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Gas cylinders — Stamp marking

Bouteilles à gaz — Marquage

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 13769 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 13769:2002) and ISO 13769:2002/Amd1:2003, which have been technically revised.

Introduction

This International Standard has been prepared on the basis of the 14th revised edition of the United Nations *Recommendations on the Transport of Dangerous Goods — Model Regulations*. It is intended to be applied at the time of cylinder manufacture. However, it could be applied by the cylinder user during use operations, e.g. the stamping of “empty weight” (item 10 in Figures A.1, A.2 and A.3) on to cylinders not so marked at the time of manufacture.

Some stamp markings include the year and date. The order of these time elements is given with the most significant figures (the year) to the left, in accordance with the rules given in ISO 8601.

Gas cylinders — Stamp marking

1 Scope

This International Standard specifies stamp marking of refillable transportable gas cylinders and tubes of volume greater than 0,5 l and less than or equal to 3 000 l, including:

— steel and aluminium gas cylinders;

— composite gas cylinders;

— acetylene cylinders;

— LPG cylinders (see Annex B).

These are hereafter referred to as “cylinders”.

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 11114-1:1997, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials*

3 Terms and definitions

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

3.1
permanent marking
stamp marking
marking applied to cylinders by hard metal stamping, engraving, casting or other similar methods

NOTE 1 This marking remains legible during the entire lifespan of the cylinder.

NOTE 2 For composite cylinders, permanent markings may be achieved by use of a printed label encapsulated either by placing it under the resin or by covering it with a permanent transparent coating on the shoulder or the side wall of the cylinder (see also 4.3).

3.2
durable marking
marking such as stencilling (marking of the item using inks and/or paints), labelling (in accordance with e.g. ISO 7225) or other suitable methods

NOTE This marking can be modified but has to remain legible for a limited period.

4 Application of stamp markings

4.1 General

Markings listed in Table 1 consist of manufacturing, operational and certification stamp marks. See 4.3 for the arrangement of stamp marks. Additional markings may be applied as agreed by the interested parties, provided the layout does not cause any confusion in their interpretation and the clarity of the other mandatory markings is not affected.

4.2 Workmanship

The stamp markings shown in Table 1 shall be applied permanently and legibly in such a way that the integrity of the cylinder is unaffected, e.g. on a reinforced part of the cylinder or on a permanent attachment. For welded cylinders, some stamp markings will appear on a welded identity plate or on another part permanently attached to the cylinder and not subject to gas pressure.

For composite cylinders, permanent markings may be achieved by use of a printed label encapsulated either by placing it under the resin or by covering it with a permanent transparent coating on the shoulder or the side wall of the cylinder (see 4.3). Except for the “UN” mark, the characters in the stamp markings shall be at least 5 mm in height. On cylinders with an outside diameter less than 140 mm, this height may be reduced, but in no case shall the characters be less than 2,5 mm in height. The minimum size of the “UN” mark shall be 10 mm for cylinders with a diameter greater than or equal to 140 mm and 5 mm for cylinders with a diameter less than 140 mm.

The depth of the characters in the stamp markings made by any method shall be such that they are legible and durable under all operating conditions.

The stamp marking tools used shall have such radii as are necessary to prevent the formation of sharp notches. It is recommended that the radius of the stamp marking tool is not less than 0,2 mm. Different values can be used, but it shall be demonstrated by fatigue and burst tests in accordance with the design standard or equivalent that the failure does not initiate in the markings.

4.3 Arrangement and position of stamp markings

All stamp markings described in Table 1 shall appear consecutively in the sequence given in the figures in Annex A, which indicates the arrangement of the stamp markings. The United Nations Model Regulations distinguish between different groups of stamp marks and give them an explicit place in the arrangement of certain markings. In Figure A.1 and Figure A.2, the top group of stamp marks includes manufacturing marks (12, 2, 3, 4, 6). The group of stamp marks in the middle includes operational marks (13, 10, 11, 17, 7). The bottom group of stamp marks includes certification marks (27, 1, 28, 8, 9). In Figure A.3, the top row includes manufacturing marks. The second and third rows include operational marks and the bottom row includes certification stamp marks.

Annex B includes examples of positions of stamp markings for metallic LPG cylinders.

When an identity plate or label (for composite cylinders) is used, all the stamp markings may be on a single plate or label, provided the layout does not cause any confusion in their interpretation and follows the requirements of Table 1.

For hoop-wrapped composite cylinders, when a label under the resin is used, for traceability purposes at least the manufacturer’s identification and the manufacturing serial number shall be duplicated by stamping them on the shoulder in accordance with Annex A.

