

**Sub-Committee of Experts on the  
Transport of Dangerous Goods**

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**NOTE ON THE PROGRESS MADE ON THE WORK CARRIED OUT  
BY THE TECHNICAL COMMITTEE ISO/TC 58 GAS CYLINDERS**

**Transmitted by the International Organization for Standardization (ISO)  
(prepared by Mr. Palne Mogensen, Chairman of ISO/TC 58)**

A progress report on the work of technical committee ISO/TC 58 was distributed to the UN Sub-Committee of Experts on the Transport of Dangerous Goods in **December 2000** (Doc. UN/CETDG/21/INF.39). This note is an update of that document taking into account the progress made since that time. **Please note that 4 International Standards have reached the publication stage since then.**

## **1 ISO/TC 58, common matters**

### **1.1 Business plan**

A draft business plan for TC 58 has been set up and is now available on the Livelink system on the Internet: (<http://isotc.iso.ch/livelink/livelink.exe>) The ISO/TC business plans are found under the heading "ISOTC home". No password is required. You are all welcome to submit comments, either by e-mail (directly at the Livelink site) or by conventional mail. The business plan is an important document, which guides the direction of the work in the TC. Input from interested external bodies constitutes an essential part of the plan. It will be discussed at the TC 58 plenary meeting in Stockholm in the beginning of October this year.

### **1.2 Secretariat change**

The secretariat of ISO/TC 58 has been with Sweden (SIS) for a long time. From January 2002, UK (BSI) will take over. UK is already holding the secretariat of TC 58/SC 3 and also CEN/TC 23 Gas cylinders. This arrangement should be beneficial for the cooperation between ISO/TC 58 and the CEN mirror committee, thus further reducing unnecessary duplication of work, etc.

## **2 Standards for steel gas cylinders**

### **2.1 Pressure drums**

The scope of TC 58 now also covers steel pressure drums, the design and testing of which will be handled by TC 58/SC 3. Work has already begun and the following work item has been accepted:

***ISO/AWI 21172 Gas cylinders – Welded steel gas drums with up to 3000 l capacity for the transport of gases – Design and construction.***

### **2.2 Welded steel cylinders**

The majority of gas cylinders in the world are of welded design, notably cylinders for LPG (liquefied pe-

roleum gases) and acetylene. An important International Standard in this area is: ISO 4706:1989 *Refillable welded steel gas cylinders*, which is now under periodical review and will be brought up to state-of-the-art with regard to design philosophies, etc.

A dedicated standard for LPG cylinders has been adopted from CEN/TC 286 and is presently circulated for enquiry, **ISO/CD 22991 *Gas cylinders – Transportable refillable welded steel cylinders for liquefied petroleum gas (LPG) – Design and construction.***

### **3 Standards for other types of cylinders**

#### **3.1 Aluminium cylinders**

Two work items on aluminium cylinders are presently in progress. The last item below will be issued as a technical report, set up much in the same way as the corresponding document for high strength steels:

ISO/WD 20703      *Gas cylinders – Refillable welded aluminium alloy gas cylinders – Design, construction and testing;*

ISO/AWI TR 20704      *Gas cylinders – Test methods on fracture performance for high strength aluminium.*

#### **3.2 Gas cylinders of composite materials**

The composite cylinder standardization project consists of three parts as follows. The first two are under preparation for FDIS voting and the third will be sent out for a second enquiry:

ISO/FDIS 11119-1 *Gas cylinders of composite construction -- Specification and test methods -- Part 1: Hoop wrapped composite gas cylinders;*

ISO/FDIS 11119-2 *Gas cylinders of composite construction -- Specification and test methods -- Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners;*

ISO/DIS 11119-3 *Gas cylinders of composite construction -- Specification and test methods --Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-metallic and non-load-sharing metal liners.*

#### **3.3 Gas cylinders for hydrogen fuelled automotive vehicles**

ISO/CD 15869 *Gaseous hydrogen and hydrogen blends – Land vehicle fuel tanks*, is developed in a joint standardization effort with ISO/TC 197 *Hydrogen technologies* and ISO/TC 22 *Road vehicles* as partners. The document has been reworked considerably and will be presented in five parts, specifying general requirements plus special requirements for metal cylinders and the various composite cylinder types respectively.

