



Recognized technical code
(Anerkanntes Technisches Regelwerk, ATR)
for the construction, equipment, testing, approval, mark-
ing and use of salvage pressure receptacles
(ATR D 1 / 16)

Based on section 8 no. 10 of the Ordinance on the Transport of Dangerous Goods by Road, Rail and Inland Waterways (GGVSEB) of 30 March 2015 (Federal Law Gazette I, p. 366), the BAM Federal Institute for Materials Research and Testing in agreement with the Federal Ministry of Transport and Digital Infrastructure promulgates, in accordance with section 6.2.5 of ADR and RID¹, the recognized technical code for the construction, equipment, testing, approval, marking and use of salvage pressure receptacles (ATR D 1/16) as set out below.

The Federal Institute for Materials Research and Testing promulgates the present ATR in agreement with the Federal Ministry of Transport and Digital Infrastructure also based on section 12 paragraph 1 no. 8 of the Transport of Dangerous Goods by Sea Ordinance in the version promulgated on 9 February 2016 (Federal Law Gazette I, p. 182) in conjunction with section 6.2.3 of the IMDG Code².

The present code may be applied from the date of its publication in the Federal Ministry of Transport Gazette until it is revoked. The Federal Ministry of Transport and Digital Infrastructure will submit this Code to the competent OTIF and UNECE³ Secretariats in accordance with section 6.2.5 of ADR/RID.

The present ATR may be applied to the approval of salvage pressure receptacles for carriage by rail, road, inland waterways and sea. The present ATR shall not apply to transport by air.

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- 1 RID = Regulations governing the International Carriage of Dangerous Goods by Rail
ADR = European Agreement concerning the International Carriage of Dangerous Goods by Road
 - 2 IMDG Code = International Maritime Dangerous Goods Code
 - 3 OTIF = Intergovernmental Organisation for International Carriage by Rail (Bern)
UNECE = United Nations Economic Commission for Europe (Geneva)

1. Introduction

- 1.1 With documents ST/SG/AC.10/C.3/2009/9 and ST/SG/AC.10/C.3/2009/16/Rev.1, Germany together with the United Kingdom proposed to the UN Committee of Experts for the Transport of Dangerous Goods (UN SubCom ETDG) that salvage pressure receptacles be included in the UN Model Regulations as a special type of containment for specific purposes and that general requirements be laid down.
- 1.2 Based on the above-mentioned documents, at its session in July 2010, the UN Sub-Committee of Experts on the Transport of Dangerous Goods adopted a compromise proposal that was elaborated by an informal working group which met in parallel (see also report in document ST/SG/AC.10/74 and -74/Add.1). After the confirmation of the adopted text by the UN Sub-Com TDG at its session in December 2010, the relevant definition and provisions (sub-section 6.2.3.11) were included in the 17th revised edition of the UN Model Regulations in 2011. They were incorporated into the 2013 edition of ADR/RID and into the IMDG Code incorporating Amdt. 37-2014.
- 1.3 Thus, the definitions and general requirements are laid down in the UN Model Regulations and in the above mode-specific codes. The UN SubCom ETDG is of the opinion that the different possible designs of salvage pressure receptacles cannot be standardized. Moreover, no internationally agreed technical code is to be expected in the foreseeable future. This is why the approval is to be carried out on the basis of nationally recognized codes in accordance with 6.2.3 of the IMDG Code and/or section 6.2.5 in conjunction with sub-section 6.2.3.11 of ADR/RID.
- 1.4 With document ST/SC/AC.10/C.3/2014/16, Germany proposed amending the definition; this is why the UN Model Regulations in the 19th revised edition (2015) permit a maximum water capacity of 3 000 litres for recovering pressure receptacles with a capacity of not more than 1 000 litres. In accordance with ADR/RID 2017 and the IMDG Code incorporating Amdt. 38-2016, these amended requirements are to be applied. The implementation

of these requirements is effected with the present ATR, which will replace ATR D1/10 as from 1 January 2017.

2. Scope of application

2.1 The present recognized technical code may be applied to the approval and use of salvage pressure receptacles for carriage by rail, road, inland waterways in accordance with section 6.2.5 of ADR/RID/ADN and sea in accordance with 6.2.3 of the IMDG Code. The present ATR shall not apply to transport by air.