Table 1 — Stamp markings

Stamp marking number	Description of the marking	Status	Figures as shown in Annex A (with examples)		
			Figure A.1	**Figure A.2**	**Figure A.3**
		Mandatory (M) [a] Normative (N) [b] Optional (O)	Location of stamp marking for compressed gases	Location of stamp marking for liquefied gases	Location of stamp marking for acetylene
1	**Standard:** The identification of the relevant construction standard to which the cylinder is designed, manufactured and tested.	M	ISOXXX	ISOXXX	ISOXXX
2	**Country of manufacture:** Capital letter(s) identifying the country of manufacture of the cylinder shell using the characters of the distinguishing signs of motor vehicles in international traffic as specified in the United Nations *Recommendations on the Transport of Dangerous Goods — Model Regulations.*	M when different from country of approval (stamp marking No. 28)	CH	CH	CH
3	**Manufacturer's identification:** Name and/or trademark of cylinder manufacturer.	M	MF	MF	MF
4	**Manufacturing serial number:** Alphanumeric identification number given or assigned by the manufacturer to clearly identify the cylinder. In the case of cylinders less than or equal to 1 l, the manufacturing batch number may replace the manufacturing serial number.	M	7654321	7654322	7654323
5	**Stamp for non-destructive examination (NDE):** Where the cylinder is tested by and meets all the requirements of NDE in accordance with an ISO standard for gas cylinders (for example ultrasonic, magnetic particle, dye penetrant, acoustic emission), the following symbols shall be used: UT: for ultrasonic; MT: for magnetic particle; PT: for dye penetrant; AT: for acoustic emission.	N if applicable	UT	MT	PT
6	**Identification of steel compatibility:** Steel cylinders and composite cylinders with steel liners compatible with hydrogen and other gases of group 2 and group 11 in ISO 11114-1:1997 shall be stamp-marked with the letter "H". Stainless-steel cylinders manufactured from high-grade stainless steel and composite cylinders with high-grade stainless-steel liners shall be stamped with the letters "HG". EXAMPLE X2CrNiMo17-12-2, as found in ISO/TS 15510.	M if applicable	H		
7	**Test pressure:** The prefix "PH" followed by the value of the test pressure in bars and the letters "BAR".	M	PH300BAR	PH250BAR	PH60BAR
8	**Inspection stamp:** Stamp or identification of authorized inspection body.	M	#	#	#
9	**Initial test date:** Year (four figures) followed by month (two figures) of initial testing, separated by a slash.	M	2007/10	2007/10	2007/10

Table 1 (*continued*)

Stamp marking number	Description of the marking	Status Mandatory (M) [a] Normative (N) [b] Optional (O)	Figures as shown in Annex A (with examples)		
			Figure A.1 Location of stamp marking for compressed gases	**Figure A.2** Location of stamp marking for liquefied gases	**Figure A.3** Location of stamp marking for acetylene
10	**Empty weight** [c]**:** The weight of the cylinder in kilograms, including all integral parts (e.g. neck ring, foot ring, etc.) followed by the letters "KG". This weight shall not include the weight of the valve, valve cap or valve guard, any coating or any porous material for acetylene. The empty weight shall be expressed to three significant figures rounded up to the last digit. For cylinders of less than 1 kg, the empty weight shall be expressed to two significant figures rounded up to the last digit. For acetylene cylinders, it shall be expressed to at least one digit after the decimal point. EXAMPLE Weight measured: 0,964 kg; 1,064 kg; 10,64 kg; 106,41 kg To be expressed as: 0,97 kg; 1,07 kg; 10,7 kg; 107 kg	M	62,1KG	43,3KG	45,3KG
11	**Water capacity:** The minimum water capacity, in litres, guaranteed by the cylinder manufacturer, followed by the letter "L". On request by the customer or owner of the cylinder for compressed gases, this capacity may be expressed as the nominal average water capacity with a tolerance of ± 1,5 %. In such a case, the symbol "≈" shall be stamped in front of the value of the water capacity. In the case of liquefied gases, the water capacity in litres is expressed to three significant figures rounded down to the last digit. If the value of the minimum or nominal water capacity is an integer, the digits after the decimal point may be neglected. The actual determined volume may also be indicated on request by the customer or owner in special cases. For cylinders intended to contain acetylene, the stamped water capacity shall be the actual determined volume, rounded down to three significant figures.	M for liquefied gases N for acetylene O for compressed gases	≈50L	40,6L	50,8L
12	**Identification of the cylinder thread:** e.g. 25E: thread in accordance with ISO 10920; or 17E: thread in accordance with ISO 11116-1.	M	25E	25E	25E
13	**Minimum guaranteed wall thickness:** Minimum guaranteed wall thickness in millimetres (as per the type approval test) of the cylindrical shell, followed by the letters "MM".	M Exception: not mandatory for composite cylinders or cylinders ⩽ 1 l	5,8MM	15,5MM	4,2MM

