



Economic and Social Council

Distr.: General
7 July 2021
English
Original: French

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

Geneva, 21 September–1 October 2021

Item 3 of the provisional agenda

Standards

Information on the difficulties in applying a standard cited in Chapter 6.2

Transmitted by the Government of France*, **, ***

Summary

Executive summary:	This document provides the Joint Meeting with information on the difficulties in applying a mandatory standard referred to in Chapter 6.2.
Action to be taken:	Decisions on actions to be taken in conjunction with the Joint Meeting Working Group on Standards and the European Committee for Standardization (CEN).

Introduction

1. The French market surveillance authorities have taken action on several types of non-refillable metal pressure receptacles containing helium. As part of this market surveillance action, a number of non-conformities were identified and steps to ban placing them on the market were taken.
2. This market surveillance action has highlighted some difficulties in applying EN ISO 11118:2015 as referenced in 6.2.4 of RID/ADR. The application of this standard is mandatory for the issue of type approvals, until further notice, to meet the requirements of 6.2.3.1, 6.2.3.3 and 6.2.3.4.

* A/75/6 (Sect.20), para. 20.51.

** Circulated by the Intergovernmental Organisation for International Carriage by Rail (OTIF) under the symbol OTIF/RID/RC/2021/41.

*** This document was scheduled for publication after the standard publication date owing to circumstances beyond the submitter's control.



3. The present document aims to provide the Joint Meeting with an overview of these difficulties.

Materials

4. 6.2.1.2.2 of RID/ADR specifies: “Pressure receptacles and their closures shall be made of the materials specified in the design and construction technical standards and the applicable packing instruction for the substances intended for carriage in the pressure receptacle. The materials shall be resistant to brittle fracture and to stress corrosion cracking as indicated in the design and construction technical standards.”

EN ISO 11118 states in 5.1.6: “All materials shall be suitable for use at the minimum service temperature or -20 °C, whichever is lower.”

This standard does not set any criteria for assessing the resistance of the material to brittle fracture.

When these materials are used with a small thickness, the risk of brittle fracture is much lower. This could be developed and clarified in the standard. Moreover, when the material is too thin to perform impact bending tests, a fracture mechanics analysis could be used to justify the choice of material.

It might be appropriate to require that materials be chosen according to standards that provide sufficient guarantees of resilience.

Manufacturing quality

5. Article 8.2 (c) of EN ISO 11118 states that, “after completion of all welded/brazed joints, the weld shall not have concavity, weld under-cutting, or abrupt weld irregularity nor have any cracks or other defects”.

EN ISO 11118 does not set criteria for the acceptance levels of defects and does not refer to any other standard (e.g. EN ISO 5817, “Welding – Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) – Quality levels for imperfections”).

Therefore, it is not possible to evaluate defects in welded/brazed joints. Acceptable defects are not defined.

Qualification of welders

6. 8.1.1.2.2.1 of EN ISO 11118 states: “(a) All welding operators and welding procedures shall be approved by meeting the requirements of 8.1.1.2.2 through 8.1.1.2.2.9 or those given in ISO 9606-1, ISO 15613, and ISO 15614-1.”

However:

– EN ISO 11118 does not specify the examinations and tests required for the qualification of welding procedures in cases where EN ISO 15613 or 15614-1 are not implemented.

– EN ISO 11118 only defines the welder qualification tests as follows:

“8.1.1.2.2.8 Welder qualification tests

- a) For longitudinal welds:
 - 1) Bend test, root of weld;
 - 2) Weld tensile test.
- b) For circumferential welds:
 - 1) Macro test;
 - 2) Weld tensile test.
- c) For threaded connections to cylinder ends: macro tests, 180° apart.
- d) For welded attachments, foot rings, collars, or lugs: macro test.

- e) For fillet welds: macro tests, 180° apart.”

The requirements are significantly different between EN ISO 11118 and ISO 9606–1.