2.2 Salvage pressure receptacles in accordance with the present ATR shall be constructed, equipped, tested, marked, approved, placed on the market and used for transport in accordance with the Ordinance on portable pressure equipment (Ortsbewegliche-Druckgeräte-Verordnung) of 29 November 2011 (Federal Law Gazette I, p. 2349) as amended by Article 491 of the Ordinance of 31 August 2015 (Federal Law Gazette I, p. 1474) in conjunction with section 6.2.5 and sub-section 6.2.3.11 of ADR/RID. If an approval for carriage by sea has been granted, it is based on 6.2.3 of the IMDG Code. In this case, the pertinent requirements of the IMDG Code and the Ordinance on the Transport of Dangerous Goods by Sea shall additionally be considered.

Note: The use of salvage pressure receptacles in accordance with the present ATR for emergency transport in accordance with sub-section 1.1.3.1 (d) and (e) of ADR/RID is left to the discretion of the responsible person.

3. Specifications for the materials, design, manufacture and testing of salvage pressure receptacles

3.1 Definitions

For the purposes of the present ATR, the definitions and characters (symbols) of section 3 of DIN EN 14208:2004 "Transportable gas cylinders - Specification for welded pressure drums up to 1000 litre capacity for the transport of gases - Design and construction" as well as the following definitions shall apply:

Salvage pressure receptacle

A steel pressure receptacle specially constructed, equipped, tested, marked and approved for *non-conforming pressure receptacles*, with a *nominal water capacity* of not more than 3 000 litres and openings of a suitable size to pack, close and safely carry a *non-conforming pressure receptacle* of a water capacity not exceeding 1 000 litres or several *non-conforming pressure receptacles* of a smaller capacity up to a total water capacity not exceeding 1 000 litres.

Note 1: Besides the non-conforming pressure receptacle proper to be packaged, the salvage pressure receptacle may also contain the equipment of the non-conforming pressure receptacle as well as other articles necessary for safe carriage. This includes for example devices which serve to prevent skidding of the packaged non-conforming pressure receptacle and to protect it against impact.

Note 2: Small tanks with an individual water capacity not exceeding 1 000 litres may also be packed into a salvage pressure receptacle.

Interior installations

The articles or equipment installed or placed in the salvage pressure receptacle, e.g. drilling device(s), holder(s), means for cushioning and securing the non-conforming pressure receptacles.

Nominal water capacity

The geometric volume determined for example by volumetric measurement of the salvage pressure receptacle taking into account the interior installations.

Pressure volume product

The product of the nominal water capacity (volume) and the test pressure of the salvage pressure receptacle.

Non-conforming pressure receptacle

A pressure receptacle whose conformity, e.g. due to an accident, damage or incorrect handling, is no longer given, or justifiably questionable, or cannot be verified on site and cannot, or only by unreasonable efforts, be restored on site.

3.2 General requirements

Salvage pressure receptacles shall comply with the general requirements of sections 6.2.1, 6.2.3 and 6.2.5 of ADR/RID or, in the case of an approval for carriage by sea, of 6.2.1 and 6.2.3 of the IMDG Code as regards construction, equipment, testing, marking, approval and use as well as the requirements of standard EN 14208:2004, unless the present ATR provides otherwise.

Salvage pressure receptacles may have special construction features required for its intended use and may be equipped with interior installations, e.g. flat heads, quick opening devices, openings in the cylindrical area, devices for drilling the salvaged pressure receptacles.

Manufacturers and subsequent distributors of salvage pressure receptacles shall provide information regarding procedures to be followed and a description of the types and dimensions of the means of closure (including required gaskets) and of any other components needed to ensure that packages as presented for carriage are capable of passing the applicable performance tests in accordance with the present ATR.

Manufacturers and operators of salvage pressure receptacles shall ensure that the personnel involved in packing and closing the receptacles has received comprehensive training in accordance with sections 1.3.1 to 1.3.3 of ADR/RID and the IMDG Code.

3.3 Restriction of use

Salvage pressure receptacles may be approved and used for non-conforming pressure receptacles containing gases compressed, liquefied or dissolved under pressure but not for pressure receptacles or receptacles containing refrigerated liquefied gases (closed or open cryogenic receptacles).