Table 1 (*continued*)

Stamp marking number	Description of the marking	Status Mandatory (M) [a] Normative (N) [b] Optional (O)	Figures as shown in Annex A (with examples)		
			Figure A.1 Location of stamp marking for compressed gases	**Figure A.2** Location of stamp marking for liquefied gases	**Figure A.3** Location of stamp marking for acetylene
14	**Identification of aluminium alloy:** Number of the aluminium alloy according to The Aluminum Association (see Note), with prefix "AA" for all aluminium-alloy cylinders and composite cylinders with aluminium liners. NOTE Address: The Aluminum Association Inc., 900 19th Street NW, Washington DC 20006-2168, USA.	N for aluminium cylinders	—	AA7060	—
15	**Identity of porous material:** For acetylene cylinders prepared with porous material, name or trademark of porous material. The country and factory of origin shall be traceable through this mark. Stamp marking No. 15 need not be stamped at the time of testing the empty cylinder shell.	N for acetylene	—	—	ZZZ
16	**Identification of content:** For acetylene cylinders, the formula "C2H2" may be stamp-marked.	O for acetylene	—	—	C2H2
17	**Working pressure:** Settled pressure, in bars, at a uniform temperature of 288 K (15 °C) for a full gas cylinder preceded by the letters "PW".	M for compressed gases and acetylene	PW200	—	PW18
18	**Maximum permissible filling weight:** The product of the water capacity of the cylinder and the filling density of the gas. The maximum permissible filling weight shall be marked by means of stamp-marking, stencilling or labelling. If the maximum permissible filling weight is stamp-marked, it shall be followed by the letters "KG" and the name and/or chemical formula of the gas. The maximum permissible filling weight does not apply to acetylene.	O for liquefied and compressed gases filled by weight	—	30KG CO2	—
19	**Total weight (gross weight):** For acetylene cylinders, the total weight, comprising either Tare A or Tare F (see stamp marking No. 20) plus maximum allowable acetylene content, preceded by the letters "TOTAL" and followed by the letters "KG". When only Tare S is used, the total weight may be replaced by the maximum acetylene charge (see Note), excluding saturation gas, preceded by the letters "MAX" and followed by the letters "KG". NOTE The stamped value can be less than the approved value.	N for acetylene (C_2H_2)	—	—	TOTAL85,1KG

Table 1 (*continued*)

Stamp marking number	Description of the marking	Status Mandatory (M) [a] Normative (N) [b] Optional (O)	Figures as shown in Annex A (with examples)		
			Figure A.1 Location of stamp marking for compressed gases	**Figure A.2** Location of stamp marking for liquefied gases	**Figure A.3** Location of stamp marking for acetylene
20	**Tare weight:** For cylinders for liquefied gases, for acetylene and where regulation requires filling by weight for compressed gases. The tare weight is the sum of the empty weight (stamp marking No. 10), the weight of the valve including the dip tube if fitted, the weight of any fixed valve guard and the weight of all other parts that are permanently attached (e.g. by clamping or bolted fixing) to the cylinder when presented for filling. The tare weight shall be marked as follows: the letters "TARE" followed by the value of the tare weight and the letters "KG". The tare weight shall be expressed to three significant figures rounded down to the last digit. For cylinders of less than 1 kg, (for LPG less than 10 kg) the tare weight shall be expressed to two significant figures rounded down to the last digit. For acetylene cylinders, it shall be expressed to at least one digit after the decimal point. EXAMPLE Weight measured 0,964 kg 1,064 kg 10,64 kg To be expressed as 0,96 kg 1,06 kg 10,6 kg For liquefied gases, as an alternative the requirement for the indication of the tare weight is considered to be satisfied if the gross weight of the filled cylinder, the product name and the filling weight (stamp marking 18) of the cylinder are marked. EXAMPLE "23,6 (KG)" (durable marking); "BUTANE — 13 KG" (permanent marking). For dissolved-acetylene cylinders, Tare S, as described below, shall be stamp-marked. The additional marking of Tare A, as described below, is optional. Note the sequence of stamping: Tare A followed by Tare S. Tare S is the empty weight + the weight of the valve and all other parts that are permanently attached when presented for filling + the weight of the porous material + the weight of the solvent + the weight of the saturation gas at atmospheric pressure and 15 °C. The letters "TARE S" shall be used in place of "TARE" when only one tare weight is stamp-marked. Tare A is the same as Tare S except that the weight of the saturation gas is not included. For solvent-free acetylene cylinders, one weight only (described below as "TARE F") shall be stamp-marked. Tare F is the empty weight + the weight of the valve and all other parts which are permanently attached when presented for filling + the weight of the porous material.	N for liquefied gases and where regulation requires filling by weight for compressed gases This stamp marking may be replaced by a durable marking TARE S or TARE F mandatory (M) for acetylene (C_2H_2)	—	TARE55,4KG	TARES75,6KG or TARE 75,1/75,6KG