### **4 Additional work in progress**

#### **4.1 Compatibility between gases and materials**

The compatibility of cylinder and valve materials is important for the safety of workers and the public. Standards covering metallic and non-metallic materials and the assessment of materials for oxygen compatibility have been published. The following Committee draft was recently distributed for national review: **ISO/CD 11114-4 *Gas cylinders -- Compatibility of cylinder and valve materials with gas***

**contents -- Part 2: Hydrogen compatibility**, deals with testing for compatibility of metallic materials with hydrogen. The scope of the project is presently limited to steels.

#### 4.2 Cylinder markings

For cylinders in international traffic it is of paramount importance that they carry uniform and legible markings, leaving no room for mistakes. **ISO 13769 Gas cylinders – Stamp marking**, proposes a system for permanent markings addressing the needs of the three main interests in the markings: Authorities, Operators (fillers and users) and Requalification inspectors. The first DIS did not pass a "test FDIS" stage and a second FDIS is being drafted, which should resolve the conflicts between the marking scheme for gas cylinders in the Orange Book and the previous DIS.

#### 4.3 Terminology

The International Standard ISO 10286 *Terminology*, is presently under revision with regard to definitions of various states of gases (compressed, liquefied, dissolved, etc.) and pressures (working, settled, operating, etc.) in order to harmonise with other regulations such as the UN Orange Book, ADR, etc. **A DIS is in preparation to be sent out for enquiry late in 2001.**

#### 4.4 On-going work within subcommittee ISO/TC 58/SC 2 Gas cylinders - Cylinder fittings

A number of important gas cylinder valve standards are approaching the final stages of development. As seen in the list below, they cover specifications and testing of valves in very specialised applications as well as the common cylinder valves.

The following International Standards are at the publication stage:

- ISO 10692-1 Gas cylinders -- Gas cylinder valve connections for use in microelectronic industry -- Part 1: Outlet connections for single gases;**
- ISO 10692-2 Gas cylinders -- Gas cylinder valve connections for use in microelectronic industry -- Part 2: Specification and type testing for valve to cylinder connections.**

The following documents are at the formal voting (FDIS) stage:

- ISO/FDIS 15245-1 Transportable gas cylinders -- Parallel threads for connection of valves to gas cylinders – Part 1: Specification;**
- ISO/FDIS 15245-2 Transportable gas cylinders -- Parallel threads for connection of valves to gas cylinders – Part 2: Gauge inspection.**

The following documents are at the Committee Draft (CD) stage:

- ISO/CD 407                      *Small medical gas cylinders -- Pin-index yoke-type valve connections (Revision of ISO 407:1991);*
- ISO/CD 5145/DAM 1 *Cylinder valve outlets for gases and gas mixtures – Selection and dimensioning – Amendment 1. Updating of ISO 5145: 1990;*
- ISO/CD 15996                *Gas cylinders – Residual pressure valves – General requirements and type testing.*

The following documents are at Working Draft (WD) stage:

- ISO/WD 13339    *Gas cylinders – Oxypotential of toxic and corrosive gases* (has been cancelled as self-standing project and will eventually be incorporated as Part 2 of ISO 10156:1996);

- ISO/AWI 14245 *Specifications and testing for liquefied petroleum gas valves (Adoption of prEN 131 52 is proposed) (has been cancelled, but will be reinstated when decided on how to proceed);*
- ISO/AWI 15995 *Manually operated liquefied petroleum gas valves -- Specifications and testing (Adoption of prEN 131 53 is proposed);*
- ISO/NP 10156 *Gases and gas mixtures – Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets (revision of ISO 10156:1996);*
- ISO/NP 10298 *Determination of toxicity of a gas or a gas mixture (revision of ISO 10298:1995);*
- ISO/NP 13338 *Determination of tissue corrosiveness of a gas or a gas mixture (revision of ISO 13338:1995).*

