



**Recognized technical code
(Anerkanntes Technisches Regelwerk, ATR)**

**for the construction, equipment, test, approval, marking and use of seamless
sample pressure receptacles made of metallic materials
as transportable pressure equipment**

(ATR D 1/11)

Based on Section 8 No 10 of the Ordinance on the Transport of Dangerous Goods by Road, Rail and Inland Waterways (GGVSEB) of 17 June 2009 (Federal Law Gazette I p. 1389) as amended by the Ordinance of 4 March 2011 (Federal Law Gazette I p. 347), the Federal Institute for Materials Research and Testing (BAM) in agreement with the Federal Ministry of Transport, Building and Urban Development promulgates, in accordance with section 6.2.5 of RID and ADR¹, the recognized technical code for the construction, equipment, test, approval, marking and use of seamless sample pressure receptacles (ATR D 1/11) as set out below.

The Federal Institute for Materials Research and Testing promulgates this ATR also based on Section 6 paragraph 5 of the Transport of Dangerous Goods by Sea Ordinance in the version promulgated on 22 February 2010 (Federal Law Gazette I, p. 238) as amended by Article 2 of the Ordinance of 3 August 2010 (Federal Law Gazette I, p. 1139) in conjunction with sub-section 6.2.3.1 of the IMDG Code².

The present code may be applied from the date of its publication in the Federal Ministry of Transport Gazette. The Federal Ministry of Transport, Building and Urban Development will submit this code to the competent OTIF and UNECE³ Secretariats in accordance with section 6.2.5 of RID/ADR.

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

1. Introduction

- 1.1 The reason for the elaboration of the present recognized technical code is the application of a manufacturer of specifically designed pressure receptacles that are used as sample pressure receptacles e.g. for the exploration of petroleum or natural gas. The samples have to be carried to specialized laboratories for analysis and these transport operations fall within the scope of dangerous goods legislation.

For the purpose described above, the specific pressure receptacles must be corro-

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 (OTIF) Bern
United Nations Economic Commission for Europe (Geneva)

sion resistant to the fluids to be expected, able to withstand very high pressures, and easily usable under practical conditions.

- 1.2 In order to meet these requirements, alternative metallic materials of high tensile strength are to be used which do not meet the definition of "steel", e.g. titanium. Moreover, it is to be permissible to construct the sample pressure receptacles without bottle-like tapering (i.e. with flat ends).
- 1.3 For the construction, testing and approval, a recognized standard for pressure receptacles should be used, if possible. With a view to the international use and the application also for materials of high tensile strength, standard ISO 9809-2:2000 was selected for this purpose: "Gas cylinders - Refillable seamless steel gas cylinders - Design, construction and testing; Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1100 MPa".

Permissible deviations from standard ISO 9809-2:2000 are determined below under no. 3. Wherever this is possible, reference is made to other internationally recognized standards.

2 Scope

- 2.1 The present ATR may be applied to the approval and use of seamless sample pressure receptacles of an alternative design for carriage by rail, road, inland waterways and sea. This ATR shall not apply to transport by air.
- 2.2 Seamless sample pressure receptacles under this 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 - OrtsDruckV - Article 1 of the Ordinance of 17 December 2004 (Federal Law Gazette I, p. 3711) as amended by Article 3 of the 5th Ordinance of 3 August 2010 (Federal Law Gazette I, p. 1389) amending ordinances on the transport of dangerous goods in conjunction with section 6.2.5 of RID/ADR as well as section 6.2.3 of the IMDG Code.
- 2.3 For conformity assessment, the procedure under section 1.8.7 and paragraph 6.2.3.6.1 of ADR/RID in the version applicable as of 1 July 2011 shall be applied.

3 Specification for the materials, design, manufacture and testing of seamless sample pressure receptacles

3.1 Definitions

- 3.1.1 Within the framework of the present Code, the definitions and characters (symbols) of sections 3 and 4 of EN 9809-2:2000 shall apply.
- 3.1.2 By derogation from standard ISO 9809-2, the tensile strength may be lower than 1,100 N/mm².
- 3.1.3 Therefore, in the application of the present recognized technical code, the term "high tensile strength" used in this ATR does not automatically mean that the tensile strength is greater than 1,100 N/mm².

3.2 General requirements

- 3.2.1 Seamless sample pressure receptacles of an alternative design made of alternative materials shall comply with the general requirements in sections 6.2.1, 6.2.3 and 6.2.5 of RID/ADR or 6.2.1 and 6.2.3 of the IMDG Code as well as the specifications of standard ISO 9809-2:2000 "Gas cylinders - Refillable seamless steel gas cylinders - Design, construction and testing; Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1100 MPa" as regards construction, equipment, testing, marking, approval and use, unless deviations are explicitly permitted in the present ATR.

Note: The scope of the standard mentioned above is hereby extended to allow for wall thicknesses of the sample pressure receptacles which are greater than those determined in part 1 of the standard.

