



Operating Manual

Composite Compressed Air Cylinder

Cylinder and Valve Assembly



Order No.: 10051437/09

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1 Safety Regulations

1.1 Correct Use

WARNING!

Bursting cylinder and loss of required properties due to misuse!

The composite compressed air cylinder must only be used as intended. Misuse may lead to accidents and bursting of the cylinder causing severe injuries or death. Misuse may also lead to loss of required properties.

- Only use the cylinder for devices for which the cylinder is approved / certified with.
- Observe the permissible application that is indicated on the cylinder.
- Do not exceed the maximum permissible pressure of the cylinder (PS_{max}; see cylinder label).
- Do not use the cylinder under water.
- Protect the cylinder from strong mechanical strain, excessive heat, and chemical attacks.

Failure to follow these warnings can result in serious personal injury or death.

WARNING!

Bursting cylinder due to machining!

Any inappropriate treatment (e.g. drilling, riveting, grinding) changes the mechanical properties, wall thickness and strength of the cylinder. This may lead to accidents and bursting of the cylinder causing severe injuries or death.

- Do not machine the cylinder by drilling, riveting, grinding, etc.

Failure to follow this warning can result in serious personal injury or death.

WARNING!

Bursting cylinder due to damage or distortion!

Damage or distortion of the cylinder may lead to bursting of the cylinder and accidents causing severe injuries or death.

- Do not damage or distort the cylinder.
- If necessary, implement particular precautions to protect the cylinder from damage.

Failure to follow these warnings can result in serious personal injury or death.

The assembly of composite compressed air cylinder and valve, in this manual also referred to as device, cylinder and valve assembly, or cylinder, is used as breathing air cylinder with an operating pressure of 200 bar and 300 bar, respectively.

The composite compressed air cylinder is qualified for filling with breathing air.



If the composite compressed air cylinder is used in combination with an MSA respiratory protective device, refer to the corresponding apparatus manual.

This manual is established for qualified respiratory protective device users. The manual serves as guidance for the safe use, assembly, storage, and handling of composite compressed air cylinders made of different materials:

- All-composite cylinders: synthetic liner and carbon fibre/glass fibre/epoxy taping
- Composite cylinders: aluminium liner and carbon fibre/glass fibre/epoxy taping

It is imperative that this operating manual be read and observed when using the device. In particular, the safety instructions, as well as the information for the use and operation of the device, must be carefully read and observed. Furthermore, the national regulations applicable in the user's country must be taken into account for a safe use.

WARNING!

This product is supporting life and health. Inappropriate use, maintenance or servicing may affect the function of the device and thereby seriously compromise the user's life.

Before use, the product operability must be verified. The product must not be used if the function test is unsuccessful, it is damaged, a competent servicing/maintenance has not been made, genuine MSA spare parts have not been used.

Failure to follow these warnings can result in serious personal injury or death.

Alternative use, or use outside this specification will be considered as non-compliance. This also applies especially to unauthorised alterations to the product and to commissioning work that has not been carried out by MSA or authorised persons.

1.2 Liability Information

MSA accepts no liability in cases where the device has been used inappropriately or not as intended. The selection and use of the device are the exclusive responsibility of the individual operator.

Product liability claims, warranties and guarantees made by MSA with respect to the device are voided, if it is not used, serviced or maintained in accordance with the instructions in this manual.

