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## Transportable gas cylinders (excluding LPG) – Procedures for change of gas service

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Swedish Standards corresponding to documents referred to in this Standard are listed in "Catalogue of Swedish Standards", issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

## Gasflaskor (exkl. gasolflaskor) – Procedur för byte av gasslag

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ICS 23.020.3

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English version

**Transportable gas cylinders  
(excluding LPG) – Procedures for change of gas service**

Bouteilles à gaz transportables (GPL exclus) –  
Procédures pour le changement de service

Ortsbewegliche Gasflaschen (ausgenommen  
LPG) – Verfahren für den Wechsel der Gasart

This European Standard was approved by CEN on 1997-08-02. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

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**Foreword**

This European Standard has been prepared by Technical Committee CEN/TC 23 "Transportable gas cylinders", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1998, and conflicting national standards shall be withdrawn at the latest by April 1998.

This European Standard has been submitted for reference into the RID and/or in the technical annexes of the ADR. Therefore in this context the standards listed in the normative references and covering basic requirements of the RID/ADR not addressed within the present standard are normative only when the standards themselves are referred to in the RID and/or in the technical annexes of the ADR.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## **0 Introduction**

It is occasionally desirable to change gas cylinders from one gas service to another. Certain of these service changes can be made quite easily, while others require a careful inspection of the interior and exterior of the cylinder, and consideration of its compatibility with the new gas service. Cylinders are manufactured in accordance with EN Standards and are intended for use with a variety of gases under specified filling conditions.

This standard has been prepared to assist those engaged in the filling of gas cylinders in changing cylinders from one gas service to another.

## 1 Scope

This European Standard applies to all refillable gas cylinders including tubes (water capacity greater than 150 l) and specifies requirements which shall be considered whenever a cylinder is being transferred from one gas service to another.

This European Standard does not apply to cylinders for Liquefied Petroleum Gas (LPG), dissolved acetylene or radioactive gases.

NOTE. The exclusion of LPG from the Scope of this standard relates to substances carried under the UN identification number 1965 'Hydrocarbon gas mixture, liquefied, N.O.S.' (see 'Recommendations on the Transport of Dangerous Goods', published by the United Nations).

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 720-2:1996	Transportable gas cylinders - Gases and gas mixtures Part 2: Determination of flammability and oxidizing ability of gases and gas mixtures
prEN 1802:1995	Transportable gas cylinders - Periodic inspection and testing of seamless aluminium gas cylinders (excluding LPG)
prEN 1803:1995	Transportable gas cylinders - Periodic inspection and testing of welded steel gas cylinders (excluding LPG)
prEN 1968:1995	Transportable gas cylinders - Periodic inspection and testing of seamless steel gas cylinders (excluding LPG)
prEN 1975:1995	Transportable gas cylinders - Specification for the design and construction of refillable transportable seamless aluminium alloy gas cylinders of capacity from 0,5 litres up to and including 150 litres
prEN ISO 11114-1:1997	Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents Part 1: Metallic materials
prEN ISO 11114-3:1997	Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents Part 3: Test methods

### 3 Definitions

For the purposes of this standard, the following definitions apply:

**3.1 competent person:** Person who has the necessary technical knowledge and experience to assess the requirements for the safe change of service of cylinders from one gas (or gas mixture) service to another, to specify the equipment used for that operation and to provide appropriate instructions for the change of service operation.

**3.2 experienced person:** Person who is trained and has the necessary skills to undertake the change of service operations specified by the competent person.

**3.3 compatibility:** Term which relates to the interaction of the gas and cylinder/cylinder equipment which comes into contact with the gas under the conditions of use. Hence, the term compatible implies a satisfactory gas/cylinder/cylinder equipment combination.

**3.4 non destructive test (NDT):** Test method other than a hydrostatic pressure test, which has the capability of detecting potentially hazardous areas of weakness, such as cracks in the cylinder material of construction. Examples of NDT method are (shear-wave) ultrasonic and acoustic emission.

### 4 Requirements

#### 4.1 Principles

Change of service operations shall only be carried out by experienced persons, working to written instructions issued by and working with equipment specified by the competent person.

Although some cylinders are restricted to specific gas services, the majority of cylinders can be transferred from one gas service to another, provided applicable regulations are observed and appropriate procedures are followed and material compatibilities are considered (see prEN ISO 11114-1 and prEN ISO 11114-3).

