INTERNATIONAL STANDARD

ISO 11755

Second edition
2005-06-01

Gas cylinders — Cylinder bundles for compressed and liquefied gases (excluding acetylene) — Inspection at time of filling

Bouteilles à gaz — Cadres de bouteilles pour gaz comprimés et liquéfiés (à l'exclusion de l'acétylène) — Inspection au moment du remplissage

Reference number
ISO 11755:2005(E)

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Published in Switzerland

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 11755 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 4, *Operational requirements for gas cylinders*.

This second edition cancels and replaces the first edition (ISO 11755:1996), which has been technically revised.

Introduction

Transportable gas cylinder bundles require inspection before, during and after the filling process to ensure that all components are suitable for the intended filling conditions, and are free of serious defects and contamination that can affect the integrity of the bundle.

Gas cylinders — Cylinder bundles for compressed and liquefied gases (excluding acetylene) — Inspection at time of filling

1 Scope

This International Standard specifies the requirements for inspection before, during and after the time of filling for cylinder bundles for compressed and liquefied gases, also referred to as bundles.

This International Standard does not apply to acetylene bundles.

This International Standard does not apply to bundles when they are a part of a battery vehicle.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6406, *Gas cylinders — Seamless steel gas cylinders — Periodic inspection and testing*

ISO 10461, *Gas cylinders — Seamless aluminium-alloy gas cylinders — Periodic inspection and testing*

ISO 11623, *Transportable gas cylinders — Periodic inspection and testing of composite gas cylinders*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
compressed gas
gas which, when packaged under pressure for transport, is entirely gaseous at − 50 °C

NOTE This category includes all gases with a critical temperature less than or equal to − 50 °C.

3.2
cylinder bundle
bundle
transportable assembly of gas cylinders which is designed for being routinely lifted and which consists of a frame and two or more cylinders, each of water capacity up to 150 l, connected to a manifold by cylinder valves or fittings such that the cylinders are filled, transported and emptied without disassembly

3.3
frame
structural and non-structural members of a gas cylinder bundle which combine all its components together, whilst providing protection for the bundle's cylinders, valves and manifold, and which enable the bundle to be transported

3.4
cylinder valve
valve which is fitted into a cylinder and to which a manifold is connected

3.5
cylinder fitting
device with no gas shut-off capability that serves as a means for connecting the manifold of a bundle to its individual cylinders when cylinder valves are not fitted to the cylinders

3.6
manifold
system for connecting the cylinder valves or fittings to the main outlet valve(s) or outlet connection(s) of the cylinder bundle

3.7
main outlet valve
valve which is fitted to the manifold of the bundle isolating it from the outlet connection(s)

3.8
liquefied gas
gas which, when packaged under pressure for transport, is partially liquid at temperatures above $-\ 50\ ^{\circ}C$

3.8.1
high pressure liquefied gas
gas with a critical temperature between $-\ 50\ ^{\circ}C$ and $+\ 65\ ^{\circ}C$

3.8.2
low pressure liquefied gas
gas with a critical temperature above $+\ 65\ ^{\circ}C$

3.9
maximum permissible filling weight
product of the minimum guaranteed water capacity of the cylinders of the cylinder bundle and the filling ratio of the gas to be contained therein

3.10
maximum permissible operating pressure
highest pressure permitted to be developed in a cylinder during service

4 Inspection at time of filling

4.1 Inspection prior to filling

Before filling a bundle, it shall be verified by visual examination that

a) the bundle is permitted to be filled in the country of the filling station,

b) the bundle has an unexpired periodic inspection and test date,

c) the bundle is compatible with the nature of the gas and filling pressure or filling weight[1)],

d) the frame is free from damage which can affect its mechanical integrity,

e) the restraining systems that prevent the cylinders from moving are secure and the cylinders have not moved while in service,

f) any lifting attachments and/or fork-lift slots are free from damage that can affect the integrity of the bundle,

g) the manifold and pipework are securely attached to the frame and are undamaged,

h) flexible hoses, where fitted, are free from damage,

1) In International Standards, weight is equivalent to a force, expressed in newtons. However, in common parlance (as used in terms defined in this International Standard), the word “weight” continues to be used to mean mass, but this practice is deprecated (ISO 31-3).

