International Standard

ISO 10286

Gas cylinders — Vocabulary

Bouteilles à gaz — Vocabulaire

Sixth edition
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 23, *Transportable gas cylinders*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This sixth edition cancels and replaces the fifth edition (ISO 10286:2021), which has been technically revised.

The main changes are as follows:

— introduction of several new terms and definitions throughout Clause 3;

— correction of definitions throughout Clause 3;

— removal of some terms and definitions in Clause 3;

— addition to Annex B of both the terms introduced in Clause 3 and of additional terms where no definition were given but the correct translation into French and German are given.

In addition to text written in the official ISO languages (English, French), this document gives text in German. This text is published under the responsibility of the Member Body for Germany (DIN) and is given for information only. Only the text given in the official languages can be considered as ISO text.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The terms and definitions in this document are given in the following layout:

preferred term(s)	in bold typeface
admitted term(s)	or synonyms, in normal typeface
DEPRECATED: deprecated term	deprecated term(s), in normal typeface, with the designation "DEPRECATED":
definition	the definition, where available, in normal typeface
Note 1 to entry:	notes to entry, cross-references and examples.
Figures/non-verbal representations	

The terms in this document are sorted in systematic order as far as possible. Further guidance on terminological presentation can be found in ISO 10241-1.

The definitions support the understanding of the terms used in this document. They have been prepared with due regard to possible uses in different fields related to gas cylinders. However, it is possible that they will require adaption for particular uses.

Within this document, the term "ADR" is for simplification used as to also include similar regulations such as RID and ADN, where appropriate.

Table 1 shows a hierarchical overview of pressure receptacles according to the UN Model Regulations.

Annex A shows the different pressures for pressure receptacles in relation to each other.

Annex B shows a table giving both the terms of clause 3 as well as terms for additional terminology including the translation to the other two languages of this three-language document.

Annex C shows figures related to the additional terminology given in Annex B.

Terms given in square brackets are not within the scope of this document. They are shown for information only.

Unless noted by exception, the use of the word "cylinder" in this document refers to cylinders as well as tubes and pressure drums.

In International Standards, weight is equivalent to a force, expressed in Newton. However, in common parlance (as used in terms defined in this document), the word "weight" continues to be used to mean "mass", even though this practice is deprecated (ISO 80000-4).

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Table 1 — Overview of terms for pressure receptacles and related containers which are not defined as pressure receptacles

Battery-vehicle[d]	Small receptacle containing gas (gas cartridge) and aerosol dispenser	MEGC (multiple-element gas container)	pressure receptacle							[Tank[a]]
			Cylinder	Tube	Pressure drum	Bundle of cylinders	Salvage pressure receptacle	[Closed cryogenic receptacle[b]]	[Metal-hydride storage system[c]]	

[a] In scope of CEN/TC 296 and CEN/TC 286.

[b] In scope of ISO/TC 220.

[c] In scope of ISO/TC 197.

[d] This designation is used in the ADR.

NOTE Within this document, for simplification, the use of the term “ADR” also includes similar regulations such as RID and ADN, where appropriate.

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Gas cylinders — Vocabulary

1 Scope

This document defines terms for the manufacture and use of gas cylinders and other pressure receptacles and their fittings.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

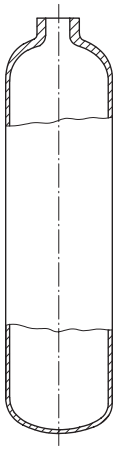
3.1 Terms related to pressure receptacles

3.1.1 All pressure receptacles

3.1.1.1
pressure receptacle
DEPRECATED: receptacle
transportable receptacle intended for holding substances under pressure including its closure(s) and other service equipment

Note 1 to entry: It is a collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles, metal-hydride storage system, bundle of cylinders and salvage pressure receptacles.

EXAMPLE Seamless gas cylinder:



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3.1.1.2
cylinder
gas cylinder
transportable pressure receptacle of a water capacity not exceeding 150 l with a test pressure volume product not exceeding 1,5 million bar·litres

Note 1 to entry: In ISO/TC 58 standards, the term “gas cylinder” is frequently used for clarification.

Note 2 to entry: 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

3.1.1.3
tube
pressure receptacle of seamless or composite construction having a water capacity exceeding 150 l but not more than 3 000 l with a test pressure volume product not exceeding 1,5 million bar·litres

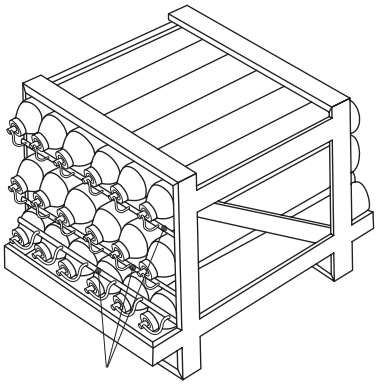
Note 1 to entry: 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

3.1.1.4
pressure drum
welded pressure receptacle of a water capacity exceeding 150 l and of not more than 1 000 l

3.1.1.5
bundle of cylinders
DEPRECATED: cylinder bundle, cylinder pack
pressure receptacle comprising an assembly of cylinders or cylinder shells that are fastened together and which are interconnected by a manifold and transported as a unit, having a product of test pressure and total water capacity not exceeding 1,5 million bar·litres except that bundles intended for the transport of toxic gases are limited to 1 000 l total water capacity

Note 1 to entry: 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

EXAMPLE



Note 2 to entry: In ISO/TC 58 standards, the term “bundle” is frequently used for simplification.

