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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**

Bern, 15–19 March 2021

Item 2 of the provisional agenda

Tanks**Inclusion of provisions for the carriage of molten aluminium
of UN number 3257****Transmitted by the Government of Germany^{*}, ^{**}, ^{***}***Summary*

- Executive summary:** Molten aluminium of UN number 3257 is carried in bulk in accordance with special provision VC 3. According to VC 3, the competent authority of the country of origin lays down the corresponding conditions of carriage. The aim of the proposal is to establish uniform minimum requirements for carriage.
- Action to be taken:** Include supplementary provisions for the carriage of molten aluminium of UN number 3257 in bulk – include a new AP 11 in RID/ADR 7.3.3.2.7.
- Related documents:** OTIF/RID/RC/2018-B (ECE/TRANS/WP.15/AC.1/152), VIII. Accidents and risk management (agenda item 7) A. Accident involving molten aluminium
Informal document INF.5 (Germany) Joint Meeting September 2018.

^{*} 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/2021/1.

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

Introduction

1. In informal document INF.5 of the September 2018 session of the Joint Meeting, Germany provided information about an accident involving the carriage of molten aluminium in vats. The vehicle concerned had been approved abroad and did not have the protective devices on the top of the vat that are required in Germany. There was leakage of the product as the result of a ventilation valve being broken off. If there is leakage of product in accidents, such accidents are characterised by significant material damage (e.g. reconstruction of the road surface).
2. In Germany, large quantities of molten aluminium of UN number 3257 are carried in accordance with the national provisions. The molten aluminium is carried in special vats with a fireproof cladding. At the Joint Meeting in September 2018, it was established that the national and international carriage of molten aluminium also takes place in other countries under similar conditions.
3. As accidents during the carriage of molten aluminium can cause a significant amount of material damage, Germany is of the view that uniform minimum requirements for uniform safety levels for carriage in bulk should be included in RID/ADR.
4. At the present, molten aluminium of UN number 3257, Class 9, is carried in accordance with RID/ADR 7.3.3.1, special provision VC 3, under the national conditions laid down by the country of origin. Germany proposes to broaden the additional provisions for goods of Class 9 in RID/ADR 7.3.3.2.7 by including an AP 11, which should specify appropriate minimum requirements for molten aluminium.
5. In the discussion, it should also be checked whether a transitional measure is required for existing wagons/vehicles or containers.

Proposal

In column (17) of Table A in Chapter 3.2, insert the alphanumeric code “**AP11**” for UN 3257 ELEVATED TEMPERATURE LIQUID, N.O.S.

Insert the following additional provision AP 11 in RID/ADR 7.3.3.2.7 “Goods of Class 9”:

AP 11 Wagons or large containers/vehicles or containers for the carriage of molten aluminium of UN number 3257 in accordance with 7.3.3, special provision VC 3, shall meet the following requirements.

1. Scope

Molten aluminium of UN number 3257 may be carried in bulk in specially equipped wagons or large containers/vehicles or containers, provided the following conditions are met.
2. General requirements for the means of containment and their load securing.
 - 2.1 The means of containment for the molten aluminium (vats with fireproof cladding) shall either be insulated so as not to exceed a surface temperature of 130 °C during carriage or shall be so positioned that the means of containment cannot be touched. The surface temperature shall in no case have a detrimental effect on the functioning of the wagon/vehicle, particularly the brake pipes and electric cables.
 - 2.2 The vats shall be secured on the wagon/vehicle in accordance with the load security principles of RID/ADR 7.5.7.1.
 - 2.3 It is not necessary to affix marks to the vats in accordance with RID/ADR Chapter 5.3 if such marks have already been affixed to the wagon/vehicle.
3. Fire and explosion protection

The risk of fire as a result of thermal influence of the molten aluminium on the vat, the wagon/vehicle or load security aids, and the risk of an explosion resulting from

e.g. escaping vapours or chemical reaction of gases that have evolved, shall be prevented (e.g. by using inert gases).