Table 1 (*continued*)

Stamp marking number	Description of the marking	Status Mandatory (M) [a] Normative (N) [b] Optional (O)	Figures as shown in Annex A (with examples)		
			Figure A.1 Location of stamp marking for compressed gases	**Figure A.2** Location of stamp marking for liquefied gases	**Figure A.3** Location of stamp marking for acetylene
	If the tare weight for acetylene cylinders includes parts, other than the valve, that are permanently attached, the total weight of these parts may be stamped in front of the letters "TARE". This weight shall be expressed to the same number of decimal places as the tare weight (e.g. 2,3TARE 77,4/77,9 KG)	O			
21	**Identification of solvent for acetylene cylinders:** Identification of solvent shall be made if the solvent is not acetone. Identification of dimethylformamide as DMF followed by the weight of solvent and the letters "KG" shall be made. If acetone, the letter "A" may be stamp-marked followed by the weight of the solvent and the letters "KG". Acetylene cylinders without solvent shall be stamp-marked "SF" (solvent-free) in place of this marking.	N if solvent is not acetone	—	—	DMF18,5KG
22	**Inspection stamp and date of periodic inspection:** Stamp or identification of authorized inspection body and year (last two or all four figures) and subsequently the month (two figures) of retest shall be stamp-marked at the time when periodic inspection is carried out. The year and month shall be separated by a slash (i.e. "/"). For UN cylinders, the inspection body marking shall be preceded by the character(s) identifying the country authorizing the inspection body, if that country is different from the country of approval for manufacture (see stamp marking No. 28). Enough space shall be provided on the cylinder for more than one re-inspection. For acetylene cylinders, these stamp marks shall be marked either on the cylinder or on a ring that can be attached only by removing the valve.	M	# 14/11	# 14/11	# 14/11
23	**Space for additional optional markings or for application of labels, e.g. name of cylinder owner.**	—	—	—	—
24	**Inspection stamp certifying the correct massing:** This mark shall be stamped in proximity to the "Identity of porous material" stamp marking as specified in stamp marking No. 15. Stamp marking is not required when the same inspector verifies both shell manufacture and massing.	N for acetylene (C_2H_2)	—	—	#
25	**Service life of composite cylinders:** For cylinders of unlimited life, no stamp required. For cylinders with limited life, the letters "FINAL" followed by the expiry date comprising the year (four figures) and month (two figures).	N for composite cylinders		FINAL2019/08	—
26	**Underwater use of composite cylinders:** Composite cylinders which have met the specific test requirements for underwater use shall be stamp-marked with the letters "UW".	N for underwater composite cylinders	UW	—	—

Table 1 (*continued*)

Stamp marking number	Description of the marking	Status Mandatory (M) [a] Normative (N) [b] Optional (O)	Figures as shown in Annex A (with examples)		
			Figure A.1 Location of stamp marking for compressed gases	**Figure A.2** Location of stamp marking for liquefied gases	**Figure A.3** Location of stamp marking for acetylene
27	**International mark(s):** These marks (UN, π, etc.) can only be applied to cylinders that conform to the international regulations such as the United Nations *Recommendations for the Transport of Dangerous Goods — Model Regulations*.	M (if applicable)	(un)	(un)	(un)
28	**Country of approval:** Capital letter(s) identifying the country of approval of stamp mark No. 27, using the characters of the distinguishing signs of motor vehicles in international traffic specified in the United Nations *Recommendations on the Transport of Dangerous Goods — Model Regulations*.	M	F	F	F

[a] Mandatory according to the UN *Recommendations on the Transport of Dangerous Goods — Model Regulations*.