3.1.1.6
salvage pressure receptacle
pressure receptacle having a total test pressure volume product not exceeding 1,5 million bar·litres into which are placed damaged, defective, leaking or non-conforming pressure receptacle(s) for the purpose of transport, e.g. for recovery or disposal

Note 1 to entry: 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

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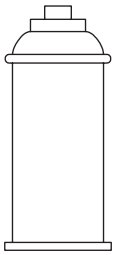
3.1.1.7
pressure receptacle shell
cylinder, tube, pressure drum or salvage pressure receptacle without its closures or other service equipment, but including any permanently attached device(s) (e.g. neck ring, foot ring etc.)

[SOURCE: UN Model Regulations]

3.1.1.8
small receptacle containing gas
gas cartridge
non-refillable receptacle having a water capacity not exceeding 1 000 ml for receptacles made of metal and not exceeding 500 ml for receptacles made of synthetic material or glass, containing under pressure a gas or mixture of gases

3.1.1.9
aerosol
aerosol dispenser
non-refillable receptacle made of metal, glass or plastics and containing a gas, compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder and fitted with a release device allowing the contents to be ejected

EXAMPLE



Note 1 to entry: This note applies to the German language only.

3.1.1.10
metal hydride storage system
single complete hydrogen storage system, including a pressure receptacle shell, metal hydride, pressure relief device, shut-off valve, service equipment and internal components used for the transport of hydrogen only

Note 1 to entry: Metal hydride storage systems are covered by ISO/TC 197.

Note 2 to entry: See also Table 1.

[SOURCE: UN Model Regulations.]

3.1.1.11
closed cryogenic receptacle
transportable thermally insulated receptacle for refrigerated liquefied gases, of a water capacity of not more than 1 000 l

Note 1 to entry: Closed cryogenic receptacles are covered by ISO/TC 220.

Note 2 to entry: See also Table 1.

[SOURCE: UN Model Regulations]

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3.1.1.12
MEGC
multiple-element gas container
multimodal assembly of cylinders, tubes or bundles of cylinders which are interconnected by a manifold and assembled within a framework, including service equipment and structural equipment necessary for the transport of gases

Note 1 to entry: ADR uses a different definition.

[SOURCE: UN Model Regulations]

3.1.1.13
battery-vehicle
vehicle containing elements which are linked to each other by a manifold and permanently fixed to a transport unit

Note 1 to entry: The following elements are considered to be elements of a battery-vehicle: cylinders, tubes, bundles of cylinders and pressure drums, as well as certain tanks destined for the carriage of gases with a capacity of more than 450 l.

Note 2 to entry: This term is used in the ADR only.

3.1.1.14
tank
portable tank, including a tank container, a road tank-vehicle, a rail tank-wagon or a receptacle to contain solids, liquids or gases, having a capacity of not less than 450 l when used for the transport of gases

Note 1 to entry: ADR uses a different definition.

[SOURCE: UN Model Regulations]

3.1.1.15
portable
capable of being carried by hand

Note 1 to entry: When used in connection with tanks, this means “transportable”.

3.1.1.16
user
entity (or individual) that operates and/or uses equipment

3.1.1.17
minimum design wall thickness
thickness of the metallic cylinder wall calculated from the design standard, taking into account the material properties and dimensions at time of manufacture

3.1.1.18
external coating
layer of material applied to the cylinder as a protective coating not intended to be removed or for cosmetic purposes

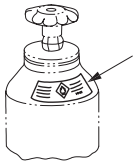
EXAMPLE Gel coat and paint.

Note 1 to entry: Not all composite cylinders will have an external coating.

3.1.1.19
precautionary label
label giving information on the recommended measures to minimize or prevent adverse effects resulting from exposure to content, which includes identification of content (UN Number, Proper Shipping Name), hazards of the content and precautions to be observed in the storage and use of the pressure receptacle and its contents

EXAMPLE

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Note 1 to entry: See ISO 7225 for additional examples.

3.1.2 All gas cylinders

3.1.2.1
type 1
category of pressure receptacles that includes all metal pressure receptacles

3.1.2.2
composite cylinder
cylinder reinforced by continuous filaments held in a matrix

Note 1 to entry: Cylinders of type 2, type 3, type 4 and type 5 are composite cylinders.

3.1.2.3
type 2
category of pressure receptacles that refers to hoop wrapped pressure receptacle with a load-sharing metal liner and composite reinforcement on the cylindrical portion only

3.1.2.4
type 3
category of pressure receptacles that refers to fully wrapped pressure receptacle with a load sharing metal liner and composite reinforcement on both the cylindrical portion and the dome ends

3.1.2.5
type 4
category of pressure receptacles that refers to fully wrapped pressure receptacle with a non-load sharing liner and composite reinforcement on both the cylindrical portion and the dome ends

3.1.2.6
type 5
category of pressure receptacles that refers to composite pressure receptacle without a liner

3.1.2.7
acetylene cylinder
cylinder manufactured and suitable for the transport of acetylene, containing a porous material and solvent (where applicable) for acetylene with a valve and other accessories affixed to the cylinder

3.1.2.8
cylinder end
part of the cylinder either closing the cylindrical section or enabling the installation of a closure, e.g. valve

EXAMPLE Cylinder base, cylinder shoulder.

3.1.2.9
cylinder neck thread
axial hole with a tapered or parallel thread formed on the internal surface of a cylinder neck

Note 1 to entry: For parallel threads, this includes a thread formed on the internal surface including a sealing recess for the “O” ring and thread relief.

