

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**

16 March 2017

Report of the Working Group on Tanks

1. The Working Group on Tanks met from 13 to 15 March 2017 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 25 experts from 12 countries and 6 non-governmental organizations, dealt with the following official and informal documents:

Documents: ECE/TRANS/WP.15/AC.1/2017/3 (Germany)
 ECE/TRANS/WP.15/AC.1/2017/13 (EIGA)
 ECE/TRANS/WP.15/AC.1/2017/17 (the Netherlands)
 ECE/TRANS/WP.15/AC.1/2017/18 (the Netherlands)
 ECE/TRANS/WP.15/AC.1/2017/19 (the Netherlands)
 ECE/TRANS/WP.15/AC.1/2017/20 (France)
 ECE/TRANS/WP.15/AC.1/2017/21 (France)
 ECE/TRANS/WP.15/AC.1/2017/22 (United Kingdom)
 ECE/TRANS/WP.15/AC.1/144 (Secretariat)

Informal documents: INF. 6 (UIP)
 INF. 7 (United Kingdom)
 INF. 8 (ECFD)
 INF. 11 (Belgium)
 INF. 12 (United Kingdom)
 INF. 13 (United Kingdom)
 INF. 25 (United Kingdom)
 INF. 27 (Germany)

Item 1: ECE/TRANS/WP.15/AC.1/2017/3 (Germany) – Introduction of a definition of diameter of shell.

3. The proposal by Germany is to improve the understanding of “diameter of the shell”, that when used, the internal diameter is meant. To achieve this a definition is proposed.

4. The group agreed at the previous session that this is correct for 6.8. Some experts expressed that the definition also touches 6.7. Although there is consensus that where diameter of shell is used in 6.7 also the internal diameter is intended, it is questioned if this can be decided by the Joint Meeting. It was said that this should be brought to the attention of the Sub-committee of experts on transport of dangerous goods.

5. The definition was amended to “diameter” to better address all situations it was used in 6.8 and 6.7, with an explanation that it is for shells for tanks not to conflict with other place where “diameter” is used e.g. for explosive articles.

Proposal 1: Introduce a new definition in 1.2.1 to read:

“Diameter” (for shells of tanks) means the internal diameter of the *shell*.

Item 2: ECE/TRANS/WP.15/AC.1/2017/13 (EIGA) – 6.8.3.2.9 Items of equipment - Relief valves.

6. The EIGA document is a continuation on the proposal for the protection of safety valves against ingress of water in document ECE/TRANS/WP.15/AC.1/2016/26 of the autumn 2016 session. Main objective is to exempt safety valves of cryogenic tanks from having protection against ingress of water if this is possible. Additional modifications are proposed to the already approved wording for 6.8.3.2.9 and the consequential transitional requirement.

7. It was agreed that the proposed note is not needed as 6.8.3.2.9 addresses tanks for compressed, liquefied and dissolved gases. Safety valves for tanks for refrigerated liquefied gases are dealt with in 6.8.3.2.11. It was felt that the already approved wording of the autumn 2016 session for the new last paragraph of 6.8.3.2.9 could be clearer. Further amendment was made to describe the objective in line with 6.7 instead of giving a measure (cap). The transitional measure was found to be too short for industry to modify existing equipment. It was agreed that it should be complied with at the first intermediate or periodic inspection after 1 January 2021.

Proposal 2: Introduce a new paragraph at the end of 6.8.3.2.9 to read,

Safety valves shall be designed to prevent or be protected from the entry of water or other foreign matter which may impair their correct functioning. Any protection shall not impair their performance.

Proposal 3: Amend transitional measure 1.6.3.47 and 1.6.4.49 to read (new wording in italic script):

Fixed tanks (tank-vehicles) and demountable tanks / tank wagons / tank-containers built before 1 July 2019, fitted with safety valves meeting the requirements applicable up to 31 December 2018 but which do not meet the requirements of 6.8.3.2.9 last paragraph concerning their design or protection applicable from 1 January 2019 may continue to be used until the next intermediate or periodic inspection after 1 January 2021.

Item 3: ECE/TRANS/WP.15/AC.1/2017/17 (the Netherlands) - Rupture pressure of bursting discs in 6.8.2.2.10.