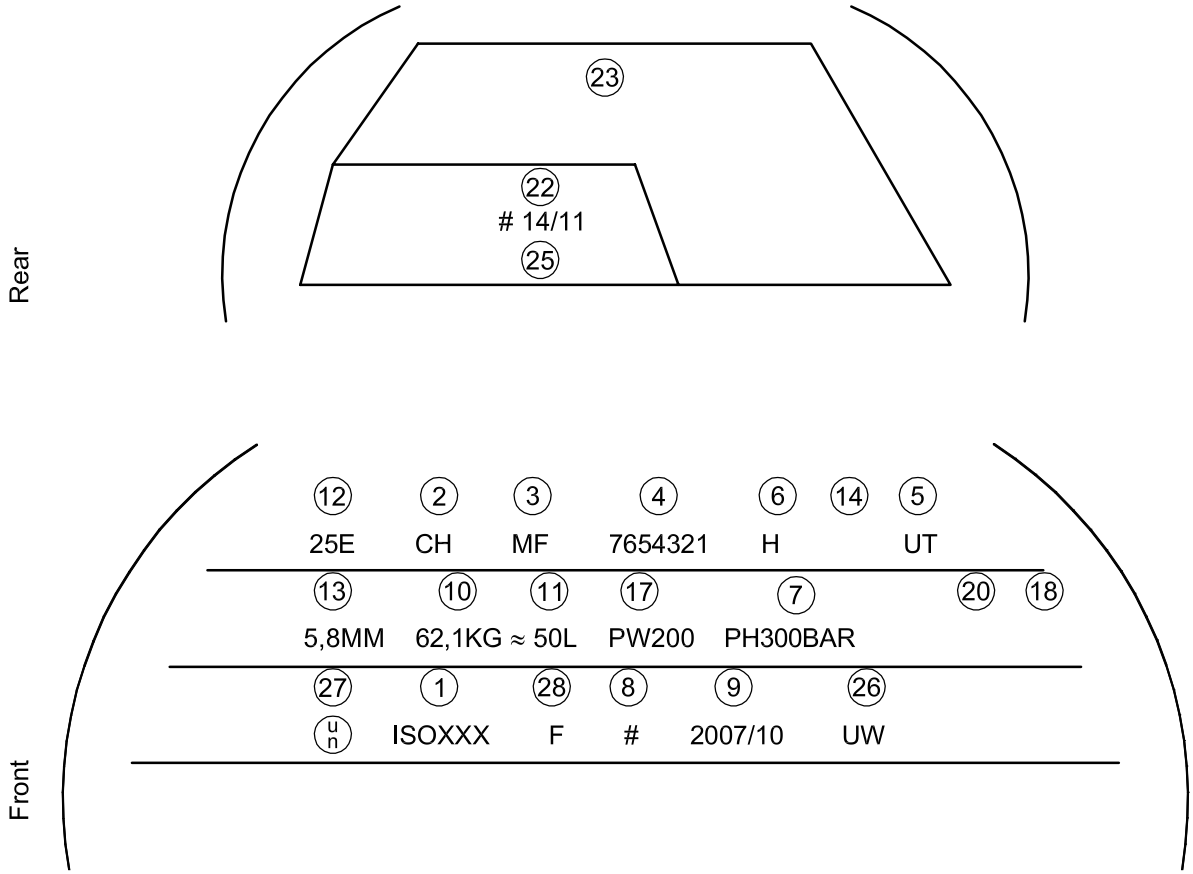
[b] Not mandatory according to the UN but normative for this International Standard.

[c] 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, although this practice is deprecated (see ISO 80000-4).

Annex A
(normative)