Salvage pressure receptacles shall only be approved and used for non-conforming pressure receptacles containing acetylene or chemically unstable gases if it has been established by tests that a possible chemical reaction resulting in a build-up of excessive pressure within the salvage pressure receptacle does not destroy the receptacle or affect its leakproofness so that even after such a reaction safe carriage to the destination is possible. Such tests shall be documented in detail indicating the test setup, test procedure and test results. The gases or gas mixtures and their quantities for which such tests have been carried out successfully shall be indicated in the type approval certificate of the salvage pressure receptacle.

3.4 Material requirements

In addition to the provisions of sub-section 6.2.5.1 of ADR/RID or 6.2.3.1 of the IMDG Code, the requirements and specifications in section 4 of EN 14208:2004 shall be complied with. Alternatively, for constructions without welds, steels may be used which meet the specifications of EN 10216 for "Seamless steel tubes for pressure purposes - Technical delivery conditions" (Part 1:2004 to Part 2:2004). Materials for salvage pressure receptacles which are to be approved for non-conforming pressure receptacles containing acetylene or chemically unstable gases shall also meet the requirements for heat resistant materials in accordance with EN 10028-3:2009 "Flat products made of steels for pressure purposes - Part 3: Weldable fine grain steels, normalized" or EN 10216-2:2007 "Seamless steel tubes for pressure

purposes - Technical delivery conditions - Part 2: Non alloy and alloy steel tubes with specified elevated temperature properties”.

3.5 Design of salvage pressure receptacles

Unless provided otherwise in the following, the specifications concerning the design of pressure drums in accordance with EN 14208:2004 shall be complied with.

- 3.5.1 For the design of the salvage pressure receptacle, the operating states and load limits shall be considered; this applies in particular to the components which load changes due to interior pressure may directly or indirectly impinge on (e.g. walls in the cylindrical section, heads, connecting elements) if they are made of different materials, are subject to different levels of pre-stress or if handling during assembly or closure may result in deformation (plastification of materials).
- 3.5.2 At test pressure, the stress in the material shall not exceed 77 % of the minimum guaranteed yield stress (R_e) at any point of the salvage pressure receptacle including load-sharing mountings.
- 3.5.3 If e.g. improper handling may cause premature deformation (plastification), it shall be established for components which, as a result, may be subject to additional compressive loads that 77 % of the minimum guaranteed yield stress is not exceeded at test pressure; such components shall be designed for resistance to short-time load cycles. Components with deformations (plastification) shall not be used.
- 3.5.4 By derogation from sub-section 5.4.6.1 of EN 14208:2004, salvage pressure receptacles may have openings at their ends of more than 0.5 D_o . The openings shall be compensated and their closure (closure head) shall be protected against damage or displacement e.g. when being put on or lifted. For the design of the closure head system, the requirements of EN 13445-3:2002 (Unfired pressure vessels – part 3: Design) shall be considered.
- 3.5.5 By derogation from sub-section 5.4.1 of EN 14208:2004, connection apertures for fittings shall be permitted in the cylindrical area. They shall be de-

signed for the specific intended use of the salvage pressure receptacle and fitted with devices for protection against damage, e.g. being wrenched off.

3.5.6 In accordance with the requirements of packing instruction P 200 in chapter 4.1 of ADR/RID and the IMDG Code, the salvage pressure receptacles may be fitted with a pressure controlled pressure relief device (PRD) designed for the specific intended use. The pressure threshold for triggering the relief (triggering pressure) shall be above the maximum gas pressure developing at 65 °C and in the case of gases compressed or liquefied under pressure shall be not less than the test pressure. Neither the upper triggering pressure nor – in the case of closing valves – the blow-down pressure shall exceed 120 % of the test pressure. The minimum volume flow to be ensured during pressure relief shall be designed for the gas type and shall be such that bursting of the salvage pressure receptacle is safely prevented if non-conforming pressure receptacles are placed in the salvage pressure receptacle.

3.5.7 Salvage pressure receptacles shall be fitted with attachments which allow lifting the receptacles from above and/or below (e.g. by a crane or materials handling vehicle). These attachments – also together with stiffening elements fitted to the receptacle – shall be able to bear without deformation at least 1.5 times the permissible maximum weight of the salvage pressure receptacle and shall not affect the leakproofness and function of the salvage receptacle and its closures.

