

OTIF/RID/CE/GTP/2023/5

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RID: 16th Session of the RID Committee of Experts' standing working group
(London, 20 to 23 November 2023)

Subject: Inclusion of provisions for the carriage of molten aluminium of UN number
3257

Joint proposal transmitted by Germany and the Secretariat

SUMMARY

Explanatory summary: Provisions for the carriage of molten aluminium have been adopted for the 2025 edition of ADR. In order to be complete, these provisions should also be included in RID.

Decision to be taken: Include an additional provision AP 11 in RID.

Related documents: Report ECE/TRANS/WP.15/AC.1/152, section VIII. Accidents and risk management (agenda item 7) Accident involving molten aluminium
Informal document INF.5 (Germany) from the Joint Meeting in September 2018
ECE/TRANS/WP.15/AC.1/2021/1
Informal document INF.41 (Germany) from the Joint Meeting in March 2021 and
Informal document INF.27 (Germany) from the Joint Meeting in September 2022
ECE/TRANS/WP.15/AC.1/2023/14
Report of WP.15 on its 113th session
ECE/TRANS/WP.15/262, paragraph 18

Introduction

1. At the RID/ADR/ADN Joint Meeting (Berne, 20 – 24 March 2023), the provisions for the carriage of molten aluminium drafted by an informal working group were adopted. As proposed by the informal working group, the Joint Meeting decided to adopt these new provisions for ADR only, subject to a final decision by the Working Party on the Transport of Dangerous Goods (WP.15) (see report ECE/TRANS/WP.15/AC.1/168, paragraph 46).
2. As far as the Secretariat is aware, molten aluminium is currently only carried by road because the window of time between filling the vats and delivering them to the processing industry is very limited due to the cooling of the aluminium. However, there may be cases where carriage by rail is also considered, particularly in order to reduce CO₂ emissions. Molten metals are already carried short distances by rail.
3. Molten aluminium assigned to UN No. 3257 in Class 9 is currently carried in accordance with RID/ADR 7.3.3.1, special provision VC 3, under the conditions laid down by the competent authority of the country of origin. The aim of the informal Joint Meeting working group was to replace the very different national conditions with uniform minimum requirements for carriage.
4. In order not to have to resort to the national conditions of the countries of origin when carrying molten aluminium by rail, Germany and the Secretariat propose that the provisions adopted for ADR at the 113th session of WP.15 (Geneva, 15 – 17 May 2023) should also be included in RID, provided they are also relevant to rail transport. The text adopted for ADR is reproduced below, with the adaptations necessary for RID highlighted in bold.

Proposals

Chapter 1.6

1.6.1 Add the following transitional measure:

"1.6.1.54 Vats for the carriage of molten aluminium of UN No. 3257 which have been constructed and approved before 1 July 2025 in accordance with the provisions of national law but which do not, however, conform to the construction and approval requirements of AP 11 in 7.3.3.2.7 applicable as from 1 January 2025 may continue to be used with the approval of the competent authorities in the countries of use.*

Chapter 3.2

Table A In column (17), for the first entry of UN No. 3257, add:

"AP11".

Chapter 7.3

7.3.3.2.7 Add the following new alphanumerical code AP11:

"AP 11 In accordance with VC 3 in 7.3.3.1, for the purpose of carriage in bulk of molten aluminium, "standards specified by the competent authority of the country of origin" means that the following requirements shall be met.

1. General requirements

1.1 *Vat* means a containment intended for the carriage of molten aluminium of UN No. 3257, including its shell, refractory lining and service and structural equipment.

1.2 Vats shall be insulated so as not to exceed a surface temperature of 130 °C during carriage and shall be so positioned that the means of containment cannot be touched by other ~~road users~~ **persons** under normal conditions of carriage. The surface temperature shall in no case have a detrimental effect on the functioning of the ~~vehicle wagon, particularly the brake pipes and electric cables.~~

1.3 The vats shall be secured on the ~~vehicle wagon~~ in accordance with the load security principles of 7.5.7.1.

1.4 Vats need not be affixed with placards and markings in accordance with chapter 5.3 if these placards and markings have been affixed to the ~~vehicle wagon.~~

2. Fire and explosion protection

The risk of fire by the thermal influence of the molten aluminium on the vat, the ~~vehicle wagon~~ or load security aids, and the risk of explosion resulting from escaping vapours or chemical reaction of gases that have evolved, shall be prevented (e.g. by using inert gases).

3. 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 EN 13445-3:2014. 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 ~~vehicle wagon~~. The forces in 6.8.2.1.2 shall be taken into account.

The vat closures shall be designed in accordance with EN 13445-3:2014 and shall remain leakproof if a vat with contents (lateral position and top of the vat) overturns.

