discharge tanks intended for the carriage of substances having a vapour pressure not exceeding 110 kPa (absolute pressure) for which a tank code with letter "G" is given in Chapter 3.2 of RID/ADR.

In order to comply with the requirements of RID/ADR, the following amendments to EN 13094:2015 shall be made.

**1. Amendment of 3.1, Terms and definitions**

*Delete the definition of maximum working pressure in 3.1.4.*

**2. Amendment of 6.4, Dynamic conditions**

*In the first paragraph of 6.4.2, replace " $P_v$ " with " $P_{ta}$ ",*

*where  $P_{ta}$  = static pressure (gauge pressure) in MegaPascals (MPa).*

**3. Amendment of 6.5, Pressure conditions**

**3.1 Amendment of 6.5.1**

*Delete "c) 1,3 times the maximum working pressure".*

**3.2 Amendment of 6.5.2**

*Replace " $1,3 \times (P_{ta} + P_{ts})$ " with " $\max(0,2; 1,3 \times P_{ta\ water}; 1,3 \times P_{ta})$ ".*

**4. Amendment of Annex A, A.5 Calculation method — Worksheet**

**4.1 Amendment of A.5.2.2.1, Table A.2, Pressures**

Replace N° 2 “Maximum working pressure <sup>b</sup>,  $P_{ms}$ ” with “Opening pressure of the breather device,  $P_{ts}$ ”.

Delete “<sup>b</sup>  $P_{ms}$  is the maximum of  $P_{vd}$ ,  $P_{ts}$ ,  $P_d$  and  $P_r$ ”.

**4.2** Amendment of A.5.2.2.2, Table A.3, Calculation pressure in service conditions

In 4, 5, 6 and 7, replace “ $P_{ms}$ ” with “ $P_{ts}$ ”.

**4.3** Amendment of 5.6.2.1.2, Tensile stress due to pressure during transport

In a) Force, replace “ $P_{ms}$ ” with “ $P_{ts}$ ”.

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**Item 6: ECE/TRANS/WP.15/AC.1/2018/13 (France) – Electronically signed and transmitted tank inspection certificates.**

15. A question was raised during the autumn 2017 session concerning the acceptance of electronic documents and signatures for tank inspection certificates. In document 2018/13 additional information is given.

16. Reference is made to the UNCITRAL Model Law on Electronic Signatures, which aims to enable and facilitate the use of electronic signatures by establishing criteria of technical reliability for the equivalence between electronic and handwritten signatures and in particular Article 46 of Regulation (EU) No. 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market states: “An electronic document shall not be denied legal effect and admissibility as evidence in legal proceedings solely on the grounds that it is in electronic form.”.

17. Several experts acknowledge that their organization already issued electronic documents. The tanks working group confirmed its earlier position that electronic documents and signatures should be accepted.

**Item 7: INF 6 (France) – Alteration according to 6.8.2.4.4 and modification according to 6.8.2.3.4.**

18. It was explained that in the French version an incorrect term was used for a change of a tank not covered by the original type approval. The Francophone experts of the tanks working group supported the amendment that applies to the French version of RID/ADR only. France informed the working group that standard EN 12972 in the French version would also be brought in line with this terminology.

**Proposal 5: amend 6.8.2.3.4 in the French version of RID/ADR 2019 to read (new wording in italic script and deleted wording stricken through):**

“6.8.2.3.4 En cas de *transformation* ~~modification~~ d’une citerne avec un agrément de type en cours de validité, ayant expiré ou ayant été retiré, les épreuves, contrôles et agrément sont limités aux parties de la citerne qui ont été modifiées.

(...) Un certificat approuvant la transformation ~~modification~~ doit être délivré par l’autorité compétente ...”

**Item 8: INF.10 (Netherlands) – Interpretation of the purpose and visibility of the markings required by 6.8.2.5.2 and 6.8.3.5.6.**

19. The Netherlands asked if the markings of 6.8.2.5.2 and 6.8.3.5.6 should be visible during carriage on the outside of the tank. In particular markings of 6.8.3.5.6 of the gases

allowed to be carried were sometimes placed in the cabinet of the tank-vehicle, obscured by the doors during carriage. Additionally the requirement of 4.3.3.3.2 should also be reconsidered as it required the names of gases not carried to be “covered up”.

20. It was recognized that for tank wagons this would not be an issue as folding panels were fixed to the sides of the tank wagon displaying details of the gas being carried. Several experts said that the markings, including those of 6.8.3.5.6, would be checked by control authorities and should not be obstructed.

21. Concerning the requirement of 4.3.3.3.2 to cover up the names of the gases not being carried it was suggested that this has no added value as the information is available on the orange-coloured plate and the actual gas and mass loaded would be available in the transport document.

22. It was suggested that the requirement in 4.3.3.3.2 should be revisited at a future session and the Netherlands was invited to prepare an official document.

