



Secretariat

Distr.
GENERAL

ST/SG/AC.10/C.3/1999/35
21 April 1999

Original: ENGLISH

COMMITTEE OF EXPERTS ON THE
TRANSPORT OF DANGEROUS GOODS

Sub-Committee of Experts on the
Transport of Dangerous Goods
(Sixteenth session,
Geneva, 5-16 July 1999,
agenda item 2 (a))

DEVELOPMENT OF PROVISIONS FOR THE TRANSPORT OF GASES

Gas cylinders and other gas receptacles

Development of provisions for the transport of gases and gas cylinders

Transmitted by the Expert from Canada

The expert from Canada welcomes the introduction of agenda item 2(a) (ST/SG/AC.10/C.3/31) regarding the development of provisions for the transport of gases and gas cylinders and would like to highlight some information for the use of the Committee.

Although regulations are in place in many countries, paragraph 6.2.1 of Chapter 6.2, "Requirements for the Construction and Testing of Receptacles for Gases", of the *Recommendations on the Transport of Dangerous Goods Model Regulations* is currently reserved.

Work begun on the requirements for the design and construction of multiple-element gas containers (MEGCs) was carried over from the last biennium, recognising that each "element" is comprised of a gas cylinder or gas receptacle, and ISO work on standards for gas cylinders had not yet been completed (ST/SG/AC.10/C.3/30, paragraphs 15 to 18).

Experts familiar with the ISO work and representing manufacturers, inspectors, users, and regulators of the gas cylinder industry should be welcomed to participate in the working group being convened for the development of the provisions for the transport of gas cylinders in the *Recommendations on the Transport of Dangerous Goods Model Regulations*.

Experts from many countries, including Canada, have been involved in ISO's work on the standardisation of gas cylinder requirements. There are 23 participating countries and 37 observer countries on ISO Technical Committee 58, Gas Cylinders (ISO/TC 58).

It is recommended that, where ISO standards exist pertaining to a specific requirement with respect to gas cylinders, these technical International Standards should be considered first for reference by the *Recommendations on the Transport of Dangerous Goods Model Regulations* in the development of paragraph 6.2.1.

Background

The following background information is provided regarding the ISO work on gas cylinders.

1. Under ISO/TC58, numerous International Standards have now been published with respect to technical requirements for gas cylinders. These standards include requirements for the design, construction, testing, operation, and fittings of gas cylinders. (See annex 1)
2. Under ISO/TC58, numerous draft documents pertaining to technical requirements for gas cylinders are near publication as International Standards. These documents address requirements for the design, construction, testing, operation, and fittings of gas cylinders. (See annex 2)

Three notable draft standards, 9809-1 and 9809-2 pertaining to the construction of seamless steel cylinders and 7866 pertaining to the construction of seamless aluminum cylinders, are approaching the final stages for publication.

3. Under ISO/TC58, a document entitled ISO/CD 14600, "Basic Rules for an International Quality Acceptance System for ISO Gas Cylinders", is being developed to accompany the technical construction standards. This document addresses the inspection, quality assurance, and certification requirements for the manufacture of gas cylinders.

Once published, this standard will provide a framework for the harmonisation of inspection and quality assurance requirements and a basis for the worldwide recognition of cylinders manufactured in accordance with these ISO Standards.

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ANNEX 1**STANDARDS AND TECHNICAL REPORTS PUBLISHED****ISO/TC58 *Gas cylinders***

ISO 32:1977	Gas cylinders for medical use – Marking for identification
ISO 3500:1990	Seamless steel CO ₂ cylinders for fixed fire-fighting installations on ships
ISO 3807:1977	Dissolved acetylene cylinders – Basic requirements
ISO 7225:1994	Precautionary labels for gas cylinders (corrected and reprinted 1995)
ISO 10286:1996	Gas cylinders – Terminology
ISO 11114-1:1997	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic materials
ISO 11114-3:1997	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 3: Autogenous ignition test in oxygen atmosphere

ISO/TC58/SC2 *Gas cylinders – Cylinder fittings*

ISO 407:1991	Small medical gas cylinders – Pin-index yoke-type valve connections
ISO 5145:1990	Cylinder valve outlets for gases and gas mixtures – Selection and dimensioning
ISO/TR 7470:1988	Valve outlets for gas cylinders – List of provisions which are either standardized or in use
ISO 10156:1996	Gases and gas mixtures – Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets
ISO 10298:1995	Determination of toxicity of a gas or gas mixture
ISO 10920:1997	Transportable gas cylinders – 25E taper thread for connection of valves – Specification
ISO 11116-1:1999	Gas cylinders – 17E taper thread for connection of valves to gas cylinders – Part 1: Specifications
ISO 11116-2:1999	Gas cylinders – 17E taper thread for connection of valves to gas cylinders – Part 2: Inspection gauges
ISO 11117:1998	Gas cylinders – Valve protection caps and valve guards for industrial and medical gas cylinders – Design, construction, and tests
ISO 11191:1997	Gas cylinders – 25E taper thread for connection of valves to gas cylinders – Inspection gauges
ISO 13338:1995	Determination of tissue corrosiveness of a gas or gas mixture
ISO 13341:1997	Transportable gas cylinders – Fitting of valves to gas cylinders