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3.1.2.10
non-refillable cylinder
cylinder including a non-refillable sealing device that permits the cylinder to be filled only once

3.1.2.11
sleeve
transparent or non-transparent cover fitted to the outside surface of the cylinder

3.1.2.12
non-refillable sealing device
device permanently attached to the cylinder which, once activated, prevents the cylinder from being refilled

3.1.3 Composite gas cylinders

3.1.3.1
overwrap
reinforcement system of filament and matrix applied over the liner

3.1.3.2
matrix
material used to bind and hold the fibres in place

3.1.3.3
resin
polymer used for composite cylinders as a matrix or coating

3.1.3.4
liner
inner portion of a composite cylinder, comprising a metallic or non-metallic vessel, whose purpose is both to contain the gas and transmit the gas pressure to the overwrap

3.1.3.5
load-sharing liner
load-bearing liner
liner which has a burst pressure greater than or equal to 5 % of the nominal burst pressure of the finished composite cylinder

3.1.3.6
non load-sharing liner
non load-bearing liner
liner having a burst pressure less than 5 % of the nominal burst pressure of the finished composite cylinder

3.1.3.7
fibre
strand
roving
material provided as a filament or a bundle of filaments

3.1.3.8
translucent cylinder
cylinder that permits the passage of light

3.1.3.9
permanent protective attachment
integral part of the cylinder design permanently affixed to composite cylinders (type 2 to 5) covering part of or the entire surface of the cylinder, providing additional functions during handling, transport and use

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3.1.4 Acetylene cylinders

3.1.4.1
porous material
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 1 to entry: The porous material can 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.

3.1.4.2
top clearance
<acetylene cylinder> gap between the inside of the cylinder shoulder and the monolithic porous material

3.1.4.3
solvent
liquid absorbed by the porous material and is capable of dissolving and releasing acetylene

3.1.4.4
specified solvent content
weight of solvent that the acetylene cylinder nominally contains and that is established during prototype testing

3.1.4.5
maximum acetylene content
<single acetylene cylinder> specified maximum weight of acetylene including saturation acetylene in an acetylene cylinder

Note 1 to entry: Acetylene content can be calculated by subtracting tare A from the weight after filling.

3.1.4.6
maximum acetylene content
<acetylene cylinder bundle> specified maximum weight of acetylene including saturation acetylene in the bundle of cylinders

Note 1 to entry: Acetylene content can be calculated by subtracting tare A from the weight after filling.

3.1.4.7
maximum acetylene charge
maximum acetylene load
specified maximum quantity of acetylene minus the saturation acetylene

Note 1 to entry: The maximum acetylene charge is considered to be the maximum quantity of acetylene available for the end user.

Note 2 to entry: Acetylene charge can be calculated by subtracting tare S from the weight after filling.

3.1.4.8
residual gas
residual acetylene
<acetylene> weight of acetylene including the saturation acetylene contained in an acetylene cylinder returned for filling

3.1.4.9
saturation acetylene
saturation gas
acetylene that remains dissolved in the solvent in the acetylene cylinder at atmospheric pressure (1,013 bar) and at a temperature of 15 °C

Note 1 to entry: 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

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3.1.4.10
tare A
sum of weights of the empty cylinder shell, the porous material, the specified solvent content, the valve, the coating and the valve guard, where applicable, and all other parts that are permanently attached to the acetylene cylinder when it is presented to be filled

3.1.4.11
tare S
tare A plus the weight of the saturation acetylene

3.1.4.12
tare F
tare A minus the specified solvent content

3.1.4.13
acetylene decomposition blocker
safety device that stops acetylene decomposition at a pressure of ≤25 bar

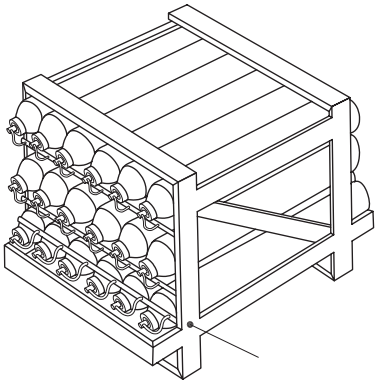
Note 1 to entry: The decomposition blocker for high-pressure acetylene can optionally comprise other safety elements such as non-return valves or automatic quick-acting shut-off devices (see ISO 15615).

Note 2 to entry: 1 bar = 0,1 MPa = 105 Pa; 1 MPa = 1 N/mm2.

3.1.5 Bundles of cylinders, battery-vehicles and MEGC

3.1.5.1
frame
structural and non-structural members of either a bundle, a MEGC or equivalent assembly which combine all other components together, while providing protection for the assembly's cylinders, valves and manifold, and which enable the assembly to be transported

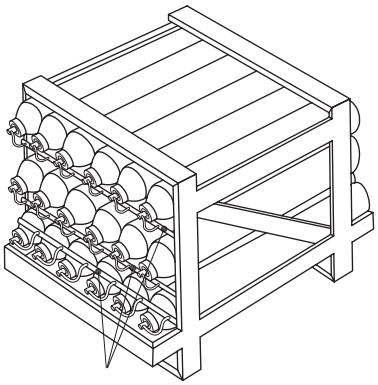
EXAMPLE



3.1.5.2
manifold
piping system for connecting pressure receptacle(s) valves or cylinder fittings to the main valve(s) or the main connection(s)

EXAMPLE

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3.1.5.3
main connection
means of making a gas connection to a bundle/battery-vehicle/MEGC

3.1.5.4
main valve
main shut-off valve
DEPRECATED: bundle valve
valve which is fitted to the manifold of a bundle of cylinders, battery-vehicle, battery wagon or MEGC isolating it from the main connection(s)

3.1.5.5
cylinder fitting
<bundles of cylinders, MEGCs, battery-vehicles> component with no gas shut-off capability that serves as a method for connecting a manifold to individual cylinders or tubes when valves are not fitted to the cylinders or tubes

Note 1 to entry: Cylinder fittings are in use both for bundles of cylinders and for assemblies such as MEGCs and battery-vehicles.