**Item 9: INF.11 (United Kingdom) – Report of the 7<sup>th</sup> informal working group on the inspection and certification of tanks.**

23. The chair of the informal working group on the inspection and certification of tanks reported on the proceedings of the 7<sup>th</sup> meeting in London on 12 to 14 December 2017. It was said that the informal working group reflected on the project objectives on the basis of a presentation by the Netherlands. It then developed the wording for 1.8.7 and 6.8 and clarified that the entry into service checks only applied to tanks in some cases. Based on suggestions by Austria it was agreed that experts (individuals) could also be regarded as an inspection body if they met the minimum requirements. The drafting of a revised 1.8.6 was entrusted to a sub group convened in Prague on 5 and 6 March led by the Czech Republic and the Netherlands. Also, time was spent in London on other related topics such as tank plates, welding procedures, NDT on austenitic-ferritic stainless steels, waiving certain initial inspections and construction of EX vehicles. The 8<sup>th</sup> session is scheduled for 2 to 4 May 2018 in London.

24. The Netherlands advised that the revised 1.8.6 developed at the Prague meeting would be available in time for the 8<sup>th</sup> session of the informal working group. France advised that a new full text version of 1.8.7 including the amendments agreed during the 7<sup>th</sup> session would also be available at the 8<sup>th</sup> session and the expert from Austria noted that given the volume of work and time limitations the informal working group should concentrate only on 1.8.6, 1.8.7 and 6.8. The working group on tanks supported continuation of the work subject to the endorsement of the Joint Meeting.

**Item 10: INF.17 (UIC) – Implementation of consignor’s duties as per RID 5.4.1.2.2 (d) (indication of holding time).**

25. UIC asked if the requirement to mark the actual holding time in the transport document as prescribed in 5.4.1.2.2.(d) would be applicable to empty uncleaned tanks especially because at the introduction of the requirement it was stated that EIGA would undertake further work on the issue of empty tanks.

26. The tanks working group shared the opinion of the industry, as mentioned in INF 17, that determining the actual holding time is important but also that it may be hard to determine taking the limited contents of the tank and unknown traffic conditions into account. A reference was given to the guidance document by EIGA, mentioned in foot note 4 to 4.3.3.5 e), and it was suggested that EIGA should revisit the document in the light of the question raised by UIC.

**Item 11: INF.19 (OTIF) – Extra-large tank-containers and INF 24 (UIC).**

27. New extra-large tank-containers have been developed intended mainly to be used on the railway. Questions were raised as to whether the current requirements are adequate for

these containers. It was noted that the current extra-large tank-containers are approved in accordance with the current regulations.

28. Previously this was discussed at the 8th session of the RID Committee of Experts' standing working group and at the working group on tank and vehicle technology that met in Hamburg. In the report of the meeting in Hamburg, for a number of tank related items the advice of the tanks working group of the Joint Meeting was sought. The following four tank related issues were identified and discussed.

Minimum wall thickness:

While the minimum wall thickness of tank-wagons for liquids is 6 mm in mild steel, the equivalent wall thickness in other metals shall never be lower than 4.5 mm. The minimum wall thickness of tank-containers over 1.80 m in diameter for liquids is also 6 mm in mild steel, but the equivalent wall thickness in other metals shall never be lower than 3 mm.

30. Discussion revealed that the freight transport system developed in the 1970's was probably designed around a tank-container with a maximum total mass of approximately 30.5 tonnes and a maximum capacity of around 36.000 litres. Originally the tanks of these tank-containers were protected by full frames. It was thought that this was one of the reasons why the wall thickness was allowed to be reduced from 6 mm in mild steel to not less than 3 mm in other metals.

It could therefore be questioned as to whether the reduction to 3 mm can be justified in the case of an increase in capacity to 73.000 litres which is comparable to the capacity of bogie tank-wagons.

It was felt that wall thickness reduction should be discussed in relation to the total package of protection of the tank-container. It was noted from the report that a risk analysis comparing rail tank wagons and extra-large tank-containers was already envisaged.

Pressure resistant closures.

As the length of the extra-large tank-containers has increased, pressure due to liquid surge increased as well. This could justify the application of 6.8.2.2.4 for this extra-large tank-container. The representative of the manufacturer confirmed compliance of the current extra-large tank-containers with this requirement.

Markings on both sides of the tank-container.

Tank wagons are provided with markings according to 6.8.2.5.2 on each side of the tank wagon. On tank-wagons also a mark concerning the date of the next inspection is given. However on tank-containers there are requirements for markings both not on specified position and no mandatory marking indicating the next periodic inspection. It was questioned if markings in line with tank-wagons should be made applicable to the extra-large tank-containers. Some experts suggested not to complicate the system and not mark both sides of tank-containers and portable tanks or mark them all on both sides. It was also recalled that recently marking the date of the next inspection on portable tanks was proposed to the UNTDG but that it was not accepted.