ISO/TC58/SC3 *Gas cylinders – Cylinder design*

ISO 4705:1983	Refillable seamless steel gas cylinders
ISO 4706:1989	Refillable welded steel gas cylinders
ISO 11120:1999	Gas cylinders- Refillable seamless steel gas cylinders, capacity between 150 L and 3000 L – Design and testing
ISO/TR 13763:1994	Safety and performance criteria for seamless gas cylinders

ISO/TC58/SC4 *Gas cylinders – Operational requirements for gas cylinders*

ISO 6406:1992	Periodic inspection and testing of seamless steel gas cylinders
ISO 10460:1993	Welded carbon steel gas cylinders – Periodic inspection and testing
ISO 10461:1993	Seamless aluminum-alloy gas cylinders – Periodic inspection and testing
ISO 10462:1994	Cylinders for dissolved acetylene – Periodic inspection and maintenance (corrected and reprinted 1995)
ISO 10463:1993	Cylinders for permanent gases – Inspection at time of filling
ISO 11113:1995	Cylinders for liquefied gases (excluding acetylene and LPG) – Inspection at time of filling
ISO 11372:1995	Cylinders for dissolved acetylene – Inspection at time of filling
ISO 11621:1997	Gas cylinders – Procedures for change of gas service
ISO 11625:1998	Gas cylinders – Safe handling
ISO 11755:1996	Cylinders in bundles for permanent and liquefiable gases (excluding acetylene) – Inspection at time of filling
ISO 13770:1997	Aluminum alloy gas cylinders – Operational requirements for avoidance of neck and shoulder cracks

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ANNEX 2**DRAFT DOCUMENTS****ISO/TC58 *Gas cylinders***

ISO/DIS 3807-1	Dissolved acetylene cylinders – Basic requirements – Part 1: Cylinders without fusible plugs
ISO/DIS 3807-2	Dissolved acetylene cylinders – Basic requirements – Part 2: Cylinders with fusible plugs
ISO/DIS 11114-2	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 2: Non-metallic materials
ISO/AWI 11114-4	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 4: Test methods for selecting metallic materials resistant to hydrogen embrittlement
ISO/CD 14600	Transportable gas cylinders – International quality assurance system

ISO/TC58/SC2 *Gas cylinders – Cylinder fittings*

ISO/FDIS 10297	Gas cylinder valves – Specifications and type testing (all gases except LPG)
ISO/CD 10692-1	Connections for gas cylinder valves for ultra-high integrity service – Part 1: Outlet connections
ISO/DIS 10692-2	Connections for gas cylinder valves for ultra-high integrity service – Part 2: Inlet connections
ISO/DIS 12209-1	Outlet connections for gas cylinder valves for compressed breathable air – Part 1: Yoke type connections
ISO/DIS 12209-2	Outlet connections for gas cylinder valves for compressed breathable air – Part 2: Threaded connections
ISO/DIS 12209-3	Outlet connections for gas cylinder valves for compressed breathable air – Part 3: Adaptor for 232 bar valves
ISO/WD 13339	Procedure for the determination of the oxipotential of oxidizing gases and gas mixtures including toxic and corrosive gases
ISO/DIS 13340	Valves for non-refillable gas cylinders
ISO/AWI 14245	Specification and testing for liquefied petroleum gas (LPG) valves
ISO/DIS 14246	Transportable gas cylinders – Gas cylinder valves – Manufacturing tests and inspections
ISO/CD 15245-1	Gas cylinders – Parallel threads – Part 1: Specifications
ISO/CD 15245-2	Gas cylinders – Parallel threads – Part 2: Gauging
ISO/AWI 15995	Specification and testing for manually operated liquefied petroleum gas valves
ISO/AWI 15996	Performance and type testing of residual pressure valves and their filling adaptors

ISO/TC58/SC3 *Gas cylinders – Cylinder design*

ISO/FDIS 7866	Refillable transportable seamless aluminum alloy gas cylinders for world-wide usage – Design, manufacture, and acceptance
ISO/FDIS 9809-1	Transportable seamless steel gas cylinders – Design, construction, and testing – Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 MPa
ISO/DIS 9809-2	Transportable 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
ISO/CD 9809-3	Transportable seamless steel gas cylinders – Design, construction, and testing – Part 3: Normalized steel cylinders
ISO/FDIS 11118	Non-refillable gas cylinders – Specifications and test methods
ISO/CD 11119-1	Gas cylinders of composite material – Specifications and test methods – Part 1: Hoop wrapped, metallic liner
ISO/CD 11119-2	Gas cylinders of composite material – Specifications and test methods – Part 2: Fully wrapped, metallic liner
ISO/CD 11119-3	Gas cylinders of composite material – Specifications and test methods – Part 3: Fully wrapped, nonmetallic liner
ISO/DIS 11439	High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles
ISO/CD 12391	Seamless steel gas cylinders – Toughness and acceptance levels of steels of strength levels above 1100 N/mm ²

ISO/TC58/SC4 *Gas cylinders – Operational requirements for gas cylinders*

ISO/DIS 10464	Liquefied petroleum gas cylinders – Periodic inspection and testing
ISO/DIS 10691	Cylinders for liquefied petroleum gas – Inspection at the time of filling
ISO/CD 11622	Filling ratios, filling pressures, and provisions for safety devices for gas cylinders
ISO/DIS 11623	Composite gas cylinders – Periodic inspection and testing
ISO/DIS 13769	Gas cylinders – Stamp marking