3.2 Terms related to accessories

3.2.1
accessory
device fitted to a pressure receptacle needed for operation and/or transport

EXAMPLE Cylinder valve, valve protection cap/valve guard, fitting, pressure regulator, pressure gauge.

3.2.2
fitting
component with no gas shut-off capability that serves as a connection

3.2.3
closure
device which closes an opening in a receptacle

EXAMPLE Valves, pressure relief devices, plugs, pressure gauges.

3.2.4
cylinder valve
type of closure which is fitted to a cylinder with the purpose of allowing or restricting the flow of gas from the cylinder

3.2.5
valve operating mechanism
mechanism which closes and opens the valve orifice and which includes the internal and external sealing systems

Note 1 to entry: For a VIPR, the valve operating mechanism is called the primary valve operating mechanism.

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EXAMPLE A threaded valve spindle which, when rotated, raises and lowers a seal/seat.

3.2.6
valve operating device
component which actuates the valve operating mechanism

EXAMPLE Handwheel (including knob), key, toggle, lever or actuator.

3.2.7
activation device
means for initiating the activation of the valve operating device

EXAMPLE Manually, mechanically, electrically, magnetically, thermally, hydraulically, pneumatically, pyrotechnically or a combination thereof.

3.2.8
valve inlet connection
DEPRECATED: valve stem
connection on the valve which connects the valve to the pressure receptacle

3.2.9
valve outlet connection
connection on the valve used to discharge the contents of the pressure receptacle

Note 1 to entry: For most valves this connection is also used for filling the pressure receptacle.

3.2.10
valve filling connection
connection on the valve used to fill the pressure receptacle

Note 1 to entry: For some valves (e.g. VIPRs) the valve filling connection is different from the valve outlet connection.

3.2.11
filling connection closing device
closing device located in the filling connection

EXAMPLE Non-return valve, isolating valve.

3.2.12
pressure outlet
outlet intended to deliver gas at a controlled pressure

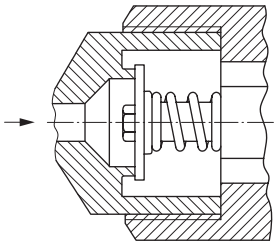
3.2.13
pressure regulating system
device(s) that reduce(s) the inlet pressure to a controlled outlet pressure

Note 1 to entry: A pressure regulating system can comprise of one or more stages of pressure regulation.

3.2.14
non-return valve
automatic valve which allows gas/liquid to flow only in one direction

EXAMPLE

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3.2.15
residual pressure valve
RPV
valve which incorporates a residual pressure device

3.2.16
residual pressure device
RPD
device that is designed to prevent ingress of contaminants by maintaining a positive pressure within the pressure receptacle relative to atmosphere by closing off its internal gas passages in the discharging direction

3.2.17
excess flow device
device designed to close or partially close when the flow of liquid, gas or vapour passing through it exceeds a predetermined value and to re-open when the pressure differential across the device has been restored below a certain value

Note 1 to entry: Some excess flow valves are designed to stay shut-off until reset.

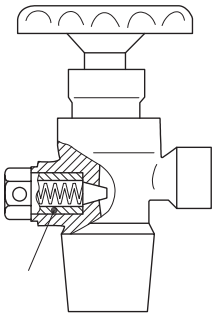
3.2.18
pressure relief device
PRD
pressure- and/or temperature-activated device used to prevent the pressure in a pressure receptacle from rising above a predetermined maximum, thereby preventing rupture of the pressure receptacle

Note 1 to entry: In some regions like North America, the term “pressure relief device” implies non-reclosing function.

EXAMPLE Pressure relief valves, bursting discs, fusible plugs and combinations of these devices.

3.2.19
pressure relief valve
PRV
DEPRECATED: safety valve
type of pressure relief device designed to relieve excessive pressure and to reclose and reseal to prevent further flow of gas or fluid from the pressure receptacle after resealing pressure is achieved

EXAMPLE



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3.2.20
ball valve
valve which uses the rotation of a ball with a through-passage to allow or shut-off flow through it

Note 1 to entry: Ball valves can have multiple ports.

3.2.21
self-closing cylinder valve
cylinder valve with a normally closed valve operating mechanism that is actuated by a separate operating device which is not an integral part of the cylinder valve

3.2.22
quick-release cylinder valve
cylinder valve with a valve operating mechanism designed for quick release of gas cylinder contents that is actuated by a valve operating device which can be activated by an activation device

Note 1 to entry: Commonly used valve operating mechanisms are pistons, flaps, bursting discs, piercing discs or differential pressure devices.

Note 2 to entry: The activation device is not necessarily part of the quick-release cylinder valve.

3.2.23
valve with integrated pressure regulator
VIPR
device intended to be permanently fitted to a pressure receptacle which comprises of at least a shut-off function and pressure regulating system

3.2.24
dual valve
dual port valve
valve designed to allow separate vapour and liquid withdrawal from a cylinder in its normal operating position each port having its own valve operating mechanism

3.2.25
thermally activated pressure relief device
TPRD
pressure relief device which is activated by temperature rather than by pressure

EXAMPLE Fusible plug, fusible trigger, shape memory metal, electrical trigger, glas bulb, chemical trigger.

