



COMPONENTS

*Technical
Product Information*



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Gas cylinders for technical innovations

This document features a summary of technical information regarding our disposable gas cylinders. Please feel free to contact our in-house experts for any further details required!



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Gases and their applications

The gases we fill are in line with the high quality requirements we apply on our gas cylinders and fulfil the specifications set out by the European and the US Pharmacopeia.



CO₂

Carbon Dioxide (CO₂) is the most versatile gas we fill. Compressed to liquid condition, CO₂ facilitates enhanced fillings compared to so-called permanent gases as Nitrogen or Argon. The consequence is a user benefit in terms of high gas yields (expanded gas volumes) in relation to the cylinder size. Applications for disposable CO₂ filled cylinders include inflation, compressed gas propulsion and gas cooling.



N₂

The inert gas Nitrogen (N₂) is filled into our disposable gas cylinders at a pressure of 180-200 bar in gaseous condition. The classical area of use for this cylinder type is in cold-weather-applications, where Nitrogen cylinders ensure reliable and fast inflation. iSi Components develops gas cylinders filled with pure N₂ or N₂ containing gas mixtures tailored to specific application requirements.



N₂O

Nitrous Oxide (N₂O) is as Carbon Dioxide (CO₂) filled in liquid condition. This grants high gas fillings and as a consequence enhanced expanded gas volumes (gas yields) for the cylinder user. Due to the strong cooling effect they provide, disposable N₂O cylinders are exceptionally suited for medical cryotherapy.



Ar

Argon (Ar) is a noble gas filled to a pressure of 180-200bar into a variety of gas cylinders by iSi Components. Our Argon cylinders are used when energy is required at high pressure or a fast & constant gas flow has to be achieved in cold weather applications. Due to its inert properties, Argon is also used in food applications. Especially for inflation purposes a lower gas yield (expanded gas volume) has to be considered compared to a similar sized CO₂ or N₂O cylinder.



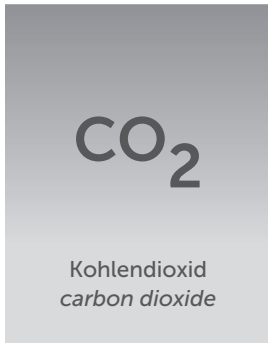
Special Fillings

Special applications frequently require us to think outside the box. Based on our know-how and experience we develop gas mixtures or gas additives tailored to special requirements. No matter if you are designing a new product or improving an existing one: Our in-house experts offer consistent support throughout the development process from proof-of-principle to market launch. Application areas that most frequently require this special kind of service are medical and scientific engineering. We look forward to your inquiry!



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Overview *Gas Properties*

**Geruch (odour)**leicht säuerlich
*slightly pungent***Geschmack (taste)**leicht säuerlich
*slightly pungent***Reinheit*
(purity*)**

3.5 = 99.95%

**Kritische Temperatur
(critical temperature)**31.06 °C
304.21 °K
87.91 °F**Feuchtigkeit* (moisture*)**

< 20 ppm v/v

Löslichkeit in Wasser (solubility in water)

0.851 l/kg

Masse im Vergleich zu Luft (mass compared to breathing air)schwerer
*heavier***Kritischer Druck
(critical pressure) - 1 bar = 14.5 PSI**

73.83 bar

**Gasausbeute (1g Gas = x Liter expandiertes Volumen):
gas yield (1g of gas = x liter of expanded volume):**

bei 30°C / 1 bar (at 30°C / 1 bar)	0.570 l
bei 15°C / 1 bar (at 15°C / 1 bar)	0.541 l
bei 0°C / 1 bar (at 0°C / 1 bar)	0.513 l
bei -15°C / 1 bar (at -15°C / 1 bar)	0.484 l

**Beispiel 21ml Zylinder mit typischer Gasfüllung: Gasausbeute bei 15°C / 1 bar
(example 21ml cylinder with typical gas fill: gas yield at 15°C / 1 bar)**

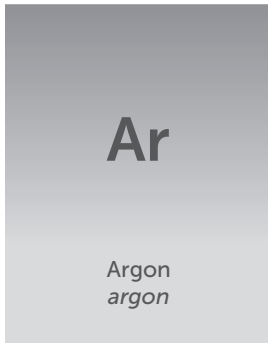
16g = 8.66 l

Auftrieb / buoyancy (Richtwerte / guide values)

expandiertes Volumen (expanded gas yield) in liters x g** = Auftrieb (buoyancy) in N

* Maximalwert gemäß iSi Components Einkaufsspezifikation (maximum according to iSi Components purchasing specification)
** g=9.81