4. Construction of vats

Vats shall be made of steel. Vats shall be designed and manufactured for a test pressure of 4 bar in accordance with the applicable version of standard EN 13445. In the course of construction, the manufacturer shall specify the weld seams that are subject to the highest stresses. The hydrostatic pressure and surge effect of the molten aluminium shall be taken into account when deciding the dimensions of the vats and their attachment to the wagon/vehicle. In so doing, the stresses described in RID 6.8.2.1.2 and the forces described in ADR 6.8.2.1.2 shall be taken as the basis.

The vat closures shall also be designed in accordance with the technical code and shall be designed so as to remain leakproof if a full vat (lateral position and top of the vat) overturns.

The filling and emptying openings shall be protected by their construction, e.g. by collars, deflectors, cages or equivalent constructions (see examples in the annex). The protective device on the top of the vat shall be designed so as to withstand a horizontal static load on the x-y plane (in the direction of travel x and at right angles to the direction of travel y) equal to twice the maximum permissible mass of the vat (2 g). These horizontal forces shall be passed through the top part of the vat – bottom part of the vat flange connection to the fastening devices; they shall also be taken into account for the calculation of the flange.

5. Testing and inspection of vats

The tests described in 5.1 to 5.5 shall be carried out by an inspection body in accordance with the applicable guidelines and requirements of standard EN 12972:2018. Appropriate test reports on the results of the tests performed shall be issued.

5.1 Design type test of vats

The construction design and workmanship shall be tested as part of a design type test procedure to ensure that the vats comply with the construction requirements of standard EN 13445. The weld seams subject to the highest stresses shall be identified in the design type test report.

5.2 Initial test and inspection

Vats shall be tested and inspected before they are placed in service.

The test shall at least include:

- (a) A check to ensure that the vat is in line with the construction documents,
- (b) A design inspection,
- (c) An examination of the external condition,
- (d) Hydraulic pressure test at a test pressure of 400 kPa (4 bar); at this stage, the vats shall not have a fireproof cladding,
- (e) An examination of the internal condition (visual inspection of the internal metal surface of the vat before the fireproof cladding is fitted and visual inspection of the fireproof cladding),
- (f) A check of satisfactory operation of the equipment.

The hydraulic pressure test can also be carried out with a replacement seal.

5.3 Intermediate test and inspection of vats

No later than every six years after the initial test and inspection (5.2) and after every periodic inspection (5.4), vats shall undergo an intermediate inspection.

The intermediate inspection shall at least include:

- (a) An examination of the documents,
- (b) An examination of the external condition, including the integrity of the flange and cover connections,
- (c) Measurement of the wall thickness to check the required minimum wall thickness,
- (d) Non-destructive testing of all weld seams that are subject to the highest stresses,
- (e) An examination of the internal condition (visual inspection of the fireproof cladding) by an expert under the responsibility of the operator.

These intermediate inspections may be performed within three months before or after the specified date.

5.4 Periodic test and inspection of vats

Each time the fireproof cladding is renewed, or at the latest twelve years after the initial or most recent periodic inspection, a periodic inspection shall be carried out.

The periodic inspection shall at least include:

- (a) An examination of the documents,
- (b) An examination of the external condition, including the integrity of the flange and cover connections,
- (c) An examination of the internal condition (visual inspection of the internal metal surface of the vat before the fireproof cladding is fitted and visual inspection of the fireproof cladding),
- (d) Non-destructive testing of all weld seams that are subject to the highest stresses,
- (e) Measurement of the wall thickness to check the required minimum wall thickness,
- (f) Hydraulic pressure test at a test pressure of 400 kPa (4 bar),
- (g) Inspection of the service equipment.

The hydraulic pressure test can also be carried out with a replacement seal.