8. The document contained answers to questions raised during the autumn 2016 session on this subject and proposals for amendment taking these answers into account. It was confirmed that hermetically closed tanks for the carriage of gases, with a safety valve preceded by a bursting disc, were foreseen and that the definition of “hermetically closed” had been modified in the past in which the application to gas tanks was overlooked. It was also found that for compressed, liquefied or dissolved gases a bursting pressure of 10% above the opening pressure of safety valves may result in a pressure higher than the test pressure.

9. It was discussed how this affected battery vehicles and MEGCs carrying toxic gases. The conclusion was that 6.8.3.2.26 prescribed that if a safety valve is fitted it should be preceded by a bursting disc. The example given for non toxic gases in which only a bursting disc is fitted will result in an "N" in the fourth position in the (tank) code. EIGA intends to clarify the situation of battery-vehicles only equipped with bursting discs.

10. Another discussion involved the lowering of the bursting pressure in relation to the temperature. A bursting pressure of 10% above opening pressure of the safety valve at 15°C could result in a bursting pressure below the opening pressure of the safety valve at higher temperatures. It was explained that although in 6.7.2 10% was used this was related to a higher opening pressure of the safety valve in relation to the MAWP which partly compensated for the decrease of the bursting pressure at higher temperatures. For 6.8 tanks a burst pressure of 0.9 to 1.0 times the test pressure at 15°C was said to be more appropriate. It was decided to keep the new value in square brackets for later confirmation.

11. Concerning the use of the word "substances" in combination with "liquid" and "solid" in the definition of "hermetically closed tank" it was decided that this should remain as it was terminology used in the present definition.

Proposal 4: Amend the definition of "hermetically closed tank" in 1.2.1 to read:

"*Hermetically closed tank*" means a tank that:

- is not equipped with safety valves, bursting discs, other similar safety devices or vacuum valves ((RID only) or with self-operating ventilation valves); or
- is equipped with safety valves preceded by a bursting disc according to 6.8.2.2.10, but is not equipped with vacuum valves ((RID only) or with self-operating ventilation valves).

A tank intended for the carriage of liquid substances with a calculation pressure of at least 4 bar or intended for the carriage of solid substances (powdery or granular) regardless of its calculation pressure is also considered hermetically closed if it:

- is equipped with safety valves preceded by a bursting disc according to 6.8.2.2.10 and vacuum valves ((RID only) or with self-operating ventilation valves), in accordance with the requirements of 6.8.2.2.3; or,
- Is not equipped with safety valves, bursting discs or other similar safety devices, but is equipped with vacuum valves ((RID only) or with self-operating ventilation valves), in accordance with the requirements of 6.8.2.2.3.

Proposal 5: Modify the second paragraph of 6.8.2.2.10 to read (new wording in *italic* script, deleted wording ~~stricken~~ through):

The bursting disc shall rupture at a nominal pressure [between 0.9 to 1.0 times the test pressure], except for tanks intended for the carriage of compressed, liquefied or dissolved gases where ~~if~~ the arrangement of the bursting disc and safety valve shall be such as to satisfy the competent authority. A pressure gauge or other suitable indicator shall be provided in the space between the bursting disc and the safety valve, to enable detection of any rupture, perforation or leakage of the disc which may disrupt the action of the safety valve.

Proposal 6: Introduce a transitional measure to read:

“1.6.3.yy /1.6.4.xx

Fixed tanks (tank-vehicles) and demountable tanks / tank wagons / tank-containers constructed before 1 July 2019 in accordance with the requirements in force up to 31 December 2018 but which do not conform to the requirements of 6.8.2.2.10 concerning the nominal pressure of the bursting disc applicable as from 1 January 2019 may continue to be used [until the next periodic inspection.]”

Item 4: ECE/TRANS/WP.15/AC.1/2017/18 (the Netherlands) – Inclusion of provisions for flame arrestors on breather devices.

12. Based on document ECE/TRANS/WP.15/AC.1/2016/20 by CEN during the autumn 2016 session it was decided not to refer to EN 16522 but instead include references to applicable sections of EN ISO 16852 directly in the requirements of 6.8.2.2.3. Although during the autumn session a table and wording were already drafted it was preferred to have this as an official proposal for consideration at a future session.

13. As some experts were not present during the autumn 2016 session the background and considerations of not referencing to EN 16522 were recalled. It was said that while EN 16522 was still available this could give rise to confusion what to apply. It was also mentioned that while the reference to EN ISO 16852 is a copy and paste from EN 16522 it had been revised in 2016 and that this should be taken into account. Because the contents should first be checked the original date was kept in square brackets.