Extract from ISO 9606–1:

Table 13 – Test methods

Test method	Butt weld (in plate or pipe)	Fillet weld and branch joint
Visual testing according to ISO 17637	Mandatory	Mandatory
Radiographic testing according to ISO 17636	Mandatory a, b, c	Not mandatory
Bend test according to ISO 5173	Mandatory a, b, d	Not applicable
Fracture test according to ISO 9017	Mandatory a, b, d	Mandatory e, f
<p>a Either radiographic testing or bend or fracture tests shall be used.</p> <p>b When radiographic testing is used, then additional bend or fracture tests are mandatory for welding processes 131, 135, 138 and 311.</p> <p>c The radiographic testing may be replaced by ultrasonic testing according to ISO 17640^[19] for thicknesses ≥ 8 mm on ferritic steels only. In this case, the additional tests mentioned in footnote b are not required.</p> <p>d For outside pipe diameters $D \leq 25$ mm, the bend or fracture tests may be replaced by a notched tensile test of the complete test piece (an example is given in figure 9).</p> <p>e The fracture tests may be replaced by a macroscopic examination, performed according to ISO 17639,^[18] of at least two sections, at least one of which shall be taken from the stop/start location.</p> <p>f The fracture tests on pipes may be replaced by radiographic testing.</p>		

Ambiguities exist between the application of EN ISO 11118 and ISO 15614-1/ISO 9606-1:

EN ISO 11118 states:

“The welding procedure and operator qualifications shall include, as a minimum, welds representative of those made in production representing the variables in the materials and the process. (8.1.1.2.1). [...] Welding operators and welding procedures shall pass the approval tests for the specific type of work and the procedure specification concerned (8.1.1.2.2.1 d).”

However, ISO 15614-1 and ISO 9606-1 are not as precise for welding procedure qualifications or welder qualifications.

The test pieces can qualify different types of production welding by virtue of the scope of validity of these standards.

The requirements of EN ISO 11118 should be complementary to those set out in ISO 9606–1, ISO 15613 and ISO 15614–1.

Thickness measurements

7. EN ISO 11118 does not require verification of the minimum thickness during the mass production of cylinders.

However, RID/ADR 6.2.1.5.1 (b) requires that the minimum thickness of the pressure receptacles be verified on an adequate sample of pressure receptacles (test batch) during the initial inspection and test.

The application of the standard presumes there is compliance with the requirements of 6.2.3.1, 6.2.3.3 and 6.2.3.4 of RID/ADR.

Reference	Title of document	Applicable subsections and paragraphs	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
<i>For design and construction</i>				
EN ISO 11118:2015	Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods	6.2.3.1, 6.2.3.3 and 6.2.3.4	Until further notice	

6.2.3.4.1 of RID/ADR states: “New pressure receptacles shall be subjected to testing and inspection during and after manufacture in accordance with the requirements of 6.2.1.5.”

The application of EN ISO 11118 therefore does not meet this requirement of RID/ADR.

Pressure device

8. 6.2.1.3.4 of RID/ADR states: “Individual pressure receptacles shall be equipped with pressure relief devices as specified in P200 [...]”.

EN ISO 11118 states in 8.1.3: “Where a pressure device is an integral part of the cylinder, the manufacturer of the cylinder shall size the pressure relief device to have sufficient relieving capacity to prevent the rupture.”

Where a pressure device is a bursting disc, it is assumed to have been tested according to annex A, A.4 “Prototype tests of pierceable metal sealing membranes”:

“The membrane shall pass when it does not become detached from the cylinder and

- (a) where the membrane acts as a pressure relief device, it releases the contents at a pressure in excess of the test pressure without the cylinder rupturing, or
- (b) where the membrane acts simply as sealing device, the cylinder ruptures at a pressure exceeding 1.6 times the test pressure.”

Problem: as a general rule, it is found that the inspection bodies consider this annex to be “not applicable”.

Indeed, annex A deals with “Non-refillable sealing devices – Specifications and prototype testing.”

For example, in the case of helium cylinders, the device that prevents refilling is the valve, not the bursting disc. However, the bursting disc must meet the requirements of clause 8.1.3 of the standard, i.e. have sufficient guaranteed characteristics to prevent cylinder rupture.

Paragraph A.4.3 a) should not appear in annex A for non-refillable sealing devices.

Proposal

9. We invite the participants of the Joint Meeting to submit their comments on these various points in order to request their possible addition to the agenda of the technical committee for standardization concerned.