#### **4.5 On-going work within subcommittee ISO/TC 58/SC 3 Gas cylinders - Cylinder design**

- ISO/AWI 3500:1990 *Seamless steel CO2 cylinders for fixed fire-fighting installations on ships (under revision).*

The following draft ISO Technical Report **has been approved. However, it will be split into four parts, which will cause a delay and publication is expected in 2001:**

- ISO/TR 12391 (type 3) *Seamless steel gas cylinders -- Toughness and acceptance levels of steels of strength levels above 1100 MPa.*

A new standard for small refillable cylinders has been proposed and is under voting for acceptance as WI:

- ISO/NP 20697** *Gas cylinders – Refillable, transportable seamless, normalized carbon steel cylinders of water capacity up to 0,5 litre for compressed, liquefied and dissolved gases and up to 1 litre for carbon dioxide – Design and construction.*

A specialised standard for nickel cylinders has been proposed, but didn't get sufficient support as a new project:

- ISO/NP 22490** *Gas cylinders – Refillable seamless nickel cylinders with a maximum service pressure of 3,5 MPa – Design, construction and testing.*

#### **4.6 On-going work within subcommittee ISO/TC 58/SC 4 Gas cylinders - Operational requirements for gas cylinders**

The following document is under publication:

- EN ISO 11623 *Transportable gas cylinders -- Periodic inspection and testing of composite gas cylinders.*

The following documents are at Draft International Standard (DIS) stage:

- ISO/DIS 10464 *Gas cylinders – Refillable welded steel cylinders for LPG -- Periodic requalification;*
- ISO/DIS 10691.2 *Gas cylinders – Refillable welded steel cylinders for liquefied petroleum gas (LPG) -- Procedures for checking before under and after filling.*

The following drafts are at the Committee Draft (CD) stage:

- ISO/CD 6406 *Periodic inspection and testing of seamless steel gas cylinders (under revision and will be coordinated with 10460, 10461, 10463 and 11113);*
- ISO/CD 10460 *Welded carbon steel gas cylinders -- Periodic inspection and testing (under revision and will be coordinated with 6406, 10461, 10463 and 11113);*

- ISO/CD 10461 *Seamless aluminium alloy gas cylinders -- Periodic inspection and testing (**under revision and will be coordinated with 6406, 10460, 10463 and 11113**)*;
- ISO/CD 10462 *Cylinders for dissolved acetylene -- Periodic inspection and maintenance (**under revision**)*;
- ISO/CD 11622 *Filling ratios, filling pressures and provisions for safety devices for gas cylinders*;
- ISO/CD 16148 *Gas cylinders - Acoustic emission methods for cylinder requalification*.
- ISO/CD 21007 *Gas cylinders – Numbering schemes for radio frequency identification*.

The following documents are at Working Draft (WD) stage:

- ISO/CD 32 *Gas cylinders for medical use – Marking for identification of content (revision of ISO 32:1977)*;
- ISOAWI 7225 *Gas cylinders – Precautionary labels – Design, content and application (revision of ISO 7225:1994)*;
- ISO/NP 10463 *Cylinders for permanent gases -- Inspection at time of filling (under revision and will be coordinated with 6406, 10460, 10461 and 11113)*;
- ISO/NP 11113 *Cylinders for liquefied gases (excluding acetylene and LPG) – Inspection at time of filling (revision of ISO 11113:1995)*;
- ISO/NP 11372 *Cylinders for dissolved acetylene – Inspection at time of filling (revision of ISO 11372:1995)*;
- ISO/NP 11755 ***Cylinders in bundles for permanent and liquefied gases (excluding acetylene and LPG) – Inspection at time of filling (revision of ISO 11755:1996)***;
- ISO/NP 13771 *Gas cylinders -- Filling conditions for liquefied petroleum gas* ;
- ISO/CD 19078 *Gas cylinders - Methods for inspection and requalification of natural gas vehicle (NGV) fuel containers*;
- ISO/AWI 21008 *Gas cylinders – Identification and marking using radio frequency identification technology – Reference architecture and terminology*.