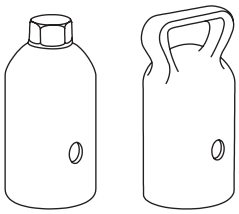
3.2.26
bursting disc
rupture disc
operating part of a pressure relief device that when installed in the device is designed to burst at a predetermined pressure to permit the discharge of fluid

3.2.27
fusible plug
non-reclosing pressure relief device designed to function by yielding or melting of a plug of fusible material within the specified temperature range

3.2.28
valve protection cap
device protecting the valve during handling, transport and storage and which needs to be removed for access to the valve to allow for connection, disconnection, opening and closing

EXAMPLE

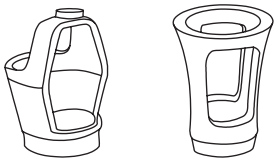
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3.2.29
valve guard
device protecting the valve during handling, transport and storage, which allows access to the valve without removal

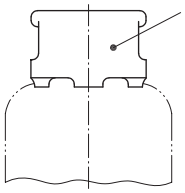
Note 1 to entry: There are two types of valve guards: rotational and non-rotational valve guards.

EXAMPLE



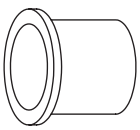
3.2.30
valve shroud
integral part of a welded cylinder design or pressure drum design for valve protection during transport, handling and storage

EXAMPLE



3.2.31
dust cap
device which is intended to protect the external inlet or outlet connection of a pressure receptacle valve against the ingress of dust, dirt or other contaminants

EXAMPLE

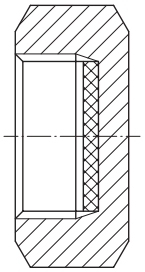


3.2.32
dust plug
device which is intended to prevent the ingress of dust, dirt or other contaminants by protecting the internal inlet or outlet connection of a valve, cylinder, tube or pressure drum

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3.2.33
sealing cap
device which is intended to seal the external outlet connection of a pressure receptacle valve

EXAMPLE



3.2.34
sealing plug
device which is intended to seal the internal outlet connection of a pressure receptacle valve

EXAMPLE



3.2.35
neck ring
ring securely attached externally to the cylinder or neck boss, with external thread or other means for attaching valve protection cap or valve guard

3.2.36
periodic inspection date ring
DEPRECATED: test date ring
ring indicating the date of the next periodic inspection

Note 1 to entry: Sometimes different forms and colours are used to enable quick identification of oncoming periodic inspection dates.

3.2.37
eduction tube
eductor tube
dip tube
tube fitted to the valve inlet to allow withdrawal of the liquid phase of a liquified gas with the cylinder in its normal operating position

Note 1 to entry: When this tube is used to homogenise mixtures, it is often called 'mix tube'.

3.2.38
single-part gauge
gauge of sufficient length to contact the length of full form taper threads

Note 1 to entry: These gauges are either plugs or rings, plain or threaded.

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3.2.39
internal leak tightness
leak tightness across the valve seat (leakage in and/or leakage out) when the valve is closed

3.2.40
external leak tightness
leak tightness to atmosphere (leakage in and/or leakage out) when the valve is open

Note 1 to entry: The total external leakage typically comprises that from the valve external sealing system plus, for example, pressure relief device, RPD, pressure indicating devices and pressure regulating system.

3.3 Terms related to manufacture

3.3.1
batch
set of homogeneous items or material, where the number of items in a batch can vary according to the context in which the term is used

Note 1 to entry: For specific applications, the definition can differ, but in this case the applications are identified within ISO/TC 58 standards by pointed brackets.

3.3.2
finished cylinder
cylinder which is fully assembled and appropriately marked, with or without any external coatings

3.3.3
finished drum
drum which is fully assembled and appropriately marked, with or without any external coatings

3.3.4
finished tube
tube which is fully assembled and appropriately marked, with or without any external coatings

3.3.5
autofrettage
pressure application procedure which strains the metal liner past its yield strength sufficient to cause permanent plastic deformation, and results in the liner having compressive stresses and the fibres having tensile stresses when at zero internal gauge pressure

3.3.6
stress relieving
heat treatment given to reduce the residual stresses of the metal

3.3.7
solution heat treatment
solution annealing
thermal treatment which consists of heating the products to a suitable temperature, holding at that temperature long enough to allow constituents to enter into solid solution, and cooling rapidly enough to hold the constituents in solution

3.3.8
quenching
hardening heat treatment in which a cylinder, which has been heated to a uniform temperature is cooled rapidly in a suitable medium

3.3.9
tempering
toughening heat treatment which follows quenching, in which the cylinder is heated to a uniform temperature below the lower critical point (AC1) of the steel

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3.3.10
normalizing
heat treatment in which the steel cylinder is heated to a uniform temperature above the upper critical point (AC3) of the steel and then cooled in a controlled atmosphere

3.4 Terms related to testing and inspection

3.4.1
testing
carrying out one or more test(s)

3.4.2
test
technical operation(s) for determining one or more characteristics according to a specified procedure to identify differences between specified, expected and actual results

Note 1 to entry: The term "testing" describes the activity of performing (a) test(s). It is not a synonym for the term "test".

3.4.3
type test
prototype test
test or series of tests conducted to prove that the design meets the requirements

3.4.4
inspection
evaluation of conformity by observation and judgement accompanied as appropriate by measurement, examination, testing or gauging

3.4.5
interval
length of time between two specified inspections and/or tests

3.4.6
design life
maximum number of years for which a pressure receptacle is designed and approved in accordance with the applicable standard

3.4.7
service life
number of years a piece of equipment is permitted to be in service

3.4.8
verification
DEPRECATED: check
confirmation, by examination of objective evidence, that specified requirements have been fulfilled

3.4.9
validation
confirmation of performance, through the provision of objective evidence, that the requirements for a specific use or application have been fulfilled

3.4.10
examination
process of determining a condition by judgement

Note 1 to entry: The examination results in a pass or fail or further measurement, testing or gauging.