14. The work on flame arrestors in the ADN committee was mentioned. However it was found as this application was only for flame arrestors on breather devices, used mainly on tanks carrying liquid fuels, references to the applicable sections of the EN ISO 16852 would not lead to problems.

15. Although flame trap and flame arrester may be covered by the definition of flame arrester in EN ISO 16852, allowing flow and protecting against passage of flame, it was decided to keep the wording flame trap as it was commonly used terminology.

Proposal 7: Add a new last paragraph (RID- penultimate paragraph) to 6.8.2.2.3 to read:

Flame arresters for breather devices shall be suitable for the vapour emitted by the substances carried (maximum experimental safety gap – MESG), temperature range and application. They shall meet the requirements and tests of EN ISO 16852:[2010] for the situations given in the table below:

Application/Installation	Testing requirements
Direct communication with atmosphere	EN ISO 16852:[2010], 7.3.2.1
Communication to pipe work system	EN ISO 16852:[2010], 7.3.3.2 (applies to valve/flame arrester combinations when tested together)
	EN ISO 16852:[2010], 7.3.3.3 (applies to flame arresters tested independently of the valves)

Proposal 8: Introduce a new transitional measure in 1.6.3.xx/1.6.4.xx to read (new wording in *italic* script):

"1.6.3.xx/1.6.4.xx

Fixed tanks (tank-vehicles) and demountable tanks/Tank-wagons/Tank-containers constructed before 1 July 2019 in accordance with the requirements of 6.8.2.2.3 in force up to 31 December 2018 but which however do not conform to the requirements of 6.8.2.2.3 last paragraph concerning the flame arresters on breather devices applicable from 1 January 2019 may continue to be used."

Item 5: ECE/TRANS/WP.15/AC.1/2017/19 (the Netherlands) – Amendment of subsection 6.8.2.1.23.

16. The document contained two independent proposals for amendment of 6.8.2.1.23 and a transitional measure to allow existing tanks to continue to be used.

17. The first proposal modifies 6.8.2.1.23 to allow lap joints to be inspected by a non-destructive test other than radiography or ultrasound. The reason for this is that the results are difficult to interpret. Based on experience with existing tank designs, it was considered that this should be limited to the attachment of the ends to the shell wall. As this is a typical construction of gravity discharge tanks a foot note was considered the most appropriate way to deal with this exception.

Proposal 9: Introduce a new footnote in the last sentence of the first paragraph of 6.8.2.1.23:

Non-destructive tests shall be carried out by radiography or by ultrasound ^x and shall confirm that the quality of the welding is appropriate to the stresses.

^x *Lap joints used for joining an end to the shell wall may be tested using alternative methods to radiography or ultrasound.*

18. The second proposal specified additional areas to be tested when shell ends are composed of two or more plates welded together before forming the end. In the so called "knuckle" area of the end, cracks may develop during forming of the end. The testing of the cylindrical part of the end in these cases was deleted as this would already be subject to the inspection of the weld "Tee" junctions connecting the end to the shell wall. During discussion some minor editorial changes were made to bring the wording of 0.8 Lambda and 0.9 Lambda in line with each other.

Proposal 10: Amend 6.8.1.23 Lambda = 0.8: to read (deleted wording ~~stricken~~ through and new wording in *italic* script)

All weld beads shall so far as possible be inspected visually on both faces and shall be subject to non-destructive checks. The non-destructive checks shall include all weld "Tee" junctions ~~and~~, all inserts used to avoid welds crossing *and all welds in the knuckle area of the tank ends*. The total length of welds to be examined shall not be less than: (rest unchanged)

Proposal 11: Amend 6.8.2.1.23, Lambda = 0.9 to read: (deleted wording ~~stricken~~ through, new wording in *italic* script)

All weld beads shall so far as possible be inspected visually on both faces and shall be subject to non-destructive checks. The non-destructive checks shall include all connections, *all* inserts used to avoid welds crossing, ~~and all welds in the knuckle area of the tank ends~~ and *all* welds for the assembly of large-diameter items of equipment. The total length of welds to be examined shall not be less than: (rest unchanged)

Proposal 12: Introduce a new transitional measure 1.6.3.z.z and 1.6.4.z.z to read:

“1.6.3.z.z/1.6.4.z.z

Tank wagons/Fixed tanks (tank-vehicles) and demountable tanks/Tank-containers constructed before 1 July 2019 in accordance with the requirements in force up to 31 December 2018 but which do not however conform to the requirements of 6.8.2.1.23 concerning the check of the welds in the knuckle area of the tank ends applicable as from 1 January 2019 may still be used.

