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AMENDMENT 1
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**Gas cylinders — Refillable composite
reinforced tubes of water capacity
between 450 L and 3000 L — Design,
construction and testing**

AMENDMENT 1

iTeh STANDARD PREVIEW
*Bouteilles à gaz — Bouteilles tubulaires en composite renforcé
rechargeables d'une capacité de 450 L à 3000 L — Conception,
construction et essais*
(standards.iteh.ai)

AMENDEMENT 1

ISO 11515:2013/Amd 1:2018

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This document was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 3, *Cylinder design*.

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Gas cylinders — Refillable composite reinforced tubes of water capacity between 450 L and 3000 L — Design, construction and testing

AMENDMENT 1

8.5.8 Blunt impact test

Replace the text in 8.5.8 with the following:

8.5.8.1 Procedure

For Type 2 tubes, one empty tube, and if necessary, a second empty tube, shall be subjected to two impacts:

- a) one at the tube sidewall midway between the ends;
- b) one at the termination of the overwrap near the domes.

For Type 3 and 4 tubes, one empty tube and if necessary a second empty tube, shall be subjected to two impacts:

- a) one at the tube sidewall midway between the ends;
- b) one at an angle of 45° to strike the shoulder of the tube (mid arc length at the dome).

See Figure 2.

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The impact can be conducted by dropping a suitable weight or by a pendulum impact.

The tube shall be secured to ensure it does not move during the impact. The impactor shall be made from a steel bar and have a diameter of between 110 and 120 mm.

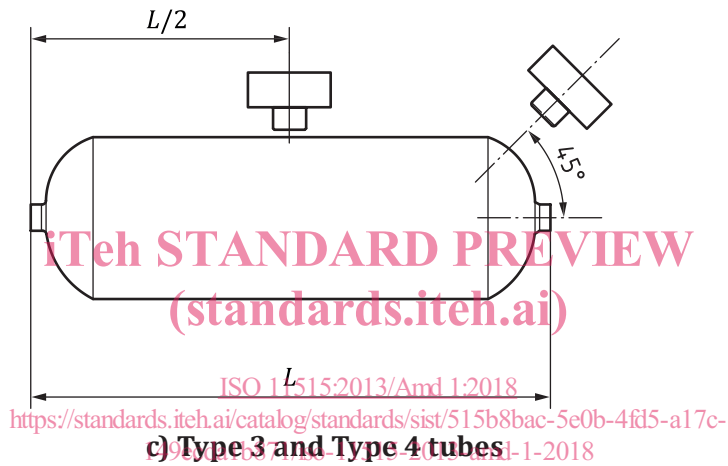
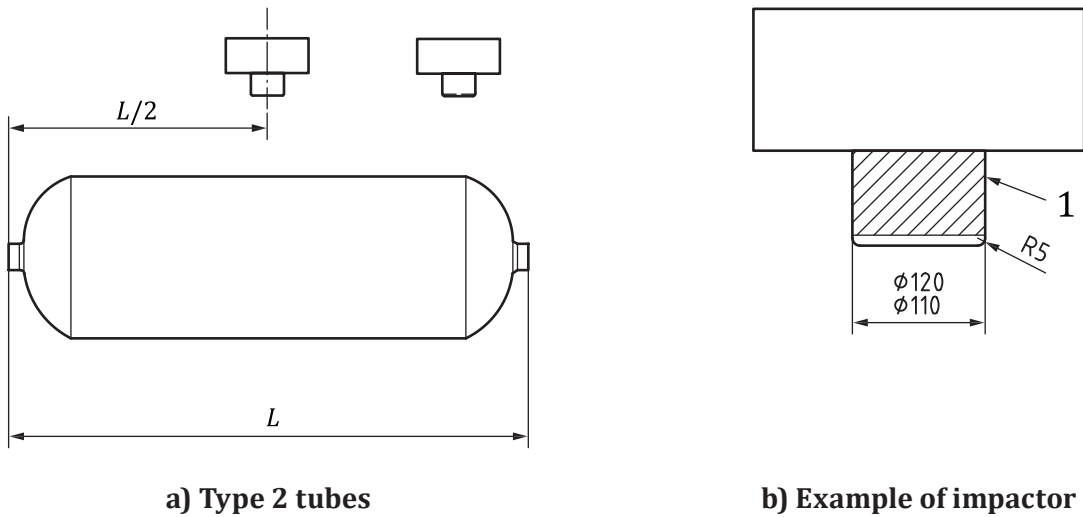
Test one — an impactor with a potential energy of 1 200 J shall strike the tube at the positions identified above.