The filling and discharge openings shall be protected by the construction of the vat, e.g. by collars, deflectors, cages or equivalent constructions.

The protective device on the top of the vat shall be designed so as to withstand, without permanent deformation, a static load, applied vertically on the filling cover, equal to twice the maximum permissible mass of the vat (2g).

The refractory lining shall be suitable to withstand the contents and it shall be suitable as insulation material.

The refractory lining shall be so designed that its leakproofness remains intact, whatever the deformation liable to occur in normal conditions of carriage (see 6.8.2.1.2).

The inspection body performing inspections in accordance with 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 work on the sheet metal jacket, in particular on load-bearing parts, may only be carried out by approved welding companies.

Seals on vat covers and closures shall be selected and applied so that they prevent molten aluminium from flowing out if a full vat overturns.

4. Inspection and tests of vats

The inspections and tests described in 4.1 to 4.5 shall be carried out by an inspection body approved by the competent authority. The inspections and tests shall be carried out in accordance with the applicable requirements of EN 12972:2018. Test reports on the results of the tests performed shall be issued.

4.1 Type examination of vats

The construction design and workmanship shall be tested as part of a type examination procedure to ensure that the vats comply with the construction requirements of EN 13445-3:2014. The weld seams subject to the highest stresses shall be identified in the type examination report.

4.2 Initial 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 type examination documents,
- (b) A check of conformity to the type,
- (c) An examination of the external condition,
- (d) A hydraulic pressure test at a test pressure of 4 bar; at this stage, the vats shall not have a refractory lining,
- (e) An examination of the internal condition (visual inspection of the internal metal surface of the vat before the refractory lining is fitted and visual inspection of the refractory lining),
- (f) A check of satisfactory operation of the equipment.

The hydraulic pressure test can also be carried out with an alternative seal.

4.3 Intermediate inspection

Vats shall undergo an intermediate inspection no later than six years after the initial inspection and each periodic 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 weld seams that are subject to the highest stresses by magnetic particle testing, penetration testing, ultrasonic testing or radiographic testing,
- (e) An examination of the internal condition (visual inspection of the refractory lining) by an expert under the responsibility of the operator,
- (f) A check of satisfactory operation of the equipment.

These intermediate inspections may be performed within three months before the specified date, without any influence on the time frame of other inspections according to 4.3 and 4.4.

4.4 Periodic inspection

Each time the refractory lining is renewed, or no later than 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 refractory lining is fitted and visual inspection of the refractory lining),
- (d) Non-destructive testing of all weld seams that are subject to the highest stresses shall be carried out by magnetic particle testing, penetration testing, ultrasonic testing or radiographic testing,
- (e) Measurement of the wall thickness to check the required minimum wall thickness,
- (f) Hydraulic pressure test at a test pressure of 4 bar, at this stage, the vats shall not have a refractory lining,

(g) A check of satisfactory operation of the equipment.

The hydraulic pressure test can also be carried out with an alternative seal.

4.5 Exceptional 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 inspection shall be carried out on the parts affected by the repairs or alterations. If the exceptional inspection fulfilling the requirements of 4.4 has been performed, then the exceptional inspection may be considered to be a periodic inspection. If an exceptional inspection fulfilling the requirements of 4.3 has been performed, then the exceptional inspection may be considered to be an intermediate inspection. The inspection body shall decide the detailed scope of the exceptional inspection, taking into account EN 12972:2018, Table A1.

5. Marking of vats

Vats shall be marked with a plate by analogy with 6.8.2.5.1, except the approval number and external design pressure. For the tests and inspections in accordance with 4.2 and 4.4, the marking shall be followed by "P". For the tests and inspections in accordance with 4.3, the marking shall be followed by "L".

6. Requirements for operation

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

Every renewal and repair of the refractory lining shall be recorded by the operator or manufacturer.

Seals shall be checked with each filling and renewed if necessary.

~~7. Vehicles~~

~~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. 13⁴.~~

~~(b) Vats shall be positioned on the vehicles in such a way that the discharge openings face or are opposite to the direction of travel.~~

~~8. Training of driver~~

~~In addition to the basic course in accordance with 8.2.1.2, drivers shall receive supplementary instruction from a competent person about the detailed risk of the carriage of molten aluminium in vats.~~

~~These shall include the following main points:~~

~~(a) The particular handling behaviour of vehicles carrying vats,~~

~~(b) General driving physics (driving stability/overtuning behaviour, particularly centre of gravity height, surge effects),~~

~~(c) Limits of electronic stability control and~~

~~(d) 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.~~

~~¹UN Regulation No. 13 (Uniform provisions concerning the approval of vehicles of categories M, N and O with regards to braking)."~~