Locations of stamp markings

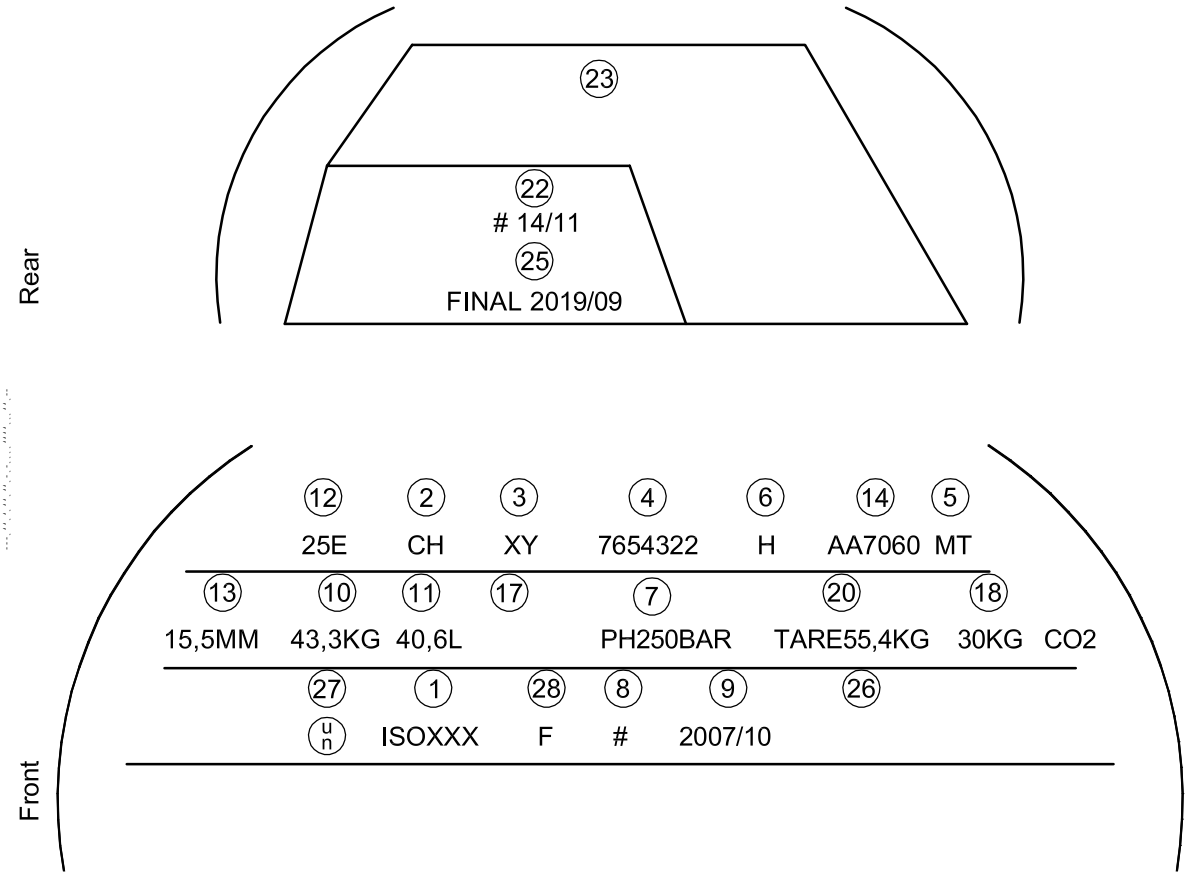
This annex is normative as it concerns the arrangement of certain stamp markings (see 4.3). These stamp markings shall be grouped as closely as possible. The stamp markings given in the figures are only examples and do not necessarily represent actual values.



Key

1 standard
2 country of manufacture
3 manufacturer's identification
4 manufacturing serial number
5 stamp for non-destructive examination (if applicable)
6 identification of steel compatibility (if applicable)
7 test pressure
8 inspection stamp
9 initial test date (year/month)
10 empty weight
11 water capacity
12 identification of cylinder thread
13 minimum guaranteed wall thickness
14 identification of aluminium alloy (if applicable)
15 —
16 —
17 working pressure
18 maximum permissible filling weight (if filled by weight)
19 —
20 tare weight
21 —
22 inspection stamp and date of periodic inspection (year/month)
23 space for additional optional markings or for application of labels
24 —
25 service life for composite cylinders
26 underwater use of composite cylinders
27 international mark(s)
28 country of approval for stamp mark No. 27

