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**Gas cylinders — Acetylene cylinder  
bundles — Filling conditions and filling  
inspection**

*Bouteilles à gaz — Cadres de bouteilles d'acétylène — Conditions de  
remplissage et contrôle de remplissage*

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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 13088 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 4, *Operational requirements for gas cylinders*.

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## Introduction

This International Standard aims at the harmonization of the different operating and filling conditions of acetylene cylinder bundles and covers requirements that reflect current practice and experience regarding inspection at the time of filling.

Where there is any conflict between this International Standard and any applicable regulation, the regulation always takes precedence.

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 (see ISO 80000-4).

In this International Standard the unit bar is used, due to its universal use in the field of technical gases. It should, however, be noted that bar is not an SI unit, and that the according SI unit for pressure is pascal (Pa).

Pressure values given in this International Standard are given as gauge pressure (pressure exceeding atmospheric pressure) unless noted otherwise.

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# Gas cylinders — Acetylene cylinder bundles — Filling conditions and filling inspection

## 1 Scope

This International Standard specifies the minimum requirements for the filling conditions and filling inspection of acetylene cylinder bundles. It applies both to bundles which are filled while the cylinders are assembled in the bundle and to bundles of which the cylinders are filled as individual cylinders and are assembled into a bundle after filling. It does not apply to bundles containing solvent-free acetylene cylinders.

This International Standard is not applicable to individual acetylene cylinders that are not intended to be assembled into a bundle (see ISO 11372).

## 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 11372, *Gas cylinders — Acetylene cylinders — Filling conditions and filling inspection*

<https://standards.iteh.ai/catalog/standards/sist/984fa94a-99ce-404c-a11f-9d9fde990d82/iso-13088-2011>

## 3 Terms and definitions

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

### 3.1

#### **acetylene cylinder**

cylinder manufactured and suitable for the transport of acetylene, containing a porous material and solvent for acetylene, with a valve and other accessories affixed to the cylinder

NOTE When there is no risk of ambiguity, the word “cylinder” is used.

### 3.2

#### **acetylene cylinder bundle**

transportable unit comprising of at least 2 cylinders up to and usually not exceeding 16 cylinders that are permanently connected together by a manifold and contained within a rigid frame equipped with all necessary equipment for filling and use

### 3.3

#### **cylinder shell**

<acetylene cylinders> empty cylinder manufactured and suitable for receiving and containing a porous material for use as part of an acetylene cylinder

### 3.4

#### **filler**

<gas cylinders> trained person responsible for inspection prior to, during and immediately after filling

**3.5**  
**maximum acetylene content**  
<acetylene cylinder bundles> specified maximum weight of acetylene including saturation acetylene in the bundle cylinder

NOTE For the relationship of the maximum acetylene content of bundle cylinders and of individual cylinders, see 4.2.1.

**3.6**  
**maximum acetylene charge**  
<acetylene cylinder bundles> maximum acetylene content minus the saturation gas

**3.7**  
**porous material**  
<acetylene cylinders> single- or multiple-component material introduced to, or formed in, the cylinder shell, that, due to its porosity, allows the absorption of a solvent/acetylene solution

NOTE The porous material may be either:

- monolithic, consisting of a solid product obtained by reacting materials or by materials connected together with a binder, or
- non-monolithic, consisting of granular, fibrous or similar materials without the addition of a binder.

**3.8**  
**residual gas**  
<acetylene cylinder bundles> weight of acetylene including the saturation acetylene contained in the cylinders of a bundle returned for filling

**3.9**  
**saturation gas**  
<acetylene cylinders> acetylene that remains dissolved in the solvent in the cylinder at atmospheric pressure (1,013 bar) and at a temperature of 15 °C

**3.10**  
**solvent**  
<acetylene cylinders> liquid that is absorbed by the porous material and is capable of dissolving and releasing acetylene

NOTE The following abbreviations are used:

- “A” for acetone;
- “DMF” for dimethylformamide.

**3.11**  
**solvent operating range**  
<acetylene cylinder bundles> range from the minimum to the maximum solvent content permissible in a bundle which is filled while the cylinders are assembled

NOTE For the determination of the solvent operating range, see Annex A.

**3.12**  
**specified solvent content**  
<acetylene cylinders> weight of solvent that the acetylene cylinder shall contain in accordance with the type approval



**3.13****tare**

(acetylene cylinders) reference weight of the acetylene cylinder including the specified solvent content

NOTE 1 The tare is further specified in accordance with definitions 3.13.1 to 3.13.2.

NOTE 2 For cylinders with solvent, the tare is expressed by indicating either tare S or both tare A and tare S.

**3.13.1****tare A**

(acetylene cylinders) sum of the weights of the empty cylinder shell, the porous material, the specified solvent content, the valve, the coating, where applicable, and all other parts that are permanently attached (e.g. by clamping or bolting) to the cylinder when it is presented to be filled

**3.13.2****tare S**

(acetylene cylinders) tare A plus the weight of the saturation gas

**3.14****bundle tare**

(acetylene cylinder bundles) reference weight of the acetylene cylinder bundle including its solvent

NOTE The bundle tare is further specified in accordance with 3.14.1 to 3.14.4.

