



Self-Contained Respiratory Protection

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Self-Contained Respiratory

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of self-contained respiratory protection by Dräger

Wearing-Time

Specifications

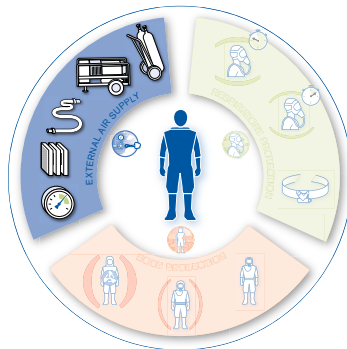
1. WHAT DO I NEED TO CONSIDER WHEN WEARING A RESPIRATORY PROTECTION DEVICE FOR LONG PERIODS?

If you want to use the respiratory protection device at work for more than 30 minutes every day then you first have to undergo the preventive medical examination required under Convention 26* (BGI 504-26) "Respiratory protection devices". You also have to comply with fixed recovery times.

EXAMPLE: EXTRACT FROM THE BGR 190* (NOVEMBER 2009)

Self-contained breathing apparatus (SCBA)	Wearing time (min)	Recovery time (min)	Uses per shift	Shifts per week
More than 5 kg total mass	60	30	4	4 (2-1-2) 2 days 1 day rest 2 days
Up to 5 kg total mass	Contingent on function	10	Dependent on wearing time	5

*Please note: You need to take different local requirements into account in each country. The data in the table apply only to Germany.



Self-Contained Breathing Apparatus

2. HOW DO I USE AN SCBA?

Self-contained breathing apparatus (SCBA) are freely portable respiration devices. They are worn either on the back or the hip with an appropriate harness.

Specific requirements for SCBAS as a safety device in accordance with EN 137:

- Pressure gauge that can be read easily by the wearer (manometer)
- Warning device that gives an alarm at a residual pressure of 55 ± 5 bar

EN 137-1: applies to industrial applications

EN 137-2: contains additional requirements for fire fighting

Example: The Dräger PAS Micro breathing apparatus





How long can I use an SCBA at a stretch?

The duration of usage for breathing apparatus is between 10 minutes (short-term SCBA) up to about 45 minutes (long-term SCBA). Depending on requirements, you can use cylinder volume, pressure and thus the amount of compressed air specific to your application. In addition, duration of usage depends on your personal air consumption.

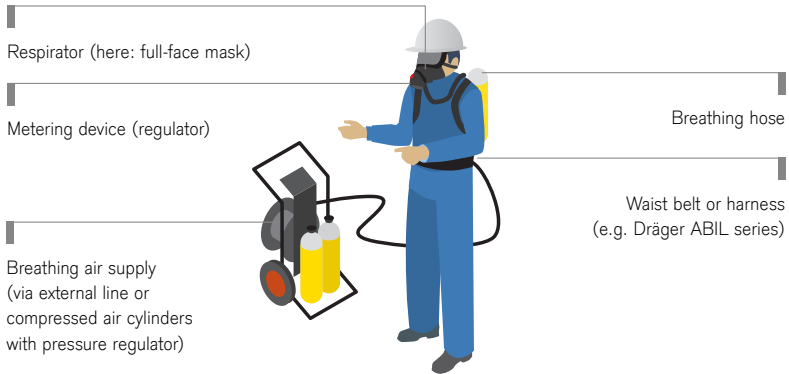
FOR EXAMPLE:

Compressed gas cylinder:	Volume: 3 l
Pressure:	200 bar
Volume of air:	approximately 600 l
Average air consumption:	approximately 40 l/min
Usage time:	approximately 15 min

Compressed Airline Systems

3. HOW DO I USE A COMPRESSED AIRLINE SYSTEM?

A Compressed air hose unit is a type of non-freely portable breathing apparatus. This means that by using a Compressed air delivery hose you can supply necessary breathing air from the outside – either from an external air line or via breathing air cylinders provided.



The requirements for compressed air hose units are governed by EN 14593.

There are three different types of compressed air hose units:

- With control valve
These devices provide a continuous stream of air.
→ High air consumption
Use: with stationary air supply
- With normal-pressure regulator
The breathing air is used only for the inhalation cycle.
→ Low air consumption
Use: for air supply from Compressed air cylinders
- With pressure regulator
The units generate an excess pressure of maximum 5 mbar in the respirator (e.g. in the full-face mask). This is to prevent hazardous substances in the ambient air from entering the mask.
Use: e.g. in atmospheres containing substances that exhibit acute toxicity

Freely wearable or not?