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3.4.11
maintenance
DEPRECATED: reconditioning
set of activities performed during the operating life of pressure equipment to ensure it complies with the relevant specification

Note 1 to entry: Maintenance can include cleaning and replacing worn or damaged parts meeting the original specification.

3.4.12
repair
set of activities performed on defective pressure equipment to restore its compliance with the relevant specification

Note 1 to entry: Repair can include replacing worn or damaged parts meeting the original specification.

3.4.13
refurbishment
<valve> operation involving dismantling of the valve, evaluation and re-use or replacement (if necessary) of its internal components, and reassembly to make it suitable for further service

3.4.14
certificate
document that records the conformity of pressure equipment with specified requirements

Note 1 to entry: Certificates can also apply to processes, systems, persons or organizations.

3.4.15
competent authority
DEPRECATED: competent body
body or authority designated or otherwise recognized as such for any purpose in each country by its government

Note 1 to entry: The term “competent body” is not to be used. UN Model recommendations only use “competent authority” and “inspection body”.

3.4.16
inspection body
independent inspection and testing body approved by the competent authority

3.4.17
competent person
DEPRECATED: authorized person
person who is qualified, trained, experienced and approved to perform specified activities such as periodic inspection and test, welding, etc.

3.4.18
inspector
person who is qualified, trained, experienced and authorized to perform inspection and testing

3.4.19
filling operator
DEPRECATED: filler
person (or persons) who fills a pressure receptacle and is (are) responsible for inspection prior to, during and immediately after filling, who has received an appropriate level of training for the work involved

3.4.20
burst pressure ratio
ratio of burst pressure to test pressure

Note 1 to entry: Sometimes burst pressure ratio may also be used as ratio of burst pressure to working pressure.

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3.4.21
leak
defect or breach in a component intended to withstand pressure resulting in a leakage

3.4.22
leakage
flow of a fluid through a leak

Note 1 to entry: Permeation is not leakage.

3.4.23
permeation
penetration or diffusion of a fluid, such as a liquid, gas, or vapor, through a solid

3.4.24
bursting
burst
structural failure of an object due to pressure with extended propagation

Note 1 to entry: For a pressure receptacle, the two failure modes are leak or burst.

Note 2 to entry: In the past, the term “rupture” was sometimes used.

3.4.25
imperfection
departure of a quality characteristic from its intended level or state

Note 1 to entry: The existence of an imperfection does not necessarily imply nonconformity with the specification, nor does it have necessarily any implication as to the usability of a product. An imperfection should be rated on a scale of severity, in accordance with appropriate specifications, to establish whether or not the product is of acceptable quality.

3.4.26
defect
DEPRECATED: fault
imperfection of sufficient magnitude to warrant rejection of the product based on specified criteria

3.4.27
flaw
<pressure receptacle shell> imperfection or defect in the structure of a material

Note 1 to entry: In many standards, the term is used for a machined notch introduced for calibration or testing purposes.

3.4.28
critical flaw
<pressure receptacle shell> flaw that is large enough to exhibit unstable crack growth under certain service conditions

3.4.29
bulge
<pressure receptacle shell> visible swelling of the wall

3.4.30
dent
DEPRECATED: flat
<pressure receptacle shell> visible depression in the wall that has neither penetrated nor removed metal material

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3.4.31
gouge
DEPRECATED: groove
<pressure receptacle shell> rounded impression where metal has unintentionally been removed, displaced or redistributed

3.4.32
blister
localized delamination or void within the material

3.4.33
lamination
<pressure receptacle shell> layering of material

3.4.34
crack
cracking
split or separation in the material

Note 1 to entry: Typically, a crack appears as a line on the surface.

3.4.35
pitting
small localised corrosion craters in metal

3.4.36
cut
damage caused by a sharp object, which came into contact with the surface

3.4.37
abrasion
damage to a surface caused by scraping, wearing, vibration or rubbing of the material away by friction

Note 1 to entry: Abrasion can be the result of many cycles of something rubbing lightly on a surface, or due to a few cycles, perhaps only one, of heavy rubbing.

3.4.38
crazing
<composite pressure receptacle shell> hairline cracking of the resin, giving it an opaque, frosty appearance

3.4.39
crease
line or ridge formed as a result of previous localized over-stressing

3.4.40
delamination
<pressure receptacle shell> form of damage, in which a separation develops between layers of the material

3.4.41
rejected
determined to be not fit for service in its current condition

3.4.42
condemned
rejected and determined to be no longer fit for service and forbidden to be repaired

3.4.43
render unserviceable
treat a piece of equipment to make it impossible to be put into service

Note 1 to entry: Examples for acceptable methods to render cylinders and tubes unserviceable can be found in ISO 18119. Examples for acceptable methods to render valves unserviceable can be found in ISO 22434.