3.6 Manufacture

3.6.1 The applicable requirements and specifications of EN 14208:2004, sections 7 (Welding procedures), 8 (Manufacture), 9 (Welded joints), 10 (Surface finish of material), 11 (Assembly), 13 (Check of thickness, out of roundness and straightness) shall be complied with.

3.6.2 For welded salvage pressure receptacles, the normative references in section 2 of EN 14208:2004 shall apply additionally insofar as they are applicable to the respective design.

3.6.3 For non-welded constructions, the relevant references in the respective applicable parts of EN 10216 shall be considered.

3.6.4 The minimum wall thickness shall be calculated in accordance with EN 14208:2004, specified in the drawing and, by derogation from sub-section 13.1 of the standard, checked for every salvage pressure receptacle by means of ultrasonic testing in accordance with EN 1714:2002.

3.7 Testing and examination

The specifications of section 14 of EN 14208:2004 shall apply. If salvage pressure receptacles are manufactured as individual items or in small numbers, destructive tests (e.g. burst test, load cycle test) may be waived with the agreement of the notified body in accordance with ODV. In this case, it shall be established by calculation that the salvage pressure receptacle is capable of withstanding the burst pressure and the minimum number of load cycles of 12 000 to test pressure. For this purpose, the elongation on which the calculation is based shall be verified at the most severely stressed points by means of a pressure test to test pressure.

4. Marking

4.1 Salvage pressure receptacles shall be marked in accordance with Chapter 6.2 of ADR/RID and the IMDG-Code in conjunction with EN ISO 13769:2003 + A 1:2005 and in accordance with ODV. For the marking in accordance with 6.2.3.9.1 in conjunction with 6.2.2.7.1 (b), instead of the marking of the standard the present ATR shall be marked as follows: "ATR D 1/16". Moreover, every salvage pressure receptacle shall be marked with the word „Salvage“ according to 5.2.1.3 of ADR/RID/IMDG Code; the words "salvage pressure receptacle" or "Bergungsdruckgefäß" may be applied additionally.

4.2 If the present ATR allows alternative arrangements, certain marks may be omitted (e.g. identification of the cylinder thread). Unless they contradict the applied marks, the marks in accordance with section 16 of EN 14208:2004 shall be applied in addition.

- 4.3 The gases or gas groups which non-conforming pressure are permitted to contain shall be indicated in the approval certificate. In the case of salvage pressure receptacles in which non-conforming pressure receptacles containing acetylene or unstable gases may be packed, these gases and the respective maximum quantity allowed shall be indicated.
- 4.4 The particulars in accordance with 4.3 above shall be marked on the salvage pressure receptacle. The operator shall ensure that this information is available where and when the packaging is effected.
- 4.5 The marking shall be applied in such a way that it is visible during packaging of non-conforming pressure receptacles also when the head of the salvage pressure receptacle is open or has been taken off.
- 4.6 Heads which may be taken off for the purposes of packing or unpacking shall additionally be marked in such a way that they are unambiguously assigned to the salvage pressure receptacle and their intended position for re-attachment is clearly identifiable.
- 4.7 The permitted sling gear of the lifting attachments shall be clearly marked. Any restrictions as regards lifting (e.g. do not lift by crane) shall be indicated.

5. Documentation

- 5.1 In addition to the provisions of ADR/RID and the IMDG Code, the requirements in section 17 of EN 14208:2004 shall be complied with.
- 5.2 A copy of the type approval certificate shall be available during carriage of the salvage pressure receptacles. If this copy is not present on the salvage pressure receptacle or fitted to it in a protected container, the operator shall ensure that it is available on site for any use in accordance with the present ATR.

6. Periodic tests and inspections and exceptional checks

Salvage pressure receptacles shall be subjected to periodic tests and inspections and exceptional checks in accordance with ADR/RID and the IMDG Code in conjunction with the present ATR. The inspection period shall be the respective shortest inspection period applicable for the gases which, being contained in non-conforming pressure receptacles, may be packed in the salvage pressure receptacle.

7. Provisions concerning use

- 7.1 Non-conforming pressure receptacles containing compressed gases shall only be packed and carried in salvage pressure receptacles if the pressure volume product of the salvage pressure receptacle is at least 1.2 times the pressure volume product of the non-conforming pressure receptacle(s) to be packed.