Quellen / Sources: iSi Components Einkaufsspezifikation (iSi Components purchasing specification), AGA Gas Handbook

**Geruch (odour)**keiner
*none***Feuchtigkeit* (moisture*)**

< 5 ppm v/v

Geschmack (taste)keiner
*none***Löslichkeit in Wasser (solubility in water)**

0.033 l/kg

Reinheit* (purity*)

4.6 = 99.996%

Masse im Vergleich zu Luft (mass compared to breathing air)schwerer
*heavier***Kritische Temperatur (critical temperature)**-122.29 °C
150.86 °K
-187.60 °F**Kritischer Druck (critical pressure) - 1 bar = 14.5 PSI**

48.98 bar

**Gasausbeute (1g Gas = x Liter expandiertes Volumen):
gas yield (1g of gas = x liter of expanded volume):**

bei 30°C / 1 bar (at 30°C / 1 bar)	0.629 l
bei 15°C / 1 bar (at 15°C / 1 bar)	0.599 l
bei 0°C / 1 bar (at 0°C / 1 bar)	0.568 l
bei -15°C / 1 bar (at -15°C / 1 bar)	0.536 l

**Beispiel 21ml Zylinder mit typischer Gasfüllung: Gasausbeute bei 15°C / 1 bar
(example 21ml cylinder with typical gas fill: gas yield at 15°C / 1 bar)**

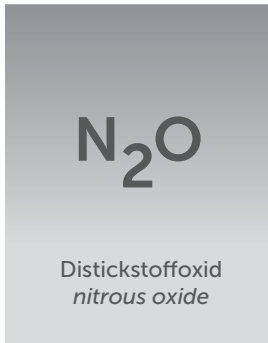
6.5g = 3.90 l

Auftrieb / buoyancy (Richtwerte / guide values)

expandiertes Volumen (expanded gas yield) in liters x g** = Auftrieb (buoyancy) in N

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Quellen / Sources: iSi Components Einkaufsspezifikation (iSi Components purchasing specification), AGA Gas Handbook

**Geruch (odour)**angenehm
*bland***Geschmack (taste)**leicht süßlich
*slightly sweet***Reinheit*
(purity*)**

2.0 = 99.0%

**Kritische Temperatur
(critical temperature)**36.41 °C
309.56 °K
97.54 °F**Feuchtigkeit* (moisture*)**

< 10 ppm v/v

Löslichkeit in Wasser (solubility in water)

0.610 l/kg

Masse im Vergleich zu Luft (mass compared to breathing air)schwerer
*heavier***Kritischer Druck
(critical pressure) - 1 bar = 14.5 PSI**

72.40 bar

**Gasausbeute (1g Gas = x Liter expandiertes Volumen):
gas yield (1g of gas = x liter of expanded volume):**

bei 30°C / 1 bar (at 30°C / 1 bar)	0.569 l
bei 15°C / 1 bar (at 15°C / 1 bar)	0.541 l
bei 0°C / 1 bar (at 0°C / 1 bar)	0.512 l
bei -15°C / 1 bar (at -15°C / 1 bar)	0.482 l

**Beispiel 21ml Zylinder mit typischer Gasfüllung: Gasausbeute bei 15°C / 1 bar
(example 21ml cylinder with typical gas fill: gas yield at 15°C / 1 bar)**

14.3g = 7.74 l

Auftrieb / buoyancy (Richtwerte / guide values)

expandiertes Volumen (expanded gas yield) in liters x g** = Auftrieb (buoyancy) in N

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Quellen / Sources: iSi Components Einkaufsspezifikation (iSi Components purchasing specification), AGA Gas Handbook



Geruch (odour)

keiner
none

Feuchtigkeit* (moisture*)

< 5 ppm v/v

Geschmack (taste)

keiner
none

Löslichkeit in Wasser (solubility in water)

0.015 l/kg

Reinheit* (purity*)

3.5 = 99.95%

Masse im Vergleich zu Luft (mass compared to breathing air)

etwas leichter
slightly lighter

Kritische Temperatur (critical temperature)

-146.95 °C
126.26 °K
-232.51 °F

Kritischer Druck (critical pressure) - 1 bar = 14.5 PSI

34.10 bar

**Gasausbeute (1g Gas = x Liter expandiertes Volumen):
gas yield (1g of gas = x liter of expanded volume):**

bei 30°C / 1 bar (at 30°C / 1 bar)	0.898 l
bei 15°C / 1 bar (at 15°C / 1 bar)	0.855 l
bei 0°C / 1 bar (at 0°C / 1 bar)	0.810 l
bei -15°C / 1 bar (at -15°C / 1 bar)	0.764 l

