

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

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Item 2 of the provisional agenda

Tanks

Tanks: Clarification of the requirements for non-destructive tests in RID/ADR 6.8.2.1.23

Transmitted by the Government of the United Kingdom

Summary

- Executive summary:** This paper makes proposals to clarify the non-destructive tests (NDT) applying to the assessment of tank welds made by manufacturers and maintenance or repair shops.
- Action to be taken:** Amend RID/ADR 6.8.2.1.23 to clarify the NDT methods applicable to manufacturers and maintenance or repair shops for the assessment of weld quality.

Introduction

1. RID/ADR 6.8.2.1.23 sets out the requirements for the execution and checking of tank welds. Other than the exception in footnote 7, this includes a requirement for only radiography (RT) or ultrasound (UT) non-destructive test methods to be used to confirm the quality of welds made by either a manufacturer or a maintenance or repair shop.
2. Prior to the 2019 edition of RID/ADR, 6.8.2.1.23 applied the weld requirements (including the non-destructive test provisions) only to the manufacturer and the structural welds of the tank. For the 2019 edition the requirements were extended to require maintenance or repair shops to have welding operations verified / confirmed and have a weld quality assurance system in place.
3. A consequence of the 2019 amendments was to inadvertently extend the requirement for RT and UT non-destructive test methods (applicable only to the tank manufacturer prior to 2019) to all welds, including minor repairs, that are made by maintenance or repair shops.
4. During preliminary discussions on this issue at the inter-sessional meetings of the "London" group in June and December 2020, it was agreed that the consequences of the amendment are not as intended. This paper therefore aims to take on board the comments and suggestions provided to make the intention of the 2019 amendment clear.

Proposal

5. (a) Move the last sentence of the first paragraph of 6.8.2.1.23 to the end of the second paragraph as follows (new text in **bold** and underlined, deleted text struck through):

~~“Non-destructive tests shall be carried out by radiography or by ultrasound⁷ and shall confirm that the quality of the welding is appropriate to the stresses.~~

The following checks shall be carried out for welds made by each welding process used by the manufacturer in accordance with the value of the coefficient λ used in determining the thickness of the shell in 6.8.2.1.17: **Non-destructive tests shall be carried out by radiography or by ultrasound⁷ and shall confirm that the quality of the welding is appropriate to the stresses.**

(b) Insert the following new paragraph immediately before the final paragraph of 6.8.2.1.23 and insert new text to clarify the final paragraph as follows (new text in **bold** and underlined):

“All welds made during repairs or alterations to a tank (including any service equipment) which require an exceptional inspection as set out in 6.8.2.4 or 6.8.3.4 shall be assessed as above or in accordance with the non-destructive tests specified in the relevant standard applicable to paragraph 6.8.2.1.23 as referenced in 6.8.2.6.2.

Where there are doubts regarding the quality of welds **made by a manufacturer or a maintenance or repair shop**, including the welds made to repair any defects revealed by the non-destructive checks, additional checks of the welds may be required.”

(c) Within the table of referenced standards in 6.8.2.6.2, insert “6.8.2.1.23” within the entries for the “Applicable sub-sections and paragraphs” of EN12972:2018 (new text in **bold** and underlined):

EN 12972:2018	Tanks for transport of dangerous goods – Testing, inspection and marking of metallic tanks	6.8.2.4 6.8.3.4 <u>6.8.2.1.23</u>	Mandatorily from 1 July 2021
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Justification

6. Under the general requirements specified for the construction of tanks, RID/ADR 6.8.2.1.6 requires the execution and checking of welds to comply with the requirements of 6.8.2.1.23. Prior to the 2019 edition of RID/ADR, 6.8.2.1.23 only applied to the manufacturer and the structural welds of the tank.

7. Amendments to RID/ADR 2019 are such that the requirement for only RT or UT methods of NDT to be used by manufacturers has been inadvertently applied to maintenance or repair shops. As currently drafted, RID/ADR 6.8.2.1.23 only allows the use of RT or UT methods of NDT for all welds made by manufacturers or maintenance or repair shops. Such a requirement is considered to be a disproportionate burden for the NDT of welds other than for the structural welds of the tank.

8. Referenced standard EN12972:2018 includes provisions that address the NDT requirements for exceptional inspections following repair or alteration of a tank, frame or service / structural equipment. Where deemed appropriate, the standard allows NDT methods other than RT or UT which for the non-structural welds of the tank would seem to be more proportionate.

9. These proposals therefore seek to clarify the NDT that should be applied during either the manufacture or the maintenance or repair of tanks. No changes are proposed to the requirements applicable to the NDT of structural welds made during manufacture, but the proposals seek to clarify the NDT requirements that must be applied to all other welds.

**Full text of 6.8.2.1.23 of RID/ADR 2021 including proposed amendments
(provided for information only)**

(new text in **bold** and underlined, deleted text struck through).

“Welding and inspection of welds

The inspection body performing inspections according to 6.8.2.4.1 or 6.8.2.4.4, shall verify and confirm the ability of the manufacturer or the maintenance or repair shop to perform welding operations and the operation of a weld quality assurance system. Welding shall be performed by qualified welders using a qualified welding process whose effectiveness (including any heat treatments required) has been demonstrated by tests. ~~Non-destructive tests shall be carried out by radiography or by ultrasound⁷ and shall confirm that the quality of the welding is appropriate to the stresses.~~

The following checks shall be carried out for welds made by each welding process used by the manufacturer in accordance with the value of the coefficient λ used in determining the thickness of the shell in 6.8.2.1.17: **Non-destructive tests shall be carried out by radiography or by ultrasound⁷ and shall confirm that the quality of the welding is appropriate to the stresses.**

$\lambda = 0.8$: All weld beads shall so far as possible be inspected visually on both faces and shall be subjected to non-destructive checks. The non-destructive checks shall include all weld “Tee” junctions, 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:

10% of the length of all the longitudinal welds;

10% of the length of all the circumferential welds;

10% of the length of all the circumferential welds in the tank ends, and

10% of the length of all the radial welds in the tank ends.

$\lambda = 0.9$: All weld beads shall so far as possible be inspected visually on both faces and shall be subjected to non-destructive checks. The non-destructive checks shall include all connections, all inserts used to avoid welds crossing, 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:

100% of the length of all the longitudinal welds;

25% of the length of all the circumferential welds;

25% of the length of all the circumferential welds in the tank ends, and

25% of the length of all the radial welds in the tank ends.

$\lambda = 1$: All weld beads throughout their length shall be subjected to non-destructive checks and shall so far as possible be inspected visually on both faces. A weld test-piece shall be taken.

In the cases of either $\lambda = 0.8$ or $\lambda = 0.9$, when the presence of an unacceptable defect is detected in a portion of a weld, the non-destructive checks shall be extended to a portion of equal length on both sides of the portion that contains the defect. If the non-destructive checks detect an additional defect that is unacceptable, non-destructive checks shall be extended to all remaining welds of the same type of welding process.

All welds made during repairs or alterations to a tank (including any service equipment) which require an exceptional inspection as set out in 6.8.2.4 or 6.8.3.4 shall be assessed as above or in accordance with the non-destructive tests specified in the relevant standard applicable to paragraph 6.8.2.1.23 as referenced in 6.8.2.6.2.

Where there are doubts regarding the quality of welds **made by a manufacturer or a maintenance or repair shop**, including the welds made to repair any defects revealed by the non-destructive checks, additional checks of the welds may be required.”