## 5 Meetings held and planned

- ISO/TC 58 23 and 24 Sept. 1999, Venice, Italy. **4 and 5 Oct. 2001, Stockholm, Sweden**
- ISO/TC 58/SC 2 3 and 4 May 2001, Clearwater, FL, USA. **28 and 29 Nov. 2001, Lyon, France.**
- ISO/TC 58/SC 3 20 to 22 Sept. 2000, San Diego, CA, USA. **1 to 3 Oct. 2001, Stockholm, Sweden**
- ISO/TC 58/SC 4 4 to 6 April 2001, Capetown, South Africa. **23 to 25 Oct. 2001, Clearwater, FL, USA.**

### Titles of Working Groups

- ISO/TC 58/WG 7 Compatibility between gases and materials (Convener: Dr. H. Barthélémy)
- ISO/TC 58/SC 2/WG 4 Valve system and cylinder neck threads (Convener: Dr. H. Barthélémy)
- ISO/TC 58/SC 2/WG 5 Yoke type valve outlets for breathing air for diving (Convener: Dr. G. Mair)
- ISO/TC 58/SC 2/WG 6 Gas cylinder valves -- Specifications and testing (Convener: Dr. G. Mair)
- ISO/TC 58/SC 2/WG 7 Determination of toxicity of gas mixtures (Convener: Dr. H. Barthélémy)
- ISO/TC 58/SC 2/WG 9 Valve connections for gases of high purity (Convener: Dr. H. Barthélémy)
- ISO/TC 58/SC 2/WG 10 Specification and tests for LPG valves
- ISO/TC 58/SC 2/WG 11 Allocation of valve outlets (Convener: Dr. H. Barthélémy)

- ISO/TC 58/SC 3/WG 11 Overwrapped cylinders (Convener: Mr. M. Trudgeon)
- ISO/TC 58/SC 3/WG 12 Non-refillable gas cylinders for industrial use (Convener: Mr. J. Lane)
- ISO/TC 58/SC 3/WG 13 Seamless steel cylinders larger than 150 litres (Convener: Dr. J. Walters)
- ISO/TC 58/SC 3/WG 14 Toughness and acceptance criteria for steels of strength levels > 1100 MPa (Convener: Mr. R. Tribolet)
- ISO/TC 58/SC 3/WG 17 Compressed natural gas cylinders for road vehicles (Convener: Mr. C. Webster)
- ISO/TC 58/SC 3/WG 18 Welded aluminium alloy cylinders (Convener: Dr. H. Barthélémy)
- ISO/TC 58/SC 3/WG 19 Test methods on fracture performance for high strength aluminium cylinders (Convener: Mr. L. Birch)
- ISO/TC 58/SC 4/WG 1 Rejection criteria for metal gas cylinders (Convener: Mr. R. Irani)
- ISO/TC 58/SC 4/WG 2 Retesting of gas cylinders by acoustic emissions (Convener: Dr. H. Barthélémy)
- ISO/TC 58/SC 4/WG 3 Methods for inspection and requalification of NGV fuel containers (Convener: Mr. L. Birch)
- ISO/TC 58/SC 4/WG 4 Requalification of LPG steel cylinders (Convener not yet appointed)

ANNEX A  
Bibliography

**List of published International Standards from technical committee ISO/TC 58**

**ISO/TC 58 Gas cylinders**

ISO 3807-1:2000	Cylinders for acetylene -- Basic requirements -- Part 1: Cylinders without fusible plugs
ISO 3807-2:2000	Cylinders for acetylene -- Basic requirements -- Part 2: Cylinders with fusible plugs
ISO 10286:1996	Gas cylinders -- Terminology ( <b>under revision</b> )
ISO 11114-1:1997 (Reprinted: 1999)	Transportable gas cylinders -- Compatibility of cylinder and valve materials with gas contents -- Part 1: Metallic materials
<b>EN ISO 11114-2:2000</b>	<b>Transportable gas cylinders -- Compatibility of cylinder and valve materials with gas contents -- Part 2: Non-metallic materials.</b>
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 14600:2000 (reprinted: 2000)	Gas cylinders -- International quality conformance system -- Basic rules

