

High-purity gases

Customer-oriented offering highest quality



From "A" for argon to "X" for xenon, Messer offers an extensive range of high-purity gases. This ranges from the "air gases" (nitrogen, oxygen and argon), carbon dioxide, carbon monoxide, hydrogen and the noble gases (helium, neon, krypton and xenon) through to the most important organic (e.g. methane, ethane, ethylene, acetylene, ...) and inorganic gases (e.g. ammonia, chlorine, sulphur dioxide, ...).

The demands on the purity of the gases are determined by the respective application. Since these cover such a wide range, Messer offers most high-purity gases in several, graduated qualities. All the necessary information on specification of gases and the available container sizes are listed in the relevant product data sheets. We will be happy to help you choose the "right" product.



Filling station for high-purity gases

Filling of cylinders with high-purity gases

When filling cylinders with high-purity gases, special measures have to be taken. The first of these is a thorough cylinder pre-treatment. Steel cylinders therefore have their internal surfaces blasted prior to initial filling or after retesting. This process produces a corrosion-free, smooth surface. In addition, the cylinders are conditioned which involves heating them in a special oven and purging them several times with pure nitrogen. This removes any impurities, in particular moisture, from the internal surface. Prior to filling, the cylinders can be evacuated with a vacuum pump directly at the filling stand.

Strict quality management monitors the quality of raw material, all the production stages and checks compliance with the specifications. Depending on the filling process and quality specifications, the measures range from batch analysis to individual cylinder analysis.

Product quality

The quality is determined by the purity, type and maximum content of impurities. The content of impurities is usually expressed as volume fraction in ppmv ("volume parts per million"). For the simple labelling of product quality, the point notation system has become generally established, which indicates the number of "nines" of the gas purity expressed in percentage terms and the first decimal place other than "nine". For example: a purity of 99,9995 % is often abbreviated as 5.5, with a maximum sum of 5 ppmv for the specified impurities.

Which impurities are contained in a particular pure gas largely depends on the production and purification process used for the gas. For the user, however, the specification of the components interfering in their process is much more important. The selection of specified impurities is therefore based on the impurities interfering in the typical applications of the gases – for example, these are mostly moisture, air components (oxygen and/or nitrogen), hydrocarbons or carbon monoxide and carbon dioxide.

Argon Ar
PURE GASES

Marking
CAS-Number: 7440-37-1
Characterization etc. ADR: UN 1005, Argon, compressed, 2.2 Class 2, 1A
Cylinder Marking: shoulder dark green

Essential properties
colourless, odorless rare gas, compressed, heavier than air
Symbols of Risks: gas, compressed
Physical Properties: molecular weight: 39.948 kg/kmol, gas density at 0°C and 1,013 bar: 1,784 kg/m³, density ratio to air: 1,3797

For additional safety information see Material/safety data sheet No. *AR-003A

Valves / Manifolds
Valve connection: 200 bar, acc. to national standards, 300 bar, ISO 5145 No. 1, W 29 x 2
Recommended Manifolds: Spectrolab FM 51 / FM 52 exact, Spectrosum FE 51 / FE 52 exact

Specifications / Cylinders	4.8 *	Spectre *	5.0	5.7 *	6.0
Composition	>= 99.998	99.998	99.999	99.9997	99.9999
Impurities					
H ₂ O	< 4	2	3	1	0.5
CO ₂	< 3	2	2	0.5	0.5
N ₂	< 10	-	5	1	0.5
THC (as CH ₄)	< 0.2	0.2	0.1	0.1	0.1
CO + CO ₂	< 0.2	0.2	0.1	0.1	0.1
Cylinders / Contents					
F 05 200 bar	-	-	1.9 *	-	-
F 10 200 bar	2.1	2.1 *	2.1	-	-
F 20 200 bar	4.3 *	-	4.3 *	4.3 *	-
F 20 300 bar	4.1 *	-	-	-	-
F 50 200 bar	10.7	10.7 *	10.7	10.7 *	-
F 50 300 bar	19.3	-	19.3	-	-
B 12 * F 50 200 bar	129.6	-	129.6	-	-
B 12 * F 50 300 bar	183.4	-	183.4	-	-

Remarks
Applications: Shielding gas for special welding problems and sensitive materials (titanium, niob, tungsten, etc.)
Spark erosion spectroscopy
Plasma processes
Filling gas for vacuum
Filling gas for lamps
* not available in each country

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Version: 2.0

Safety data sheets

Safety data sheets are the main instrument for the secure use of substances and mixtures. In accordance with the REACH and GHS/CLP regulations they contain information on every product such as the properties and hazards as well as instructions for the handling, disposal and transport. Moreover, safety data sheets include measures for fire fighting and to limit and monitor exposure.