Test two — (if necessary) an impactor with a potential energy of 488 J shall strike the tube at the positions identified above.

The tube shall then be subjected to the appropriate ambient cycle test as described in 8.5.5.

Parameters to monitor and record are:

- a) visual appearance after each impact – record position and dimensions of impact damage;
- b) parameters specified in 8.5.5.



Key
1 steel

Figure 2 — Blunt impact test procedure

8.5.8.2 Criteria

The tubes shall withstand 3 000 pressurisation cycles at maximum developed pressure p_{max} without failure by burst or leakage. The test shall continue for additional cycles representing its specified lifetime, or until the tube fails by leakage, whichever is the sooner. In either case the tube shall be deemed to have passed the test. However if failure during this second part of the test is by burst, then the tube shall have failed the test.

A tube passing the test at an energy level of 1 200 J shall be identified as achieving impact resistance level 2, which shall be reported in the qualification report and on the label (see 7.2.1). If the tube does not pass the blunt impact test at this level, a second tube shall be tested at an energy level of 488 J. A tube passing the test at an energy level of 488 J shall be identified as achieving impact resistance level 1, which shall be reported on the qualification report and on the label (see 7.2.1). A tube that does not pass at an energy level of 488 J shall not be approved.

8.5.18

Insert the following new text after 8.5.18.3:

8.5.19 High velocity impact (gunfire) test

8.5.19.1 Procedure

One tube shall be filled to 2/3 of the test pressure, p_h , with air or nitrogen.

The tube shall be positioned in such a way that the point of impact of the projectile shall be in the tube side wall at a nominal angle of 45° and such that the bullet would also exit through the tube side wall. Tubes shall be impacted by a 7,62 mm (0,3 calibre) armour-piercing projectile with a nominal speed of 850 m/s, (for example the 7,62 × 51 M993 AP NATO round).

The bullet shall be fired from a distance of not more than 45 m.

It is not necessary for the bullet to penetrate the tube side wall.

After the test the tube shall be rendered unserviceable. Parameters to monitor and record:

- a) type of projectile;
- b) initial pressure;
- c) description of failure if applicable;

8.5.19.2 Criteria

The tube passes the test if either:

- a) the bullet penetrates the tube and it does not rupture (it remains in one piece); or
- b) the bullet does not penetrate the tube side wall.

10.2 Additional marking

10.2.1 The following information, where applicable, shall be permanently and legibly marked on the tube with a permanent, durable label on the surface or by a label embedded in the resin or under a glass fibre layer.

“WARNING — THIS TUBE MUST BE FILLED ONLY WITH <<Named Gas(es)>>” where a tube is to be used for dedicated gas service.

“WARNING — THIS TUBE MUST BE USED ONLY WITH A <<Manufacturer Specified>> PRESSURE RELIEF DEVICE” where a tube is approved with a specific pressure relief device (see 8.5.10).

“Maximum torque <<(manufacturer’s recommended torque)>>” where fitting torque does not correspond to the values given in ISO 13341.

“WARNING — THIS TUBE MUST NOT BE USED IN VACUUM SERVICE” when the vacuum test was not successfully completed (see 8.5.18).

“THIS TUBE HAS IMPACT RESISTANCE LEVEL 1 (OR 2)”

As appropriate, where a tube is approved with a specific energy for the blunt impact test (see 8.5.9).

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