- 3.2.2 Seamless sample pressure receptacles of an alternative design may have special construction features required for its intended use, such as flat ends, and may be made of materials which do not meet the definition of "steel" (e.g. titanium).

3.3 Material requirements

- 3.3.1 Materials which do not meet the categories a) to c) defined in sub-section 6.1.1 of standard ISO 9809-2:2000 may be used if the material is resistant to ageing and corrosion resistant for the intended application. This shall be proven within the framework of a corrosion technical expert opinion by a testing agency of type Xa by applying recognized methods. If sufficient literature values are available, technical tests may be omitted.

Note: For adequate possibilities, see sub-section 6.1.4 of standard ISO 9809-1:1999.

- 3.3.2 Any necessary thermal treatment shall be considered when drawing up the corrosion technical expert opinion. Furthermore, the possible effects of a wall thickness greater than that specified in the scope of standard ISO 9809-2:2000 shall be evaluated within the framework of the expert opinion.

3.4 Design of the seamless sample pressure receptacles

- 3.4.1 The specifications in section 7 of standard ISO 9809-2:2000 shall apply, unless otherwise stipulated in the following.
- 3.4.2 The notes in section 7.3 shall not be applied in order to allow for a greater wall thickness of the receptacles as described above under no. 3.2.
- 3.4.3 Forms of ends which deviate from the regular shape of cylinders shall be proved by calculation in accordance with recognized standards and codes for the design of pressure receptacles. Where possible and applicable, standard EN 13445, as amended, shall be applied in this framework. If standard EN 13445 is partly not applicable or cannot be fully met, or if its application yields results which are not adequate with a view to safety, specification sheet AD 2000-B8 as published by the Arbeitsgemeinschaft Druckbehälter (pressure vessels working group) may be applied instead of the standard.

Note: The specification sheet AD 2008-B8 can be obtained from Beuth Verlag, Berlin.

3.5 Manufacture

The specifications in section 8 of standard ISO 9809-2:2000 shall apply, unless otherwise stipulated in the following. In addition to the methods described in section 8.1 of standard ISO 9809-2:2000, the vessel may be manufactured by deformation machining of rods or tubes.

3.6 Type approval procedure

3.6.1 The provisions of RID/ADR as well as the specifications in section 7 of standard ISO 9809-2:2000 shall apply, unless otherwise stipulated in the following.

3.6.2 The verification of hardness/tensile correlation required in accordance with sub-section 9.2.3 of standard ISO 9809-2:2000 shall only be required if there is such a correlation for the used material and if a respective recommendation is given in the expert opinion stipulated under no. 3.3 of the present ATR.

Note: This test is not stipulated in standard ISO 9809-1:1999.

3.6.3 The flawed cylinder burst test required in accordance with sub-section 9.2.5 of standard ISO 9809-2:2000 shall also be carried out in the case that the tensile strength is lower than 1,100 N/mm².

Note: The test is not stipulated in standard ISO 9809-1:1999; it shall, however, be carried out for sample pressure receptacles, and, for materials of lower tensile strength, it provides a more solid verification basis than is prescribed in standard ISO 9809-1:1999.

On request of the manufacturer, a receptacle from the cycle test may be used for verification. In this case, the test may be repeated with a new receptacle if the receptacle develops a leak before having withstood the required burst pressure or the required number of cycles. In the case of failure by burst, the test shall be considered as "failed".

3.6.4 The flawed cylinder cycle test required in accordance with sub-section 9.2.6 of standard ISO 9809-2:2000 shall only be required if the tensile strength exceeds 1,100 N/mm² or the expert opinion required under no. 3.3 of the present ATR contains such a requirement.

Note: This test is not stipulated in standard ISO 9809-1:1999.

4 Marking

The seamless sample pressure receptacles of an alternative design shall be marked in accordance with the provisions in chapter 6.2 of RID/ADR/ADN. Instead of the standard, the following shall be indicated: "ATR D 1/11".

5 Periodic test and inspection and exceptional checks

- 5.1 Seamless sample pressure receptacles of an alternative design in accordance with the present ATR shall be subjected to the regular periodic tests and inspections and exceptional checks in accordance with RID/ADR. The test period stipulated in packing provision P 200 in chapter 4.1 for steel pressure receptacles shall apply.
- 5.2. The extension of the intervals between inspections in accordance with packing provision P 200 (10) v, or (12), shall, however, not be permitted.

Berlin, 7th October 2011

BAM FEDERAL INSTITUTE FOR MATERIALS RESEARCH AND TESTING

Department 3
Containment Systems for Dangerous Goods

Working Group 3.24
Pressure Equipment – Pressure Receptacles
and Fuel Gas Storage Systems

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Direktor und Professor

Dr.-Ing. Georg W. Mair
Regierungsdirektor

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