**Beispiel 21ml Zylinder mit typischer Gasfüllung: Gasausbeute bei 15°C / 1 bar
(example 21ml cylinder with typical gas fill: gas yield at 15°C / 1 bar)**

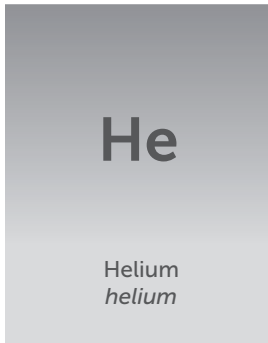
3.69g = 3.15 l

Auftrieb / buoyancy (Richtwerte / guide values)

expandiertes Volumen (expanded gas yield) in liters x g** = Auftrieb (buoyancy) in N

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** g=9.81

Quellen / Sources: iSi Components Einkaufsspezifikation (iSi Components purchasing specification), AGA Gas Handbook



Geruch (odour)

keiner
none

Feuchtigkeit* (moisture*)

< 5 ppm v/v

Geschmack (taste)

keiner
none

Löslichkeit in Wasser (solubility in water)

0.0083 l/kg

Reinheit* (purity*)

4.6 = 99.996%

Masse im Vergleich zu Luft (mass compared to breathing air)

viel leichter
much lighter

Kritische Temperatur (critical temperature)

-267.95 °C
5.20 °K
-448.60 °F

Kritischer Druck (critical pressure) - 1 bar = 14.5 PSI

2.27 bar

**Gasausbeute (1g Gas = x Liter expandiertes Volumen):
gas yield (1g of gas = x liter of expanded volume):**

bei 30°C / 1 bar (at 30°C / 1 bar)	6.289 l
bei 15°C / 1 bar (at 15°C / 1 bar)	5.977 l
bei 0°C / 1 bar (at 0°C / 1 bar)	5.682 l
bei -15°C / 1 bar (at -15°C / 1 bar)	5.348 l

**Beispiel 21ml Zylinder mit typischer Gasfüllung: Gasausbeute bei 15°C / 1 bar
(example 21ml cylinder with typical gas fill: gas yield at 15°C / 1 bar)**

0.52g = 3.11 l

Auftrieb / buoyancy (Richtwerte / guide values)

expandiertes Volumen (expanded gas yield) in liters x g** = Auftrieb (buoyancy) in N

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** g=9.81

Quellen / Sources: iSi Components Einkaufsspezifikation (iSi Components purchasing specification), AGA Gas Handbook

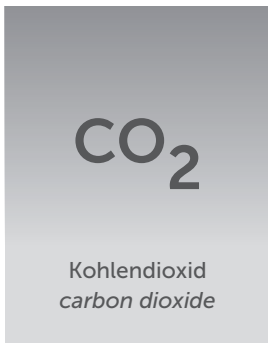
Our disposable gas cylinders

Selected steel specifications are the starting point for the production of our disposable gas cylinders. As a result of sophisticated deep-drawing processes, our products excel in reliability and safety by outperforming critical technical requirements like minimum burst pressures, etc.

Our standard product range features disposable gas cylinders with a volume (water capacity) of 1.6 to 115ml.

The most diverse compilation of gas cylinders can be found in our "small cylinder" product line (up to 22ml in volume). It comprises a variety of CO₂ cylinders with different neck designs (threaded/unthreaded, different diameters) as well as special cylinders with different gas fillings and closure types.

Our product line of disposable gas cylinders with a volume of 32 to 115ml has been optimised for critical applications in life saving and safety engineering. iSi Components 3/8" and 1/2" threaded cylinders were the first certified according to the Personal Flotation Devices standard EN-ISO 12402-7:2006.