i) visible surfaces of the cylinders are free from any signs of dents, cuts, gouges, fire damage or any other signs of damage. Rejection criteria shall be applied in accordance with ISO 6406, ISO 10461 or ISO 11623 as appropriate. If any cylinder is damaged, the cylinder bundle shall not be filled but shall be identified and removed from service for corrective action. In the case of fire damage, the bundle shall be disassembled and all cylinders inspected; any suspect cylinders shall be revalidated or rejected,

j) the bundle does not show any signs of having been immersed in water or other liquids (e.g. cylinders covered in mud or seaweed) or any signs of tampering (e.g. loosened bolts, missing panels),

k) the cylinder valves, if fitted, are all in the open position,

l) the main outlet valve is free from contamination and is undamaged and has the correct thread for the gas to be filled,

m) any pressure relief devices, such as relief valves or bursting discs, are in place and have not been visibly damaged or altered,

n) in the case of liquefied gases, the tare weight and maximum permissible filling weight are legible, and

o) in the case of compressed gases, the maximum permissible operating pressure is legible.

Additionally, a check of the main outlet valve shall be carried out to ensure that the valve operates properly.

Before filling, it shall be verified that the bundle is free from any internal contamination which can affect its integrity, e.g. by ensuring that the bundle has a positive residual pressure and, for liquefied gases, by checking the mass against the tare weight of the bundle.

4.2 Bundle identification

The following necessary data shall be permanently marked or labelled on the cylinder bundle:

a) design reference number, and approval number (if appropriate);

b) character(s) identifying the country of approval, using the distinguishing signs of motor vehicles in international traffic (see Reference [2]);

c) inspection stamp mark or stamp of authorized inspection body;

d) date of initial inspection and test, the year (four digits) followed by the month (two digits) separated by a slash (e.g. 2003/02);

e) the test pressure, in bar[2)], preceded by the letters “PH” and followed by the letters “BAR”;

f) for bundles filled by weight[1)], the tare weight and maximum permissible filling weight followed by the letters for the unit;

g) in the case of pressure receptacles for compressed gases, the working pressure, in bar, preceded by the letters “PW”;

h) for liquefied gases, the water capacity, in litres, expressed to three significant digits rounded down to the last digit, followed by the letter “L”;

i) the manufacturer's mark registered by the competent authority. If the country of manufacture is not the same as the country of approval, then the manufacturer's mark shall be preceded by the character(s) identifying the country of manufacture as indicated by the distinguishing signs of motor vehicles in international traffic (see Reference [2]). The country mark and the manufacturer's mark shall be separated by a space or slash; and

j) the serial number assigned by the manufacturer.

2) The unit “bar” is not an SI unit, and its use is deprecated. Use of “bar” in this International Standard is aligned with 6.2.2.7.2 (f) and (i) of Reference [2]. Note that 1 bar = 100 kPa.

4.3 Inspection during filling

To prevent overfilling of bundles or individual cylinders within bundles, one of the following procedures shall be followed for bundles of liquefied gases equipped with individual closable valves:

— all cylinders of a bundle shall be dismantled and only one cylinder shall be filled at a time;

or

— each cylinder in a bundle shall be equipped with a separate filling control device to monitor the exact amount of gas filled into each cylinder of the bundle.

During filling of the bundle, it shall be verified that no apparent leaks exist. Particular attention shall be paid to bundles containing toxic, flammable or pyrophoric gases.

4.4 Inspection after filling

Upon completion of the filling of the bundle, it shall be verified that:

a) the bundle has not been overfilled. For bundles filled by pressure, the pressure shall be corrected for the reference temperature. For bundles filled by mass, the mass of the full bundle shall be checked against the maximum permissible filling weight using a scale that has a working range and accuracy corresponding to the capacity of the bundle being filled;

b) the cylinder bundle has been permanently marked or correctly labelled;

c) the main outlet valve does not leak;

d) no apparent leaks exist from the bundle; and

e) cylinder valves that need to be closed for transport in accordance with transport regulations have been closed.

Bibliography

[1] EN 13769, *Transportable gas cylinders — Cylinder bundles — Design, manufacture, identification and testing*

[2] UN *Recommendations on the Transport of Dangerous Goods, Model Regulations*, Thirteenth revised edition, 2003

ICS 23.020.30

Price based on 5 pages