4. WHICH RESPIRATORY PROTECTION DEVICE FOR WHICH WORK?

Your choice of either a freely or non-freely portable breathing device depends on the conditions of use and intended application. Self-contained breathing apparatus and compressed air hose units are both open-circuit devices. They both offer the same protection against airborne contaminants and oxygen deficiency.

The type of equipment you prefer to rely on at work depends on the conditions of use and the intended application.

Self-contained breathing apparatus

Advantage: You can move around freely at work.

Disadvantage: Your breathing air supply is limited.

→ Use, for example, in tight spaces or for temporary work, with respiratory protection

Compressed air hose unit

Advantage: You have an unlimited supply of breathing air.

Disadvantage: You are severely limited in your range of motion.

→ Long-term use, such as extended maintenance and cleaning work, or if the chemical protective suit needs to be ventilated

Compressed Air Cylinders

5. WHAT TYPE OF CYLINDERS ARE THERE?

Compressed air cylinders are available with a filling pressure of 200 to 300 bar. The pressure tank is made of steel, aluminium or carbon fibre composites (CFRP). CFRP cylinders are the lightest and therefore offer the highest wearing comfort. The pressure tank is fitted with a shut-off valve. The SCBA's regulator is connected to this valve.

Design of a carbon fibre cylinder:

Outer coat

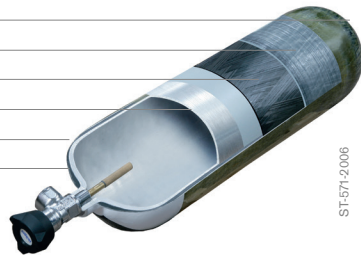
Glass fibre coil

Carbon fibre coil

Aluminium lining

Protexall® anti-corrosion layer

Cylinder valve



IMPORTANT INSTRUCTIONS

In order to prevent the ingress of moisture and contaminants into the cylinder, you should never lower the pressure below 2 bar. Compressed air cylinders must be regularly maintained.

What information does the compressed air cylinder code give me?

What are the dangers of the cylinder? What does it contain? This information is given to you in the clearly visible cylinder code, in accordance with EN 1089-3. A cylinder with a black-and-white colour on its collar is a compressed air cylinder. The colour coding only applies to the collar of the cylinder. You are free to choose the colour of the shell, although yellow has become the norm in industry and fire fighting.

A label on the compressed air cylinder provides the following information:

- Composition of the gas mixture
- Risk and safety phrases
- UN number and gas name
- Name, address and telephone number of the gas manufacturer

Generating External Breathing Air

6. THIS AIR IS PURE

If the concentration of hazardous substances at your workplace is too high and/or the oxygen too low to protect your employees with filtering respiratory protection, then you need to use self-contained respiratory protection.

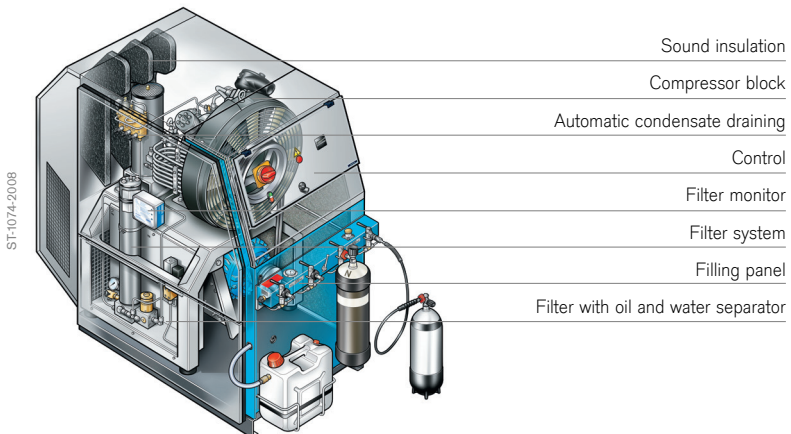
External air can be provided in two different ways:

- from a compressed air supply: directly via a compressor or compressed air network (pressure range 7 to 10 bar)
- from compressed air cylinders (nominal filling pressure maximum 300 bar)

How will the breathing air be extracted for self-contained respiratory protection?

Using compressors (mobile or stationary), external air is compressed for the direct compressed air supply or to fill the compressed air cylinder. Separators and filters in the compressor ensure that the air is cleaned.