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For additional safety information see Material/safety data sheet No. *AR-003A

Description
Rare gas, colorless, odorless, heavier than air. In closed rooms the breathing air is displaced, no warning symptoms (danger of asphyxiation).

Materials
Cylinders and Valves: any usual materials
Seals: PTFE, PCTFE, PVDF, PA, PP, IR, NBR, CR, FKM, O, EPDM

Physical Properties		
molecular weight	39.948 kg/kmol	vapour pressure at 20°C
Critical Point		gas density at 0°C and 1,013 bar
temperature	150.86 K	density ratio to air
Pressure	48.98 bar	gas density at 15°C and 1 bar
density	1,784 kg/m ³	Conversion Factor
Triple Point	3,3357 K	liquid at T _{tr} to m ³ gas (15°C, 1 bar)
temperature	0,330 K	Visial Coefficient
Pressure	0,6881 bar	Bin at 0°C
Boiling Point		B30 at 30°C
temperature	87,280 K, 186 °C	Gas density at 20°C and 1 bar
liquid density	1,3540 kg/l	specific heat capacity cp
evaporation heat	161,3 kJ/kg	thermal conductivity
		dynamic viscosity

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Product data sheets

Depending on the type of gas, the quality specifications and the quantity required, Messer offers a range of cylinders for high-purity gases. These range from 1 l pressure cans to cylinder bundles. All relevant information on our products, especially the specifications and the standard cylinder sizes are clearly indicated on the relevant product data sheet. The quantity of gas is indicated in m³ (at 15 °C and 1 bar) or in kg. You will also find therein a brief list of the physical properties for the respective gas and a reference to the valves as well as recommended equipment.

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SAFETY DATA SHEET
Revised edition no.: 0
Date: 26 / 1 / 2015
Supersedes: 0 / 0 / 0

Argon EIGA003A

2.2 Non-flammable, non-toxic gases

Warning

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product Identifier
Trade name: Argon
EINEC no.: 6163433A
Chemical description: Argon
CAS No.: 7440-37-1
EC No.: 251-147-0
Index No.: -
Registration No.: -
Chemical formula: -
* Listed in Annex IV / V REACH, exempted from registration.

1.2. Relevant identified uses of the substance or mixture and uses advised against
Relevant identified uses: Purge gas, diluting gas, inerting gas, analytical and process gases. Perform risk assessment prior to use.
Test gas/Calibration gas, Laboratory use, Purging, inerted gas for welding processes.
Use for manufacture of electron/photo voltaic components.
Contact supplier for more information on uses.

1.3. Details of the supplier of the safety data sheet
Company identification: Messer Schweiz AG
Borenweg 73
CH-8600 Lenzburg Switzerland
Tel.: +41 82 888 41 41

1.4. Emergency telephone number
Emergency telephone number: +41 82 888 41 41 / Fax-Info: +41 44 251 51 51

SECTION 2: Hazards Identification

2.1. Classification of the substance or mixture
Hazard Class and Category Code (Classification EC 1272/2008 (CLP))
Classification EC 6163433A or EC 1908295: Gases under pressure - Compressed gas - Warning - (CLP - Press. Gas Comp.) - H280
Classification EC 6163433A or EC 1908295: Not classified as dangerous substance / mixture.
Not included in Annex VI.
No GHS labelling required.

2.2. Label elements
Labelling Regulation EC 1272/2008 (CLP)

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Technical data sheets

Further information on high-purity gases can be found in the technical data sheets which contain tables listing the properties, the main physical data as well as the compatibility of materials for each gas. If you have any questions, please contact us!

Compressed-gas cylinders

The table below contains some typical data for dimensions and contents of some standard cylinders. The short form provided to denote the form of delivery describes the cylinders in accordance with the following terms:

- Type (F: cylinder, B12: bundle of 12 cylinders)
- Geometric volume (in litres)
- Material (no indication: steel, Alu: aluminium)
- Filling pressure (e.g. 200 bar)

For example: F50 200 bar means a steel cylinder with a geometric volume of 50 l and a filling pressure of 200 bar. In addition, depending on the type of gas, there

are numerous special containers, e.g. cylinders with filling material (for acetylene) or drums for some organic and inorganic gases.