All residual materials (gaseous, liquid and solid) which are incompatible with or likely to present some other hazard with the new gas, either during filling or in use, shall be removed before the change of service is executed (see Annex A). Appropriate checks shall be carried out to ensure the removal of potentially hazardous materials is effective.

Examples of such potentially hazardous materials are given in annex B.



For the purposes of this standard, the gases for which cylinder transfers are most frequently desired have been separated into several groups. This separation has taken into consideration the chemical and physical reactivity of the gases and of the contaminants which are most frequently encountered.

For guidance see annex C.

#### **4.2 Specific operational requirements**

This subsection sets out the minimum procedural requirements to enable a gas cylinder to be safely transferred from one gas service to another.

**4.2.1** The actions required for safe change of gas service shall be in accordance with table 1.

Table 2 sets out the groups of gases and the actions required for transfer from an old to a new gas service.

The specific operational actions are not necessarily listed in the order they are carried out.

**Table 1. List of actions required for change of gas service**

Step No.	Action required
1	External examination and preparation
	Verify contents/identification
	Examine cylinder external surface
	Check valve outlet and pressure relief device, if present
	Check working pressure/ specification
	Ownership
	Test date - retest if required resulting from change of service
	Reduce pressure (blow down) to atmospheric pressure using appropriate discharge
	Remove all existing labels, stencils, etc. after cylinder has been emptied
	Remark; label, paint, stamp, etc. (After gas has been removed from the cylinder.)
NOTE: If the valve is removed do an internal visual inspection.	
2	Check for absence of water contamination
3	Internal inspection for presence of liquid and/or hydrocarbons. If suspected, clean for oxygen service
4	Check materials compatibility in prEN ISO 11114-1
5	Check moisture level for steel cylinders. Use moisture requirements of prEN ISO 11114-1
6	Check for internal surface defects
7	Check for internal corrosion
8	Cylinder content evacuation
8.1	If valve has to be removed evacuate or purge
9	Check service against prEN ISO 11114-1, if not compatible perform appropriate NDT and if necessary hydrotest
10	If there are signs that the cylinder was exposed to water during service then appropriate NDT and if necessary hydrotest are required

**Table 2. Groups of gases and actions required for change of gas service**

Gas service From/to	Inert A	Inert/ Active B	Oxidizing C	Flammable D	Embrittling E	Carbon monoxide F	Toxic Corrosive Pyrophoric G
For actions required see table 1							
<b>Group A - Inert</b> Gases which do not react with the cylinder or impurities, or which in combination with impurities do not attack the cylinder e.g. nitrogen, argon, helium, neon, krypton, xenon and gas mixtures thereof	1	1 2	1 3	1	4 1 6	1 5	4 1 3
<b>Group B - Inert/Active</b> Gases which are inert in terms of oxy potential but which promote the corrosive action of water: e.g. carbon dioxide, carbon dioxide mixtures and oxygen mixtures less than 21 % O <sub>2</sub>	1 7	1	1 3	1 7	4 1 6 7	1 5 7	4 1 3 7
<b>Group C - Oxidizing</b> Oxidizing gases where there is a risk of ignition when hydrocarbons are present e.g. oxygen, nitrous oxide, air and mixtures containing these gases (see EN 720-2)	1 7	1	1	8 1 7	4 8 1 6 7	8 1 5 7	4 8 1 3 7
<b>Group D - Flammable</b> Includes hydrocarbons and gas mixtures thereof. Flammable embrittling gases and carbon monoxide are excluded	8 1	8 1	8 1 3	8.1 1	4 1 6 8	8.1 1 5	4 8 1 3
<b>Group E - Embrittling (not toxic and/or non pyrophoric)</b> Hydrogen, deuterium, silane and gases that may have a similar embrittling effect on the cylinder as a pure gas	9 8 1	9 8 1	9 8 1 3	9 8 1	9 8.1 1 6	9 8 1 5	4 9 8 1 3
<b>Group F - Carbon monoxide</b> Carbon monoxide and mixtures of carbon monoxide that may have a similar effect on the cylinder as a pure gas	8 1 10	8 1 10	8 1 3 10	8 1 10	8 1 6 10	8.1 1 5 10	4 8 1 3 10
<b>Group G - Toxic, corrosive, pyrophoric gases</b> Excluding Group F Caution: some gases (e.g. hydrides) are also embrittling (see prEN ISO 11114-1)	Specialised procedures required for this group are not given in this standard, some basic guidance is given in annex B.						