Compressor design:



Limit Values for External Air

7. HOW CAN I GUARANTEE THE QUALITY OF EXTERNAL BREATHING AIR?

Whether it's exhaust gases and water in the external air or lubricants from the compressor, when creating breathing air you can never remove all impurities completely. For the quality of the breathing air to comply with the requirements of EN 12021, you must check it every six months in accordance with BGR 190. This does not just depend on the accuracy of the methods, as the detection limits of the methods must also be within the permitted values required.

Limit values for impurities in external breathing air in accordance with EN 12021:

- Lubricants (droplets or mist): 0.5 mg/m³
- Carbon dioxide content: (500 ppm)
- Carbon monoxide content: 15 ppm
- Water content*:
50 mg/m³ (at a nominal pressure of 40 to 200 bar) or
35 mg/m³ (at a nominal pressure of more than 200 bar)

(European reference condition: 1 bar absolute, 20 °C – published 2010)

* The current draft of EN 12021 (published July 2010) specifies various water content limit values for the low-pressure range from 5 to 30 bar.

How can I ensure that external breathing air is pure?

Compliance with limit values for carbon monoxide, carbon dioxide and water:

With Dräger's proven tubes, you have a simple test system on hand – both for low and high-pressure areas. This means you can check, quickly and comfortably on-site, compliance with the limit values.

Compliance with lubricant limit values:

You can use the Dräger Impactor to check compliance with lubricant limit values. You can also measure synthetic oils regardless of type and viscosity.

MANUAL AND AUTOMATIC DRÄGER PRODUCTS FOR MONITORING BREATHING AIR

Mobile, handy solution for random measurement

D-11163-2011



Dräger Aerotest 5000

The mobile Dräger Aerotest 5000 allows you to check the purity of the breathing air supplied in a low-pressure system (or, with accessories, in a high-pressure system), e.g. of a compressor or compressed air cylinder. The reading is a quantitative measurement of impurities in the stream of compressed air. All components are immediately within reach in a carrying case.

Stationary device for permanent monitoring

D-22428-2010



Dräger Air Guard

The Dräger Air Guard enables continuous, fully automatic monitoring of the purity of compressed air for medical applications. Dräger's proven sensors also measure trace gases. An automatic alarm sounds if pre-set limits are exceeded – even in the event of short-term impurities. Alarms can also be forwarded as potential-free contacts and used to shut down e.g. the air compressor.

Air supply

AN OVERVIEW OF SELF-CONTAINED RESPIRATORY PROTECTION BY DRÄGER

How flexible is your air supply?

Non-freely portable insulating devices
(compressed air hose units)



Dräger
X-plore® 9300



Dräger
PAS® AirPack 1



Dräger
PAS® X-plore



Dräger
PAS® AirPack 2

Freely portable insulating devices

Short-term SCBA
for use up to
approx 15 min



Dräger
PAS® Colt



Dräger
PAS® Micro

Long-term SCBA
for use up to
approx 30-45 min



Dräger
PAS® Lite



Dräger
PSS® 3000

CORPORATE HEADQUARTERS

Drägerwerk AG & Co. KGaA
Moislinger Allee 53–55
23558 Lübeck, Germany

www.draeger.com

REGION DACH

Dräger Safety AG & Co. KGaA
Revalstraße 1
23560 Lübeck, Germany
Tel +49 451 882 0
Fax +49 451 882 2080
info@draeger.com

REGION EUROPE

Dräger Safety AG & Co. KGaA
Revalstraße 1
23560 Lübeck, Germany
Tel +49 451 882 0
Fax +49 451 882 2080
info@draeger.com

REGION MIDDLE EAST, AFRICA

Dräger Safety AG & Co. KGaA
Branch Office
P.O. Box 505108
Dubai, United Arab Emirates
Tel +971 4 4294 600
Fax +971 4 4294 699
contactuae@draeger.com

REGION ASIA PACIFIC

Dräger Safety Asia Pte Ltd
25 International Business Park
#04-20/21 German Centre
Singapore 609916
Tel +65 6308 9400
Fax +65 6308 9401
asia.pacific@draeger.com

REGION CENTRAL

AND SOUTH AMERICA
Dräger Panama S. de R.L.
Complejo Business Park,
V tower, 10th floor
Panama City
Tel +507 377-9100
Fax +507 377-9130
contactcsa@draeger.com

Locate your Regional Sales
Representative at:
www.draeger.com/contact