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3.4.44
devalving
DEPRECATED: removal
disconnection of the valve from the pressure receptacle

3.4.45
acoustic emission
AE
class of phenomena whereby transient elastic waves are generated by the rapid release of energy from localized sources within a material, or the transient waves so generated

3.4.46
acoustic emission examination
acoustic emission test
AT
testing of a test object during controlled stimulation using acoustic emission instrumentation to detect and analyse sources of acoustic emission

3.4.47
modal acoustic emission
MAE
non-destructive test technique focused on the detection, capture and analysis of the sound waves generated by acoustic events due to fibre tow breakage, cracking, crazing, rubbing, delamination or fracture of structural components

3.4.48
covering
protective or non-protective, transparent or non-transparent, device or attachment that can interfere with an external visual inspection

3.5 Terms related to characteristics, properties and pressures

3.5.1
gas
substance, which either has a vapour pressure greater than 300 kPa (3 bar) at 50 °C or is completely gaseous at 20 °C at the standard pressure of 101,3 kPa

Note 1 to entry: 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

3.5.2
gas mixture
combination of different single gases and/or liquids deliberately mixed in specified proportions resulting in a homogeneous gaseous mixture

3.5.3
compressed gas
gas, which, when packaged under pressure for transport, is entirely gaseous at –50 °C

Note 1 to entry: This category includes all gases with a critical temperature less than or equal to –50 °C.

3.5.4
liquefied gas
gas which, when packaged under pressure for transport, is partially liquid at temperatures above –50 °C

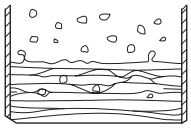
3.5.5
low pressure liquefied gas
liquefied gas, which has a critical temperature above +65 °C

3.5.6
high pressure liquefied gas
liquefied gas, which has a critical temperature between –50 °C and +65 °C

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3.5.7
dissolved gas (under pressure)
gas which, when packaged under pressure for transport, is dissolved in a liquid phase solvent

EXAMPLE



3.5.8
refrigerated liquefied gas
cryogenic gas
gas which is made partially liquid because of its low temperature at its actual pressure

3.5.9
inert gas
gas or gas mixture which does not readily react chemically with other substances

Note 1 to entry: This type of gas is typically a non-toxic, non-corrosive, non-flammable and non-oxidizing gas or gas mixture.

3.5.10
asphyxiant gas
gas or gas mixture which dilutes or replaces the oxygen normally in the atmosphere

Note 1 to entry: All gases with the exception of oxygen and its mixtures with oxygen concentration less than 19,5 % at sea level are asphyxiant. The term is mainly used for gases not connected with other hazards, flammability, toxicity, etc.

3.5.11
flammable gas
gas or gas mixture having a flammable range with air at 20 °C and a standard pressure of 101,3 kPa

Note 1 to entry: The UN Model Regulations have a more detailed definition.

3.5.12
oxidizing gas
gas or gas mixture which is able, at atmospheric pressure, to support the rate of combustion more than a reference mixture consisting of 23,5 % oxygen in nitrogen

3.5.13
toxic gas
gas or gas mixture which is either known to be or presumed to be a health hazard to humans because it has a LC_{50} value for acute toxicity equal to or less than 5 000 ml/m^3 (ppm[1)])

Note 1 to entry: Other risks such as tissue corrosiveness are sometimes associated.

Note 2 to entry: LC_{50} refers to a duration of one hour.

3.5.14
corrosive gas
gas or gas mixture with the ability to damage or destroy living tissues or materials

Note 1 to entry: For tissue corrosiveness, see ISO 13338.

Note 2 to entry: For corrosion, see ISO 11114-1.

Note 3 to entry: This note applies to the German language only.

1) ppm = parts per million

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3.5.15
pyrophoric gas
gas or gas mixture which, at atmospheric pressure, is spontaneously flammable when in contact with air

3.5.16
industrial gas
gas or gas mixture which is used in a technical process or similar activity, excluding medical and breathing applications

3.5.17
refrigerant gas
gas or gas mixture used in a heat cycle usually including, for enhanced efficiency, a reversible phase change from a gas to a liquid

3.5.18
calibration gas
analytical gas
scientific gas
gas or gas mixture which is used for analysis calibration or for purposes for supplying energy (flame, oven, etc.) and other similar purposes

EXAMPLE Gas for chromatography, atomic absorption spectro-photometer (AAS).

3.5.19
breathable gas
breathing gas
gas or gas mixture supporting life to be used in a breathing or a diving apparatus usually in a non-standard atmospheric medium such as water, high altitude, space or confined or polluted medium but not for therapeutic, diagnostic or prophylactic uses

EXAMPLE Air, oxygen and gas mixtures (nitrogen/oxygen, helium/oxygen, nitrogen/helium/oxygen).

3.5.20
gas for medical use
medical gas
gas or gas mixture intended to be administered to patients for therapeutic, diagnostic or prophylactic purposes, with or without pharmacological action, or to be used for surgical tools

Note 1 to entry: It includes medicinal gases.

3.5.21
medicinal gas
gas or gas mixture for medical, having pharmacological action and classified as a medicinal product, possibly administered to patients

Note 1 to entry: The term "medicinal gas" is not to be confused with the term "medical gas".

3.5.22
embrittling gas
gas or gas mixture which can cause cracking of metal due to the combined action of stress and hydrogen atoms

3.5.23
irritant
property of a gas which can cause a temporary reaction to the skin, eyes and mucous membranes

Note 1 to entry: It corresponds to GHS hazard class “Skin corrosion/irritation”, Cat. 2, or to GHS hazard class “Serious eye damage/eye irritation”, Cat. 2.

3.5.24
test pressure
required pressure applied during a pressure test

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3.5.25
yield pressure
pressure at which the actual yield strength of a cylinder is reached

3.5.26
burst pressure
highest pressure reached in a component during a burst test

3.5.27
developed pressure
pressure developed by the gas contents in a cylinder at a uniform temperature

3.5.28
filling pressure
pressure to which a cylinder is filled at the time of filling

Note 1 to entry: It varies according to the gas temperature in the cylinder, which is dependent on the charging parameters and the ambient conditions. It is normally higher than the working pressure (because of the heat of compression) and is always less than the test pressure.

