OTIF

ORGANISATION INTERGOUVERNEMENTALE POUR LES TRANSPORTS INTERNATIONAUX FERROVIAIRES

ZWISCHENSTAATLICHE ORGANISATION FÜR DEN INTERNATIONALEN EISENBAHNVERKEHR

INTERGOVERNMENTAL ORGANISATION FOR INTERNATIONAL CARRIAGE BY RAIL

INF. 10

12 February 2015

Original: English

RID/ADR/ADN

Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods (Bern, 23-27 March 2015)

Agenda item 5 (a): Proposals for amendments to RID/ADR/ADN – Pending issues

Requirements to be met by fixed special receptacles and special containers for the carriage of heat energy without loading and unloading the heat storage medium

Transmitted by Germany

Preliminary remarks

1. In connection with the European energy strategy, a market for the carriage of heat energy in special vehicles or containers from a source of heat to a heat consumption point has developed in Germany (and possibly also in other countries). At the last Joint Meeting (Geneva, 15-19 September 2014), Germany submitted informal document INF.7 in order to define the conditions for such carriage.

2. The representative of Germany was asked to submit a formal proposal to the next meeting, including all the comments made during the meeting or submitted by November 2014 (see also paragraph 49 of report ECE/TRANS/WP.15/AC.1/136).

3. Germany has received proposals for amendments from the United Kingdom; these proposals have been largely incorporated into this revised proposal (amendments are underlined).

4. In addition, the question of whether other nitrates might also be used as a storage medium was raised by the UK. According to the information available to Germany, no other nitrates than those mentioned in the proposal are concerned.

5. No additional comments were submitted.

Background

6. Such transport operations involve the carriage of fixed special receptacles or special containers where, at a heat source (e.g. a power station or an industrial plant with residual heat discharge), a heat storage medium in the receptacle or container is heated up and the heat is extracted from the storage medium again at the destination (the heat consumption point, e.g. a swimming pool, a plant nursery or a school) after the transport operation. The storage medium remains in the receptacle or container throughout the entire process.

7. During heating and cooling down, the storage medium may change its physical state from solid to liquid and vice versa.

8. The sector concerned is currently testing

   - storage mediums which, even at ambient temperature, have to be classified as dangerous goods (e.g. UN 1487 potassium nitrate and sodium nitrite mixture, Class 5.1, packing group II or UN 1477 nitrates, inorganic, n.o.s. (lithium nitrate, potassium nitrate), Class 5.1, packing group III)
   - and mediums which only become dangerous goods due to their high temperature.

   However, substances of packing group I and ammonium nitrates and ammonium nitrites are excluded due to their high risk potential.

9. Among the substances currently carried under elevated temperatures in accordance with UN number 3257 are molten metals, bitumen or wax and in accordance with UN number 3258 steel coils from rolling mills. In the case of these substances and articles, however, the objective is to carry the substances at a temperature range advantageous to their subsequent use and not primarily to carry heat as energy in a storage medium. This is why these transport operations are not directly comparable to the heat energy transport operations in question – only the risk due to the high temperatures make them comparable.

10. In RID/ADR, defined temperatures are assigned to the two UN numbers 3257 and 3258, and it is recommended also to apply these temperature limits when assigning possible new substances and substance mixtures which are to be used as carrier mediums for heat energy transport operations. The lower limit for liquid substances is 100 °C and for solid substances 240 °C.

11. It is also possible that transport operations will be carried out with heat storage mediums that are carried heated to above their flash-point, thus requiring a classification under UN 3256. In this case too, the specified threshold values should remain unchanged.

12. The requirements to be met by these transport operations are to be laid down in the following new special provision XYZ in Chapter 3.3. Moreover, the new special provision is to be assigned to the relevant UN numbers of the substances to be employed as heat storage mediums in column 6 of Table A of Chapter 3.2.

Proposal 1

13. Assign the new special provision XYZ to the following UN numbers in column 6 of Table A of Chapter 3.2:

    UN 1477, UN 1487, UN 3256, UN 3257 and UN 3258.