Volumen <i>volume</i> (ml)	Nominale Gasmasse <i>nominal mass of gas</i> (g)	Halsausführung <i>neck design</i>	Gesamtlänge <i>total length</i> (mm)	Durchmesser <i>diameter</i> (mm)
1.6	1.1	ø7.3mm	38.0	ø9.5
10	7.9	3/8-24 UNF-1A	65.7	ø18.0
14	10.9	3/8-24 UNF-1A	83.0	ø18.6
14	10.9	ø7.3mm	83.0	ø18.6
14	10.0	3/8-24 UNF-1A	82.9	ø18.6
15	10.5	ø8.7mm	82.5	ø18.6
20	15.5	ø8.7mm	94.1	ø22.0
21	15.6	ø8.85mm	88.4	ø22.0
21	15.6	ø8.7mm	88.2	ø22.0
21	15.5	ø8.3mm	86.4	ø22.0
21	15.6	3/8-24 UNF-1A	88.6	ø22.0
21	14.3	3/8-24 UNF-1A	88.4	ø22.0
21	15.0	3/8-24 UNF-1A	88.4	ø22.0
22	16.0	ø8.85mm	90.4	ø22.0
22	16.0	3/8-24 UNF-1A	94.4	ø22.0
32	24.0	1/2-20 UNF-1A	107.0	ø25.4
32	23.0	1/2-20 UNF-1A	107.0	ø25.4
32	24.0	M12X1.5	107.0	ø25.4
32	20.0	1/2-20 UNF-1A	107.0	ø25.4
32	18.0	1/2-20 UNF-1A	107.0	ø25.4
33	24.5	3/8-24 UNF-1A	107.0	ø25.4
40	28.0	8.7mm	160.0	ø20.7
40	28.0	3/8-24 UNF-1A	162.0	ø20.7
45	28.0	1/2-20 UNF-1A	139.0	ø25.4
45	33.0	1/2-20 UNF-1A	139.0	ø25.4
45	30.0	1/2-20 UNF-1A	139.0	ø25.4
45	33.0	M12X1.5	140.0	ø25.4
45	30.0	1/2-20 UNF-2A	139.0	ø25.4
52	38.0	3/8-24 UNF-1A	121.0	ø30.0
52	30.0	1/2-20 UNF-1A	121.0	ø30.0
52	38.0	1/2-20 UNF-1A	121.0	ø30.0
52	35.0	1/2-20 UNF-1A	121.0	ø30.0
52	35.0	1/2-20 UNF-2A	121.0	ø30.0
52	36.0	1/2-20 UNF-1A	121.0	ø30.0
63	38.0	1/2-20 UNF-1A	141.0	ø30.0
63	45.0	1/2-20 UNF-1A	141.0	ø30.0
63	40.0	1/2-20 UNF-1A	141.0	ø30.0
85	60.0	1/2-20 UNF-1A	164.0	ø31.8
85	55.0	1/2-20 UNF-1A	164.0	ø31.8
85	56.0	1/2-20 UNF-1A	164.0	ø31.8
85	56.0	M12X1.5	164.0	ø31.8
85	60.0	M12X1.5	164.0	ø31.8
103	75.0	1/2-20 UNF-1A	193.5	ø31.8
115	84.0	1/2-20 UNF-1A	185.0	ø35.0

"Your" gas cylinder is not on our list yet? Our product development experts are at your disposal!

Ar

Argon
argon

Volumen volume (ml)	Nominale Gasmasse nominal mass of gas (g)	Halsausführung neck design	Gesamtlänge total length (mm)	Durchmesser diameter (mm)
21	6.5	3/8-24 UNF-1A	88.6	ø22.0
85	25.3	1/2-20 UNF-1A	164.0	ø31.8

N₂O

Distickstoffoxid
nitrous oxide

Volumen volume (ml)	Nominale Gasmasse nominal mass of gas (g)	Halsausführung neck design	Gesamtlänge total length (mm)	Durchmesser diameter (mm)
10	7.5	ø8.7mm	65.0	ø18.0
21	14.3	ø8.7mm	88.0	ø22.0
32	23.5	7/16-20 UNF-1A	109.0	ø25.4
32	23.5	7/16-20 UNF-1A	108.0	ø25.4
49	35.4	7/16-20 UNF-1A	114.0	ø30.0

N₂

Stickstoff
nitrogen

Volumen volume (ml)	Nominale Gasmasse nominal mass of gas (g)	Halsausführung neck design	Gesamtlänge total length (mm)	Durchmesser diameter (mm)
115	25.0	1/2-20 UNF-1A	185.0	ø35.0

Luft

Luft
air

Volumen volume (ml)	Nominale Gasmasse nominal mass of gas (g)	Halsausführung neck design	Gesamtlänge total length (mm)	Durchmesser diameter (mm)
63	4.0	1/2-20 UNF-1A	141.0	ø30.0

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Our quality

Nothing should be left to chance when it comes to the safety of gas cylinders. For iSi Components, product safety is a function of product quality.

The production and quality management processes we have put in place are benchmark-setting in our industry and outperform the requirements set out in standards for disposable gas cylinders.

These include 100% safety and leak-proof-testings, full traceability throughout the production process and a continuous review and development of all processes by in-house experts.

And success proves us right: Production and quality audits performed by independent experts, customers and project partners, TUEV & UL product safety/quality certificates as well as our ISO 9001:2008 certificate, confirm the effectiveness of our efforts in quality management.

iSi Components experts not only share their know-how and experience in standard setting panels. We are also at the forefront of implementing new standards to provide our customers a headstart for the approval of their products.