Item 6: ECE/TRANS/WP.15/AC.1/2017/20 (France) – Tanks with a section including a concave part – interpretation of 6.8.2.1.18 and INF 8 (ECFD).

19. The document by France questioned if a tank with a circular cross section and a cut-out conforms to the regulation. Document INF 8 from ECFD commented on the points raised by France.

20. After an exchange of views between the experts it was recognized that different interpretations were possible. An interpretation is that the cross section of the tank was circular with a part taken out and another interpretation that due to the cut-out the cross section had become another shape to which foot note 2 of 6.8.2.1.18 applied, including a requirement that shell walls shall have convex radii. Despite the different interpretations the group felt that such tanks are safe and should be allowed to be used under ADR.

21. It was also remarked that circular, box-shape and elliptical cross sections were to be considered as examples and that regulation should not hinder technical development. The particular design dates back to 1989 with around 2000 units entered into service without problems experienced with the shell.

22. It was agreed that the regulation needed modification to allow for other designs and prevent different interpretations. The UK offered to develop a proposal for a preliminary exchange of views. This exchange of views could be in the remit of the Informal working group on inspection and certification of tanks that would meet in June, before returning to the tanks working group autumn session. In the meantime the CEN working group responsible for EN 13094 is encouraged to conclude the work on the draft revision of the standard.

Item 7: ECE/TRANS/WP.15/AC.1/2017/21 (France) – Demountable tanks – tank-containers, interpretation of definitions.

23. Based on a picture of a tank on a road vehicle it was questioned whether this could be considered as a tank-container or a demountable tank. While some experts were of the opinion that this can only be a tank container because of the corner castings, others are of the opinion that it could only be a demountable tank because of the foldable legs and cabinet extending below the corner castings, some experts are of the opinion that it cannot be determined because design information is missing.

24. It was also questioned if a tank-container can be approved for road use only. As the definition of container in 1.2.1 specifies one or more means of transport it is assumed that this is possible.

25. The varying opinions of the experts seems to justify a future revisit of the definitions of demountable tank and tank-container recognizing that some of these definitions are multi-modal.

Item 8: ECE/TRANS/WP.15/AC.1/2017/22 (United Kingdom) – report of the informal working group on the inspection and certification of tanks + INF 12 and INF 13 (United Kingdom).

26. The United Kingdom asked on behalf of the informal working group on the inspection and certification of tanks for endorsement of the fundamental principles developed and agreed by the group and for the consent of the Joint Meeting to continue with its work.

27. The fundamental principles are that a type approval is issued by one contracting party and that other contracting parties will accept this type approval. Tanks built according to this type approval shall have the initial inspection performed by the country in which the tank is to be registered or alternatively the country of manufacture if accepted by the competent authority in which the tank is to be registered. An “entry into service inspection” is conducted by the country in which the tank is to be registered if the initial inspection is not done by the country of registration. While tanks according to the type approval will be registered in different contracting parties it is expected that by cross control, harmonisation will improve and that there will be a constant form of market surveillance. Inspection bodies are to be appointed by contracting parties according to common requirements and when appointed it is intended that they would be notified to the UNECE/OTIF secretariats who would publish a list of inspection bodies on their websites.

28. The experts of the tanks working group acknowledged that the fundamental principles are feasible. However it was questioned whether this would be a separate system for Class 3 to 9 tanks, existing in parallel to TPED. Several observations were made on the wording for competent authority in paragraph 5a, the registration of tank containers and the application of a single inspection body. It was explained that so far only the new section for 6.8. had been reproduced in INF 12 and that the corresponding requirements in 1.8.6 and 1.8.7 were still under development.

29. The tank working group supported continuation of this work and all interested parties are invited to submit comments and to participate in the informal working group that is planned to reconvene from 6 to 8 of June 2017 in London.

Item 9: INF 6 (UIP) – Welding operations in accordance with 6.8.2.1.23.

30. There was in principle general support for the proposal by UIP, to clarify that the requirements of 6.8.2.1.23 were also applicable to repair shops undertaking welding. It is also confirmed that EN 12972 describes how to test tanks but not by whom.