**3.14.1****tare  $BA_{max}$** 

(acetylene cylinder bundles) sum of tare A for all cylinders permanently connected together by a manifold containing the maximum solvent content [therefore including the amount of the positive solvent operating range (see A.3)] plus the weights of the rigid frame and all other associated and permanently attached equipment

**3.14.2****tare  $BS_{max}$** 

(acetylene cylinder bundles) sum of tare S for all cylinders permanently connected together by a manifold containing the maximum solvent content including the amount of the positive solvent operating range (see A.3) plus the weights of the rigid frame and all other associated and permanently attached equipment

**3.14.3****tare  $BA_{min}$** 

(acetylene cylinder bundles) sum of tare A of all cylinders permanently connected together by a manifold containing the minimum solvent content [therefore excluding the amount of the negative solvent operating range (see A.3)] plus the weights of the rigid frame and all other associated and permanently attached equipment

**3.14.4****tare  $BS_{min}$** 

(acetylene cylinder bundles) sum of tare S of all cylinders permanently connected together by a manifold containing the minimum solvent content [therefore excluding the amount of the negative solvent operating range (see A.3)] plus the weights of the rigid frame and all other associated and permanently attached equipment

**3.15****maximum gross weight**

(acetylene cylinder bundles) tare  $BA_{max}$  plus the maximum acetylene content of all bundle cylinders or tare  $BS_{max}$  plus the maximum acetylene charge of all bundle cylinders, respectively

**3.16**  
**working pressure**

(acetylene cylinders) settled pressure at a uniform reference temperature of 15 °C in a cylinder containing the specified solvent content and the maximum acetylene content

NOTE It is equal to the working pressure which is stamped on the individual cylinder.

**4 Basic requirements for acetylene cylinder bundles**

**4.1 General**

Acetylene cylinders in accordance with ISO 3807 or an equivalent applicable regulation/standard may be filled simultaneously without dismantling the bundle, provided that the conditions of this standard are fulfilled.

Acetylene cylinders in a bundle shall have the same nominal dimensions, nominal water capacity, solvent and working pressure. Only one porous material shall be used (covered by one type approval).

This clause and Annex A apply to bundles which are filled while the cylinders are assembled in the bundle. Clause 7 applies to bundles of which the cylinders are individually filled and then assembled into a bundle.

**4.2 Filling conditions**

**4.2.1 Maximum acetylene content**

The maximum acetylene content for cylinders in a bundle is specified by the manufacturer and is lower than that of individual cylinders to allow for a solvent operating range.

NOTE Often the acetylene content in acetylene cylinder bundles is 90 % of that of its individual cylinders. However, other values for the maximum acetylene content of cylinders in a bundle can be used. As a result, different values for the maximum and minimum solvent content and the maximum number of consecutive fillings have to be applied (see 4.2.2, 4.2.3 and Annex A).

**4.2.2 Solvent content**

The maximum and minimum solvent content are a function of the amount of the reduced maximum acetylene content to be used in the bundle (see 4.2.1) and the filling conditions for the individual acetylene cylinder and shall be derived in accordance with Annex A.

NOTE The result of the calculations is used for initially fixing tare  $BA_{min}$  and tare  $BA_{max}$  (when tare A is used) or tare  $BS_{min}$  and tare  $BS_{max}$  (when tare S is used). These calculations do not have to be carried out for every filling of the bundle.

**4.2.3 Maximum number of consecutive fillings**

The maximum number of consecutive fillings before the bundle has to be dismantled and the cylinders have to be checked individually and replenished with solvent is a function of the solvent operating range and shall be derived in accordance with Annex A.

NOTE In practice, the number of times that a bundle with acetone as solvent may be filled without dismantling generally does not exceed 6 when derived in accordance with Annex A.

In the case of a bundle with DMF as solvent, the need to dismantle the bundle to replenish the solvent usually coincides with the periodic inspection of the cylinders for this bundle. The number of fills before the bundle is dismantled shall not exceed 100.

## 5 Assembly, marking and documentation of acetylene cylinder bundles

### 5.1 Assembly

Before assembling or reassembling the cylinders in a bundle, the solvent in the individual cylinders shall be replenished to the maximum solvent content.

### 5.2 Verification of marking and necessary documentation

The revised tare based on the maximum solvent content for each individual cylinder used in a bundle shall be shown on the cylinder.

An identification plate shall be permanently affixed to the bundle frame. Before filling an acetylene cylinder bundle, the following information shall be made available:

a) Bundle filling data:

- 1) the gas name ("acetylene, dissolved"), identification number (UN-number 1001) and the chemical formula;
- 2) the maximum acetylene content of the bundle, in kilograms;
- 3) the working pressure, as stamped on each cylinder;
- 4) the type of solvent;
- 5) the last inspection date (year and month) of that cylinder within the bundle which is first due for periodic inspection;
- 6) tare  $BA_{min}$  and tare  $BA_{max}$  or tare  $BS_{min}$  and  $BS_{max}$  in kilograms;
- 7) date (year) of the next periodic inspection.

b) Other information:

- the type approval number of the bundle, if appropriate;
- the manufacturer of the bundle;
- the name or identification of the owner;
- a unique identification number of the bundle;
- the maximum gross weight of the bundle, in kilograms.

c) In addition, the following information shall be available:

- instructions for the handling of the bundle (including the information that cylinder valves should be closed in special circumstances only).

The following identification data shall be recorded and available for the bundle each time it is filled:

- the number of consecutive fillings since the last replenishment of solvent.

NOTE This might be not necessary for bundles with DMF if the maximum number of consecutive fillings is 100.