Figure A.1 — Locations of stamp markings for compressed gases

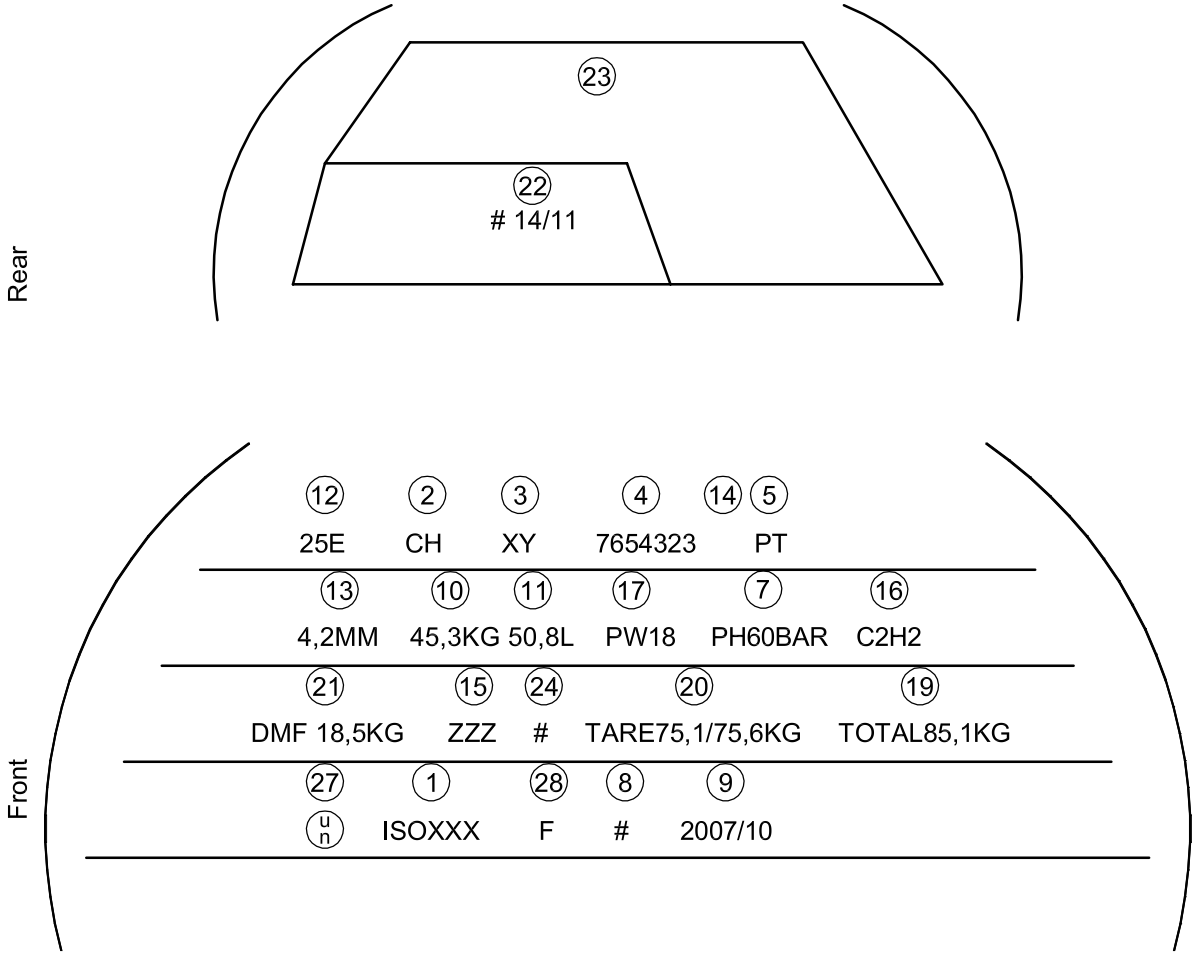


Key

1 standard
2 country of manufacture
3 manufacturer's identification
4 manufacturing serial number
5 stamp for non-destructive examination (if applicable)
6 identification of steel compatibility (if applicable)
7 test pressure
8 inspection stamp
9 initial test date (year/month)
10 empty weight
11 water capacity
12 identification of cylinder thread
13 minimum guaranteed wall thickness
14 identification of aluminium alloy (if applicable)
15 —
16 —
17 space for working pressure in case of change of service to a compressed gas [a]
18 maximum permissible filling weight
19 —
20 tare weight
21 —
22 inspection stamp and date of periodic inspection (year/month)
23 space for additional optional markings or for application of labels
24 —
25 service life for composite cylinders
26 underwater use of composite cylinders
27 international mark(s)
28 country of approval for stamp mark No. 27

[a] PW may be also marked.

Figure A.2 — Locations of stamp markings for liquefied gases



Key

1 standard
2 country of manufacture
3 manufacturer's identification
4 manufacturing serial number
5 stamp for non-destructive examination (if applicable)
6 —
7 test pressure (PH60BAR or PH52BAR) [a]
8 inspection stamp
9 initial test date (year/month)
10 empty weight
11 water capacity
12 identification of cylinder thread
13 minimum guaranteed wall thickness
14 identification of aluminium alloy (if applicable)
15 identification of porous material
16 identification of content
17 working pressure
18 —
19 total weight
20 tare weight: Tare S, or Tare A/S or Tare F
21 identification of solvent for acetylene cylinders
22 inspection stamp and date of periodic inspection (year/month)
23 space for additional optional markings or for application of labels
24 inspection stamp certifying correct filling of porous material
25 —
26 —
27 international mark(s)
28 country of approval for stamp mark No. 27