31. The group discussed where this proposal would be best placed in the regulation. As the heading of 6.8.2.1 is “Construction” and not repair or modification it was suggested that 6.8.2.4.4 would be a suitable place as it was expected that those parties dealing with repair would look there first. Another option would be an amendment to 6.8.2.1.23 as proposed in INF 6. Finally it was considered that a foot note to 6.8.2.1.23, stating that *“in the case of a repair, alteration or modification of a tank the requirements applying to the manufacturer shall likewise apply to the maintenance or repair shop performing the welding”*, was also a promising option.

32. UIP was advised to develop the proposal further along this line and present this in an official document for a future session.

Item 10: INF 7 (United Kingdom) – Identification of the state in whose territory the type approval for a fixed tank (tank vehicle), demountable tank or battery vehicle was granted.

33. Several experts said that the country identification was already used in the number of the type approval of tanks in their country. Other experts said that it would not present a problem to introduce this but that a transitional measure was required for issued type approvals. Although no transitional measure was proposed it was decided to accept the wording on the condition that it should be kept in square brackets until a transitional measure is adopted. The UK agreed to prepare a working document with a transitional measure for next session.

Proposal 13: delete the dividing line of the second bullet point of 6.8.2.3.1 and amend the wording to read:

- [an approval number for the type which shall consist of the distinguishing sign used on vehicles in international road traffic (RID)⁹(ADR)⁸ of the State whose territory the approval was granted and a registration number;]

Item 11: INF 11 (Belgium) – Holding time – Information in the transport document.

34. The proposal was to extend the requirement for entering the actual holding time in the transport document for portable tanks carrying refrigerated liquefied gases.

35. It was questioned if this had additional value as 4.2.3.7.2 already required the actual holding time to be marked on the portable tank itself. Belgium was invited to reconsider the proposal and return with an official document if this is found necessary.

Item 12: INF 25 (United Kingdom) – Pressure test using another liquid or gas.

36. After a brief discussion the working group decided to defer consideration of the UK proposal until a separate standard for testing with a gas has been developed by the CEN working group. In the meantime the UK would prepare a working document on the fundamental principles for pressure testing using a gas.

Item 13: INF 27 (Germany) – Procedure for type approval of tanks

37. The document contained three questions concerning type approval of tanks.
38. Question 1 concerned the type approval of a so called family of tanks and which one to (proto) type test . It was answered that the worst case situation should be verified by calculation while the prototype test may be performed on a representative example.
39. Question 2 concerned the application of EN 12972 for type approval. It was answered that for tanks for the carriage of gases this was the case because of the reference in 1.8.7.8 but not for other tanks as the table of 6.8.2.6.2 only applies to testing. Reference to an updated version of EN 12972 should be taken into account. It may be used for type approval on a voluntary basis.
40. Question 3 dealt with the approval of service equipment as part of the tank approval. It was stated that test reports by other inspection bodies could be accepted for the approval of the tank. It was expected that the informal working group on inspection and certification of tanks would solve this problem in the near future.

Item 14: ECE/TRANS/WP.15/AC.1/144 Annex II – Proposals for amendments to RID/ADR/ADN.

41. Concerning the requirements in square brackets in Annex II of ECE/TRANS/WP.15/AC.1/144:

- the transitional measures 1.6.3.47 (page 15) and 1.6.4.49 (page 16) have been modified by proposal 3 of this report;
- regarding transitional measures in 1.6.3.48 and 1.6.4.50 it was agreed to use the wording suggested by the secretariat show in foot note 2 and 3 on page 16;
- for 6.8.2.2 (page 20) it was decided to put the requirement it in a new paragraph to be numbered 6.8.2.2.11 and remove the square brackets;
- 6.8.3.2.9 was modified by proposal 2 shown above;
- 6.8.3.2.6 and 6.10.3.8 (f) (page 21) the square brackets may be removed.

42. As a consequence of removing the square brackets in relation to the requirements for level gauges a transitional measure is needed for existing equipment to continue to be used.

Proposal 14: Introduce a new transitional measure in 1.6.3 and 1.6.4 to read:

1.6.3.x.x/1.6.4.x.x

Fixed tanks (tank-vehicles) and demountable tanks/tank-containers constructed before 1 July 2019 in accordance with the requirements in force up to 31 December 2018 but which however do not conform to the requirements of 6.8.2.2.11 applicable from 1 January 2019 may continue to be used.