**ISO/TC 58/SC 2 Gas cylinders - Cylinder fittings**

ISO 407:1991/ Cor.1:1999	Small medical gas cylinders -- Pin-index yoke-type valve connections ( <b>under revision</b> )
ISO 5145:1990	Cylinder valve outlets for gases and gas mixtures -- Selection and dimensioning ( <b>under revision</b> )
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 10297:1999	Gas cylinders -- Refillable gas cylinder valves -- Specification and type testing (NB All gases except LPG)
ISO 10298:1995	Determination of toxicity of a gas or gas mixture
ISO 10920:1997	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: Specification
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 12209-1	Gas cylinders -- Outlet connections for gas cylinder valves for compressed breathable air-- Part 1: Yoke type connection
ISO 12209-2	Gas cylinders -- Outlet connections for gas cylinder valves for compressed breathable air-- Part 2: Threaded connections
ISO 12209-3	Gas cylinders -- Outlet connections for gas cylinder valves for compressed breathable air-- Part 3: Adapter for 230 bar valves
ISO 13338:1995	Determination of tissue corrosiveness of a gas or gas mixture

**ISO 13340:2001**      **Transportable gas cylinders -- Cylinder valves for non-refillable cylinders -- Specification and type testing**

ISO 13341:1997      Transportable gas cylinders -- Fitting of valves to gas cylinders  
Cor.1:1998

**ISO 14246:2001**      **Transportable gas cylinders -- Gas cylinder valves -- Manufacturing tests and inspections**

**ISO/TC 58/SC 3 Gas cylinders - Cylinder design**

ISO 3500:1990      Seamless steel CO2 cylinders for fixed fire-fighting installations on ships (**under revision**)

ISO 4706:1989      Refillable welded steel gas cylinders (**under revision**)

ISO 7866:1999      Gas cylinders -- Refillable seamless aluminium alloy gas cylinders -- Design, construction and testing

ISO 9809-1:1999      Gas cylinders -- Refillable seamless steel gas cylinders -- Design, construction and testing -- Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 MPa

ISO 9809-2:2000      Gas cylinders -- Refillable seamless steel gas cylinders -- Design, construction and testing -- Part2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1100 MPa

**ISO 9809-3:2000**      **Gas cylinders -- Refillable seamless steel gas cylinders -- Design, construction and testing -- Part 3: Normalized steel cylinders**

ISO 11118:1999      Gas cylinders -- Non-refillable metallic gas cylinders -- Specification and test methods

ISO 11120:1999      Gas cylinders -- Refillable seamless steel tubes of water capacity between 150 l and 3000 l -- Design, construction and testing

ISO/TR 13763:1994      Safety and performance criteria for seamless gas cylinders

(Cor. 1:1996 English only)

ISO 11439:2000      Gas cylinders -- High-pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles

**ISO/TC 58/SC 4 Gas cylinders - Operational requirements for gas cylinders**

ISO 32:1977      Gas cylinders for medical use -- Marking for identification of contents. (**under revision**)

ISO 6406:1992      Periodic inspection and testing of seamless steel gas cylinders (**under revision**)

ISO 7225:1994      Gas cylinders -- Precautionary labels (**under revision**)

(Reprinted: 1995)

ISO 10460:1993      Welded carbon steel gas cylinders -- Periodic inspection and testing (**under revision**)

ISO 10461:1993      Seamless aluminium alloy gas cylinders -- Periodic inspection and testing (**under revision**)

ISO 10462:1994      Cylinders for dissolved acetylene -- Periodic inspection and maintenance (corrected and reprinted 1995) (**under revision**)

ISO 10463:1993      Cylinders for permanent gases -- Inspection at time of filling (**under revision**)

ISO 11113:1995      Cylinders for liquefied gases (excluding acetylene and LPG) -- Inspection at time of filling (**under revision**)

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 liquefied gases (excluding acetylene) -- Inspection at time of filling
ISO 13770:1997	Aluminium alloy gas cylinders -- Operational requirements for avoidance of neck and shoulder cracks