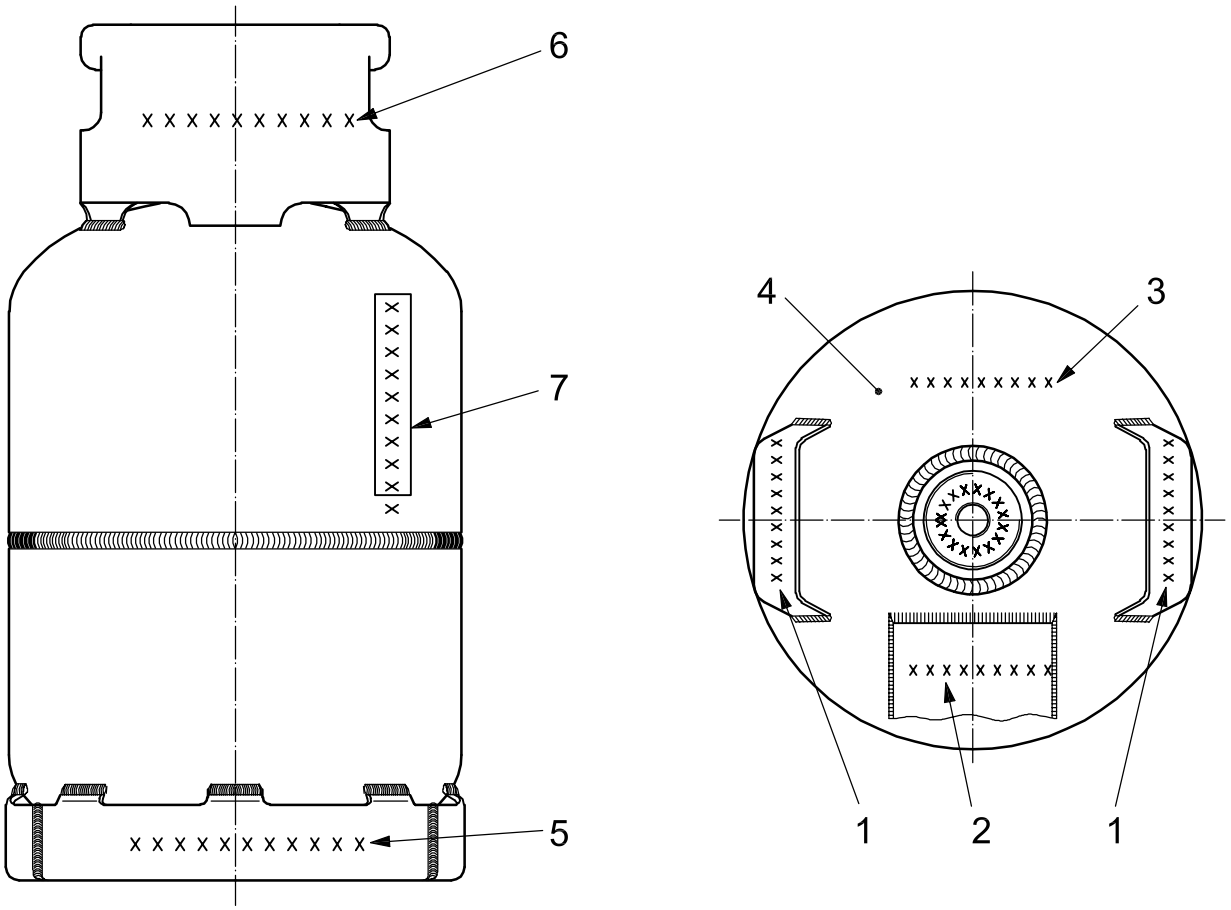
[a] The test pressure may be either 60 bar or 52 bar in accordance with ISO 3807-1 or ISO 3807-2 (as applicable).

Figure A.3 — Locations of stamp markings for acetylene

Annex B
(informative)

Metallic LPG cylinders — Examples of permanent marking positions

The permanent markings of metallic LPG cylinders are in three groups as defined by the regulations (see 4.3) and displayed at one or more of the positions in Figure B.1, depending on the design and size of the cylinder and the space available for markings.



Key

1 handle(s)
2 permanently attached nameplate
3 stamping on cylinder body
4 cylinder neck boss
5 foot-ring
6 shroud
7 for composite cylinders only, label placed under the resin or covered by a transparent coating

Figure B.1 — Permanent marking positions for metallic LPG cylinders

Bibliography

[1] ISO 3807-1, *Cylinders for acetylene — Basic requirements — Part 1: Cylinders without fusible plugs*

[2] ISO 3807-2, *Cylinders for acetylene — Basic requirements — Part 2: Cylinders with fusible plugs*

[3] ISO 7225, *Gas cylinders — Precautionary labels*

[4] ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

[5] ISO 9809-1, *Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa*

[6] ISO 10920, *Gas cylinders — 25E taper thread for connection of valves to gas cylinders — Specification*

[7] ISO 11116-1, *Gas cylinders — 17E taper thread for connection of valves to gas cylinders — Part 1: Specifications*

[8] ISO/TS 15510, *Stainless steels — Chemical composition*

[9] ISO 80000-4, *Quantities and units — Part 4: Mechanics*

[10] *Recommendations on the Transport of Dangerous Goods — Model Regulations*, United Nations

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