3.5.29
working pressure
<acetylene> settled pressure at a uniform reference temperature of 15 °C in an acetylene cylinder containing the specified solvent content (where applicable) and the maximum acetylene content

3.5.30
working pressure
<compressed gas> settled pressure of a compressed gas at a uniform reference temperature of 15 °C in a full gas cylinder

Note 1 to entry: In North America, service pressure is often used to indicate a similar condition, usually at 21,1 °C (70 F).

Note 2 to entry: In East Asia, service pressure is often used to indicate a similar condition, usually at 35 °C.

3.5.31
design pressure
pressure based on which the minimum wall thickness is calculated

Note 1 to entry: In most cylinder design regulations, it is the *test pressure* (3.5.24).

3.5.32
settled pressure
pressure of the contents of a pressure receptacle in thermal and diffusive equilibrium

3.5.33
valve test pressure
p_{vt}
minimum pressure applied to a valve during testing

3.5.34
autofrettage pressure
pressure applied during autofrettage

3.5.35
water capacity
volume of water required to completely fill an empty pressure receptacle at 15 °C

3.5.36
permitted mass
maximum mass of the cylinder plus its maximum contents

Note 1 to entry: The cylinder includes its closure, any permanently attached devices and other service equipment.

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3.5.37
maximum permissible filling mass
maximum mass of gas in kg which is allowed in a filled cylinder

Note 1 to entry: This term applies to liquefied gas.

3.5.38
maximum filling weight
product of the minimum guaranteed water capacity of the pressure receptacle and the filling ratio of the gas contained

Note 1 to entry: For liquefied gas.

3.5.39
gross weight
DEPRECATED: total weight
<general> sum of weights

3.5.40
gross weight
DEPRECATED: total weight
<acetylene cylinders> tare A plus the maximum acetylene content or tare S plus the maximum acetylene charge

3.5.41
maximum gross weight
<bundles of cylinders> sum of the tare of the bundle and the maximum filling weight

3.5.42
empty weight
mass of the cylinder including all permanent attachments (e.g. neck ring, foot ring), but excluding the mass of valve, valve cap or valve guard and any coating

Note 1 to entry: In some regions empty weight is known as mass weight.

3.5.43
tare
DEPRECATED: tare weight
<general> weight of the pressure receptacle when empty, including accessories fitted as presented for filling

3.5.44
filling ratio
DEPRECATED: filling factor
DEPRECATED: filling degree
DEPRECATED: degree of filling
ratio of the mass of gas to the mass of water at 15 °C that would fill completely a pressure receptacle fitted ready for use

3.5.45
critical temperature
temperature above which a substance cannot exist in the liquid state

Note 1 to entry: For gas mixtures, the corresponding term is “pseudo-critical temperature”.

3.5.46
minimum operating temperature
minimum ambient temperature to which the cylinder contents may be exposed during operation in °C

3.5.47
settled temperature
uniform gas temperature in the pressure receptacle after the dissipation of any heat caused by filling

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3.5.48
lethal concentration 50
LC_{50}
concentration of a substance in air exposure to which, for a specified length of time, it is expected to cause the death of 50 % of the entire defined experimental animal population after a defined time period

Note 1 to entry: Lethal concentration is usually measured as ppm (volume fraction) or mg/m^3.

Note 2 to entry: The specified length of time is typically one hour.

3.5.49
upper flammability limit in air
maximum content of a gas or gas mixture in a homogeneous mixture with air at which a flame just starts to propagate

3.5.50
lower flammability limit in air
minimum content of a gas or gas mixture in a homogeneous mixture with air at which a flame just starts to propagate

Note 1 to entry: The lower flammability limit is determined at atmospheric conditions.

Note 2 to entry: The term “flammability limit” is sometimes called “explosion limit”.

3.5.51
flammability range
range of concentration between the lower and upper flammability limits

3.6 Terms related to material

3.6.1
glass transition temperature
T_g
characteristic temperature where a polymer substrate changes from a rigid glassy material to a soft (not melted) material, usually measured in terms of the stiffness, or modulus

3.6.2
elastomer
material which at ambient temperature can be stretched repeatedly to at least twice its original length and will return with force to approximately its original length immediately upon release of the stress

3.6.3
thermoplastic
plastics capable of being repeatedly softened by increase of temperature and hardened by decrease of temperature

3.6.4
thermoset
plastics which, when cured by the application of heat or chemical means, change into a substantially infusible and insoluble product

3.6.5
stress corrosion cracking
SCC
phenomenon resulting in a split or rift in the materials, caused by a combination of load and aggressive environment

Note 1 to entry: Such cracks in composite materials are typically sharply defined and can appear as a family of cracks or as a single crack.

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3.6.6
yield strength
DEPRECATED: yield stress
value corresponding to the upper yield strength, R_{eg}, or, for metals, when yielding does not occur at tensile testing, the 0,2 % proof strength (non-proportional elongation), $R_{po,2}$

3.6.7
design stress factor
ratio of equivalent wall stress at test pressure to guaranteed minimum yield strength

3.6.8
stress ratio
ratio of the minimum strength of the fibre, as determined through burst testing of a pressure cylinder, divided by the stress in the fibre at working pressure

3.6.9
stress rupture
phenomenon by which a reinforcing fibre can fail under an applied tensile load over time and which is dependent on the stress level

Note 1 to entry: Temperature level can affect stress rupture as predicted by the Arrhenius rate equation. If the temperature level of the resin exceeds its glass transition temperature, this can also affect stress rupture.

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