5.5 Exceptional test and inspection of vats

When the safety of the vat or of its equipment may have been impaired as a result of repairs, alterations or accident, an exceptional check shall be carried out. If the exceptional check fulfilling the requirements of 5.4 has been performed, then the exceptional check may be considered to be a periodic inspection. If an exceptional check fulfilling the requirements of 5.3 has been performed, then the exceptional check may be considered to be an intermediate inspection. The inspection body shall decide the scope of the exceptional check.

6. Marking of vats

Apart from the approval number, external design pressure and calculation pressure, vats shall be marked with a vat plate by analogy with RID/ADR 6.8.2.5.1. For the tests and inspections in accordance with 5.2 and 5.4, the marking shall be followed by "P".

7. Keeping files on the vats

The operator shall keep a copy of the design type test report, the results of the initial tests and inspections and all subsequent tests and inspections in the vat file.

8. Vehicles for the carriage of vats

The following additional requirements apply to vehicles for carriage by road:

- (a) Vehicles used for carriage shall be fitted with a vehicle stability function approved in accordance with UN Regulation No. 13 (Uniform provisions

concerning the approval of vehicles of categories M, N and O with regard to braking).

- (b) Vats shall be attached to wagons/vehicles so as to avoid detrimental effects on the functioning of e.g. the brake pipes and electric cables.
- (c) Vats shall be positioned on the wagons/vehicles in such a way that the discharge openings face or are opposite to the direction of travel.

9. Vehicle driver requirements

In addition to the basic course in accordance with ADR 8.2.1.2, for the carriage of molten aluminium in vats, drivers shall either be in possession of a training certificate for the special tank course according to ADR 8.2.1.3 or shall receive supplementary instruction from a competent person.

These shall include the following main points:

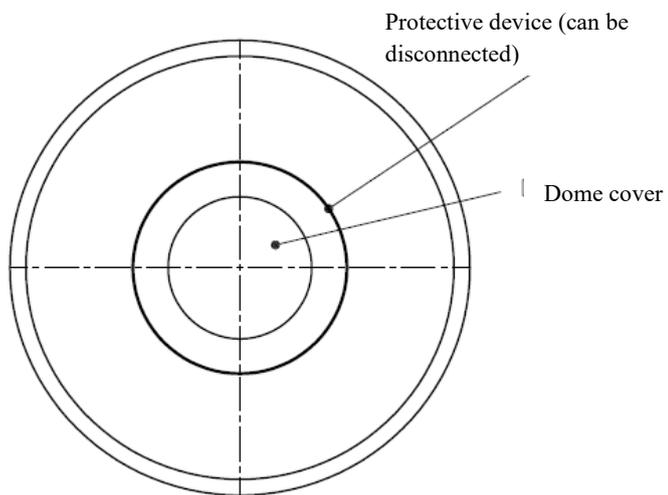
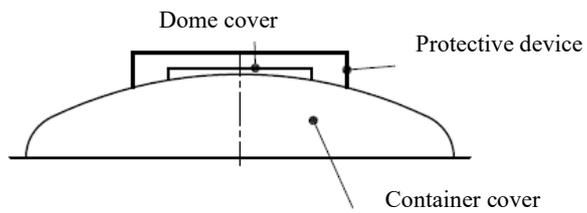
- The particular handling behaviour of vehicles carrying vats,
- General driving physics (driving stability/overtaking behaviour, particularly centre of gravity height, surge effects),
- Limits of electronic stability control and
- Special measures to be taken in the event of an accident.

The carrier shall document this instruction in writing or electronically, giving the date, duration and main topics covered.

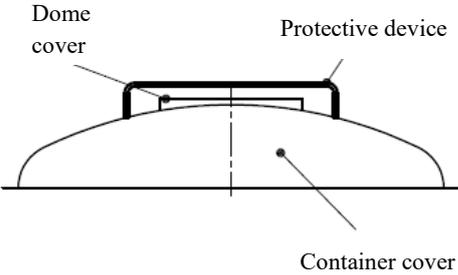
Annex

Protective devices

“Collar type” protective device



“Deflector type” protective device



“Cage type” protective device