Duplex bundle

Many installations at customer's site are designed for the 200 bar-technology. In order to nevertheless benefit from the 300 bar-supply Messer offers duplex systems. These 300 bar-bundles are equipped with a pressure reducer integrated within the bundle and thus can be connected to the existing 200 bar-installations without any additional measure.



Cylinder	Gas content	External diameter	Length	Empty weight
	<i>m³</i>	<i>mm</i>	<i>mm</i>	<i>kg</i>
F 2 200 bar	0,4	100	350	2,5
F 5 200 bar	1,0	140	440	5,5
F 10 200 bar	2	140	810	12
F 20 200 bar	4	204	790	25
F 20 300 bar	6	204	815	39
F 50 200 bar	10	229	1500	57
F 50 300 bar	15	229	1488	71
F 2 Alu 200 bar	0,4	102	390	2,6
F 5 Alu 200 bar	1,0	140	525	6,5
F 10 Alu 200 bar	2	140	995	11
F 20 Alu 200 bar	4	204	940	23,4
F 40 Alu 200 bar	8	229	1455	46
F 50 Alu 200 bar	10	250	1530	57,5
B 12 x F 50 200 bar	120	L 990 / B 750 / H 1838		920
B 12 x F 50 300 bar	180	L 990 / B 750 / H 1838		1.100
MegaPack 4 (B4 x F 150 200 bar)	120	L 870 / B 880 / H 2.260		1.020
MegaPack 4 (B4 x F 150 300 bar)	180	L 870 / B 880 / H 2.260		1.020
MegaPack 6 (B6 x F 150 200 bar)	180	L 1.240 / B 880 / H 2.260		1.530
MegaPack 6 (B6 x P 150 300 bar)	270	L 1.240 / B 880 / H 2.260		1.530

Typical data of compressed-gas cylinders

Labelling

The cylinders are labelled by a combination of imprints, the cylinder shoulder label / body label and hazard or gas type specific colour coding of the cylinder shoulder.





The most important labelling, and the one that is definitive for transport and application purposes, is the hazardous goods label, which contains the mandatory information about the gas and its potential hazards. In accordance with ADR/RID (European transport regulations) and CLP (European regulation on Classification, Labelling and Packaging of substances and mixtures) the labels contain the precise name of the gas, the danger symbols, as well as safety information for transportation and advice on the safe handling of the gas (hazard and precautionary statements).



Hazardous goods label

Shoulder colour

The colour coding of the cylinder shoulders is defined in the EN 1089-3 standard basing in general on the primary hazard.







Properties	Shoulder color	Examples
Toxic and/or corrosive ⁽¹⁾	 Yellow	Ammonia, arsine, chlorine, fluorine, carbon monoxide, nitric oxide, sulfur dioxide
Flammable ⁽²⁾	 Red	Hydrogen, methane, ethylene, forming gas, (nitrogen/hydrogen mixture)
Oxidizing ⁽³⁾	 Light blue	Oxygen mixtures, nitrous oxide mixtures
inert	 Bright green	Krypton, xenon, neon, shielding gas mixtures, compressed air

Colour coding of the cylinder shoulder according to EN 1089-3

¹⁾ See ADR/RID for definition of toxic/non-toxic and corrosive/non-corrosive. In this case, corrosive means causing burns to human tissue

²⁾ See ADR/RID for definition of flammable/non-flammable

³⁾ See ADR/RID for definition of oxidizing/non-oxidizing

Gas	Shoulder color
Acetylene	 Maroon
Oxygen	 White
Nitrous oxide	 Blue
Argon	 Dark green
Nitrogen	 black
Carbon dioxide	 Gray
Helium	 Brown

Colour coding for specific gases

Cylinder connections and fittings

The valve connections comply with the relevant national standard. These standards define the valve connections for the different types of gas. The connections for 300 bar cylinders are defined EU-wide in the ISO 5145:2004. The appropriate connection is specified on the product data sheet. Advices on selecting the appropriate components can also be found in the product data

sheet. In order to withdraw the gas safely, you will need the appropriate withdrawal equipment, for example in the simplest case, a cylinder pressure regulator. In case of several points of consumption often a central gas supply system consisting of pressure control panels, pipelines and tapping points at the various points of use is more reasonable.



Service and support

We will be happy to help you choosing the suitable gas quality and gas supply system.

MESSER 
Gases for Life

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