Proposal 2

14. Insert a new special provision XYZ in chapter 3.3 RID/ADR

"**XYZ** The carriage of heat storage mediums in mobile heat storage systems employing liquid substances at or above 100 °C and solid substances at or above 240 °C and liquid substances with a flash point above 60 °C at or above their flash point shall only be subject to the following provisions:

(1) The carriage shall be effected in fixed special receptacles (special wagons/special vehicles) or special containers that meet the requirements specified by the competent authority of the country of manufacture. If the country of manufacture is not an RID Contracting State/Contracting Party to ADR, the requirements laid down by the competent authority of the country of manufacture may be recognized by the competent authority of the first RID Contracting State/Contracting Party to ADR reached by the consignment provided that these requirements have been laid down in accordance with the minimum requirements below.

(2) The heat storage mediums:
– shall not be loaded and unloaded during operation;
– may change physical state between solid and liquid.

(3) The following minimum requirements shall be met:

(a) The general requirements regarding the construction of tanks in accordance with 6.8.2.1.2, 6.8.2.1.6, 6.8.2.1.7 (if applicable), 6.8.2.1.8 to 6.8.2.1.12, 6.8.2.1.23 to 6.8.2.1.26 and 6.8.2.1.28 shall be complied with for all special receptacles and containers, and suitable technical documentation shall be prepared for manufacturing that shall contain the documentation specified in paragraph 1.8.7.7.1, if appropriate.

(b) The maximum degree of filling shall be defined in such a way that, at the highest temperature of the heat storage medium, a space of at least 5 % remains empty in the special receptacle or container.

(c) The pressure conditions in the special receptacle or container with a view to potential over- or underpressure as a result of thermal expansion or shrinkage shall be taken into consideration in the construction of the special receptacle or container and its testing.

(d) (RID:) (Reserved)

(ADR:) At a degree of filling of more than 20 % and less than 80 %, for liquid or molten substances with a kinematic viscosity at the temperature of filling of less than 2,680 mm²/s measures to prevent surges shall be provided for as in the case of tanks with a capacity of more than 7500 l per tank compartment in accordance with 6.8.2.1.22.

(e) The temperature on the outside of the special receptacle or container shall not exceed 70 °C during the transport operation.

(f) The items of equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during carriage or handling. They shall exhibit a suitable degree of safety comparable to that of the shell.

(g) (RID:) (Reserved)

(ADR:) Independent of the containments used, the requirements to be met by the vehicle shall, depending on the UN number assigned to the heat storage medium, conform to the codes laid down in column 14 of Table A in Chapter 3.2.

(h) The special receptacles and containers shall be subjected to tests, inspections and checks in accordance with (i), (j) and (k) carried out by the expert approved by the competent authority. Certificates shall be issued showing the results of these operations, even in the case of negative results. Certificates shall be retained by the operator.

(i) The initial inspection shall include:

- a check of conformity with the requirements of the country of manufacture and the design documents;
- a check of the design characteristics;
- an examination of the internal and external conditions, if appropriate,
- a visual check of the welds;
- a pressure test, if appropriate;
- a leakproofness test and a check of satisfactory operation of the equipment;
- a check of the marking of the metal plate (see also paragraph (l)).

(j) The periodic test and inspection after five years at the latest shall include:

- an examination of the internal and external conditions, if appropriate,
- a visual check of the welds;
- a pressure test, if appropriate;
- a leakproofness test and a check of satisfactory operation of the equipment.

(k) The intermediate inspections after two and a half years at the latest shall include:

- an external visual check;
- a leakproofness test and a check of satisfactory operation of the equipment.

(l) The special receptacles and containers shall be permanently fitted with a metal plate providing at least the following particulars:

- manufacturer's name or mark;
- mass of the heat storage medium in kg;
- gross mass in kg;
- test and working pressure in MPa or bar;
- maximum working temperature;
- date of the next inspection.

(m) The marking of the special wagon/vehicle/container shall be in accordance with Chapter 5.3.

(n) The above-mentioned requirements shall apply irrespective of a possible temporary change of the physical state solid/liquid of the heat storage medium to the outgoing and return transport operation.

(o) A clearly visible gauge for the temperature of the heat storage medium shall be fitted to the outside of the special receptacle or container.

(p) Documents in connection with the transport operation or the metal plate in accordance with (l) shall include the following information:

"CARRIAGE IN ACCORDANCE WITH SPECIAL PROVISION XYZ OF RID/ADR".

(q) (RID:) (Reserved)

(ADR:) (WP.15 shall decide on the necessity of driver training.)

The other provisions of RID/ADR shall not apply."