Note: As guide value, the capacity displaced by a closed pressure receptacle made of steel can be assumed to be approx. 120 % of the respective water capacity. This value, however, depends on the material and design. Pressure receptacles made of aluminium or composites in most cases displace more capacity.

- 7.2 Non-conforming pressure receptacles containing gases liquefied under pressure shall only be packed and carried in salvage pressure receptacles if the test pressure of the salvage pressure receptacle is not lower than the test pressure stipulated for the respective gas in packing instruction P 200 in chapter 4.1 of ADR/RID and the IMDG Code.
- 7.3 Salvage pressure receptacles shall only be used for non-conforming pressure receptacles which contain gases and for the carriage of which no pressure-relief device is permitted if the pressure volume product of the salvage pressure receptacle is at least 2.2 times the pressure volume product of the non-conforming pressure receptacle(s) to be packed. This shall also apply if

the pressure-relief devices of the packed non-conforming pressure receptacle have been demounted or sealed.

- 7.4 More than one non-conforming pressure receptacle shall only be packed in the same salvage pressure receptacle if the contents of the pressure receptacles are known and their marking concerning contents is fully legible. In case the non-conforming pressure receptacles contain different gases, they shall only be packed in the same salvage pressure receptacle if the gases cannot react dangerously with each other in the event of leakage.
- 7.5 If removable interior installations are used e.g. for cushioning or securing the non-conforming pressure receptacles, the material of these installations shall neither react with the gas nor absorb it. The volume of the material introduced into the receptacle shall be estimated and deducted from the nominal water capacity or the pressure volume product.
- 7.6 If, in addition, inert gas is to be introduced or if chemically unstable gases are liable to react, the quantity of relevant inert or reaction gases and the possibly developing pressure shall be considered in selecting the appropriate salvage pressure receptacle.
- 7.7 Salvage pressure receptacles containing non-conforming pressure receptacles which are filled with chemically unstable gas in a porous mass should be carried individually in a vehicle/wagon by road or rail in order to prevent the possible heat generation within the salvage pressure receptacle from having adverse effects on the surroundings. For carriage by inland waterways or sea, stowage at a sufficient distance from other goods as well as in an adequately ventilated and exposed position shall be ensured.
- 7.8 Before packing, the salvage pressure receptacles shall be inspected for internal or external damage and internal contamination and shall be cleaned, if necessary.

8. Provisions concerning use and carriage

- 8.1 Salvage pressure receptacles shall only be used for pressure receptacles whose contents are unknown if the contained gas is assigned to UN No. 3305 N.O.S. for compressed gas, or to UN No. 3309 N.O.S. for gas liquefied under pressure, and the salvage pressure receptacles is approved and may be used for these gases.
- 8.2 Non-conforming pressure receptacles containing gases assigned to UN Nos. 3305, 3309, or other UN Nos. which are N.O.S. entries may only be packed into a salvage pressure receptacle individually.
- 8.3 The operator shall ensure that
- a) empty salvage pressure receptacles are protected against corrosion and other impacts which might affect their safety;
 - b) salvage pressure receptacles are inspected for damage, corrosion and dirt or moisture and cleaned, if necessary, after every use; the results of the inspection as well as evidence of possible hydrogen embrittlement shall be considered, documented and, at the latest at the next periodic inspection, assessed in consultation with the notified body;
 - c) salvage pressure receptacles are subjected to an exceptional check without delay if, after the failure of a non-conforming pressure receptacle packed and carried therein, material or structural defects cannot be ruled out (e.g. in the case of visible internal damage to the salvage pressure receptacle and its interior installations);
 - d) in the event that the pressure-relief device is triggered or gas is leaking from the closed salvage pressure receptacle, inspections are carried out immediately to identify the cause and, in the case of malfunction, the affected components including gaskets, if necessary, are replaced;
 - e) after the replacement of components in accordance with (d), the salvage pressure receptacle is checked for gas-tightness at test pressure;
 - f) the salvage pressure receptacle is subjected to an exceptional check in the event that the triggering in accordance with (d) was caused by excessive internal pressure above the test pressure or there is other evidence for inadmissible internal pressure;

- g) the condition and functioning of the valves and other installations, such as drilling devices, threads of flange screws, are checked after each use; screws may only be replaced by similar or equivalent screws.

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The present ATR consists of 14 pages.