Reference to 7.1.3 in 6.8.2.1.2.

It was agreed to introduce a link between the two subsections to remind constructors of the additional accelerations to be taken into account.

**Proposal 6: Introduce a new foot note 2 in RID/ 1 in ADR after "Tank-containers" in 6.8.2.1.2 to read:**

“<sup>2/1</sup> See also 7.1.3 “

The experts of the tanks working group felt that the issue of tank thickness and the pressure resistance of closures should be part of more comprehensive work. As it also involved rail only issues the tanks working group thought that it would be appropriate that this be dealt

with by the RID working group on tank and vehicle technology and that for tank issues the tank experts should be invited.

**Item 12: INF.32 Rev1 (France) – Rupture pressure of bursting discs in 6.8.2.2.10.**

36. During a previous session revised wording for the first sentence of the second paragraph of 6.8.2.2.10 was accepted for RID/ADR 2019 but kept the value of the nominal pressure between square brackets to allow for further consideration. In INF 32 Rev 1 France returned to the topic with more detailed wording that better addresses the bursting pressure at working temperature.

37. The proposed wording was improved and agreed upon by the tanks working group. The amendment should apply to RID/ADR 2019.

**Proposal 7: Amend the first sentence of the second sub-paragraph 6.8.2.2.10 for RID/ADR 2019 to read as follows:**

*“Except for tanks intended for the carriage of compressed, liquefied or dissolved gases where the arrangement of the bursting disc and safety valve shall be such as to satisfy the competent authority, burst pressures of the bursting disc shall satisfy the following requirements:*

*- the minimum burst pressure at 20 °C, tolerances included, shall be greater than or equal to 0.8 times the test pressure,*

*- the maximum burst pressure at 20 °C, tolerances included, shall be less than or equal to 1.1 times the test pressure, and*

*- the burst pressure at the maximum service temperature shall be greater than or equal to the maximum working pressure.”*

**Proposal 8: In 1.6.3.49 and 1.6.4.51, replace:**

“ nominal pressure of the bursting disc” by “ burst pressure of the bursting disc”.

**Item 13: INF.36 (Germany) – Cross-sectional shapes of shells in accordance with RID/ADR 6.8.2.1.18.**

38. Germany proposed to delete the square brackets in foot note 4/2 to 6.8.1.18 for RID/ADR 2021. This is made possible by inclusion of requirements in the latest draft for revision of EN13094 that provides for safe construction.

It was asked if the square brackets could be lifted for RID/ADR 2019, so that the standard could be used as soon as the revised EN 13094 was available. It was confirmed that 6.8.2.7 allowed for use when a standard is published and adopted for future reference in RID/ADR.

39. The tanks working group supported the proposal by Germany.

**Proposal 9: Delete the square brackets from the sentence of the foot note 4 RID/ 2 ADR to 6.8.2.1.18. (see ECE/TRANS/WP15/AC.1/148-Add1e page 12).**

**Item 14: INF.40 (France) – Correction in the table in 6.8.2.6.1.**

40. For EN 14432:2014 and EN 14433:2014 in column 2 of table 6.8.2.6.1 a note is included that explains that the valves according to these standards may, regardless of the titles, also be used for tanks constructed in compliance with EN 13094. The wording of the note is based on the title of EN 13094, which will be amended in the next revision.

**Proposal 10: For EN 14432:2014 and EN 14433:2014 add the note in column 2 of table of 6.8.2.6.1 to read:**

*“NOTE: This standard may also be used for gravity-discharge tanks. “*

**Item 15: INF.41 (United Kingdom) – Tanks: The use of ultrasound for non-destructive tests of austenitic-ferritic stainless steels.**

41. The document suggested introducing a precautionary remark concerning the use of ultrasound for inspection of welds of austenitic-ferritic stainless steels. However it was noted that the next version of EN 12972 did not allow the use of ultrasound for the inspection of welds and that this made the proposal superfluous.

**Item 16: AOB**

42. The United Kingdom raised two items in respect of vacuum operated waste tanks to which the working group gave their opinion.

The first concerned the applicability of 6.8.2.1.28 for the protection of equipment on the top of such tanks, given that 6.10.3.1 allows such equipment to be placed in the “protected area”. It was explained that this was permitted on account of the robustness of such tank designs. The second concerned the checking of the equipment of vacuum operated waste tanks which are not covered specifically by EN 12972. In this case the group was of the opinion that the provisions in 6.8.2.4.2 and 6.8.2.4.3 were sufficient to ensure that the satisfactory operation of this equipment could be checked at inspections.

43. ITCO raised a topic of the problem with the definition of “operator” in 1.2.1 that is linked to the registration of the tank-container/portable tank. This creates difficulties with enforcement where in some countries the owner is fined as the registration is in his name while the tank container is leased to another party.

ITCO is invited to consider an amendment to the definition bearing in mind that marking of the name of the owner and the operator on the tank-container and portable tank is required.

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