2 Description

2.1 Cylinder Types

Composite Compressed Air Cylinder with Cylinder Valve

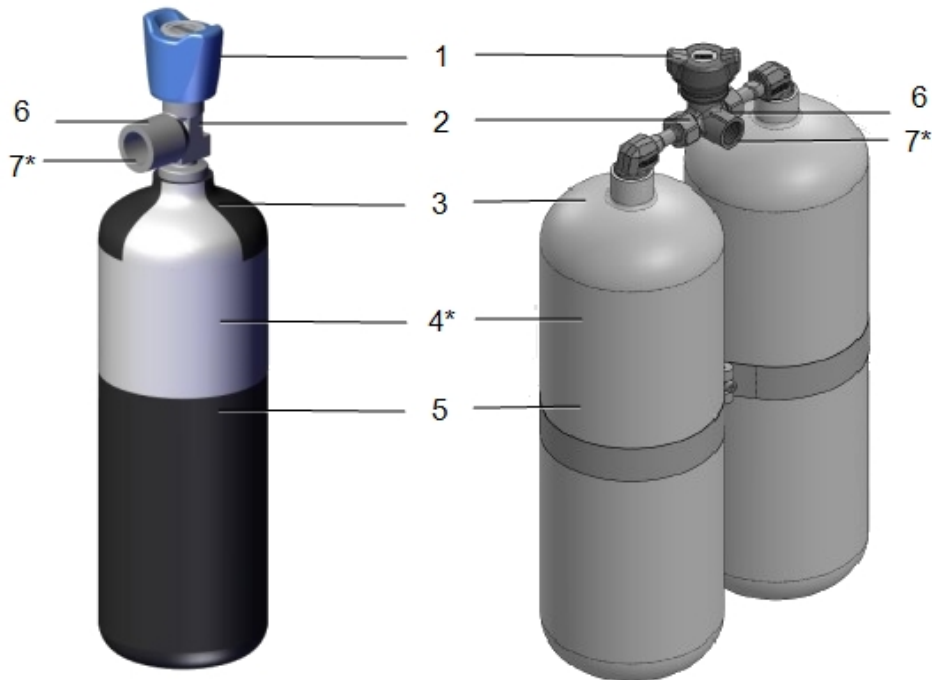


Figure 1 Overview composite compressed air cylinder with cylinder valve / M1 TwinPack

- | | | | |
|----|---|----|---|
| 1 | Handwheel | 5 | Paint coating of cylinder body: yellow, white or transparent for compressed air |
| 2 | Valve body | 6 | Outlet connection |
| 3 | Paint coding of cylinder shoulder: black/white for air | 7* | Screw plug (not included in the picture) |
| 4* | Integrated cylinder label with markings (not included in the picture) | | |

For proper use, refer to the operating manual of the relevant SCBA(s).

Composite Compressed Air Cylinder with Pressure Reducer Valve (PremAire)

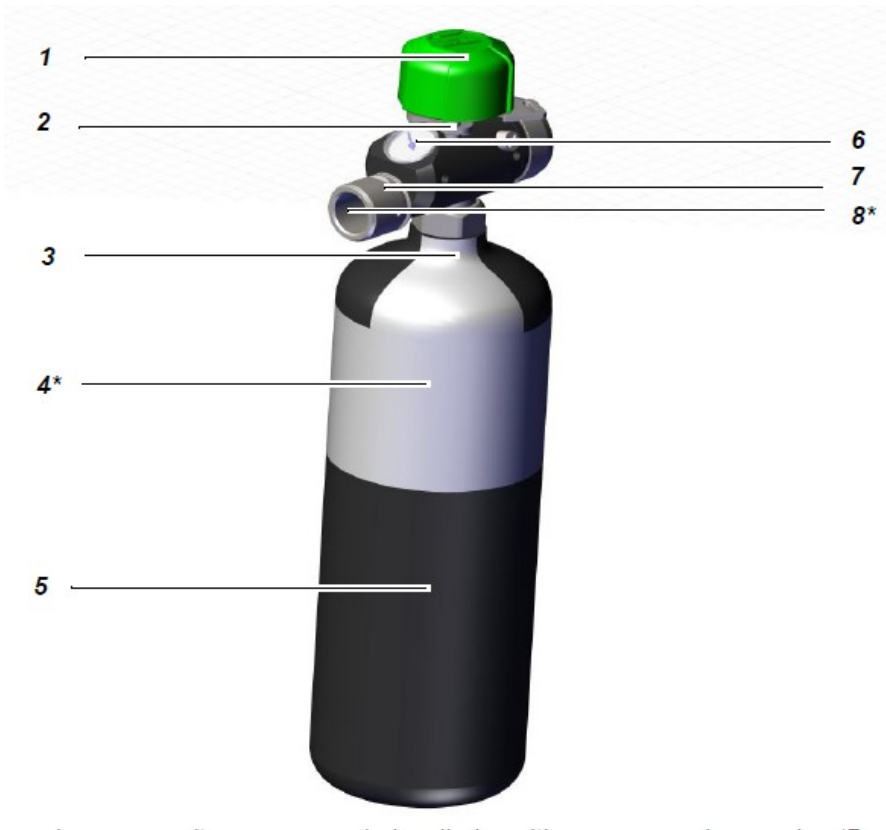


Figure 2 Overview composite compressed air cylinder with pressure reducer valve (PremAire)

- | | |
|--|---|
| 1 Handwheel | 5 Paint coating of cylinder body: yellow, white or transparent for compressed air |
| 2 Valve body | 6 Pressure gauge |
| 3 Paint coding of cylinder shoulder: black/white for air | 7 Outlet connection |
| 4* Integrated cylinder label with markings (not included in the picture) | 8* Screw plug (not included in the picture) |

For proper use, refer to the operating manual of the relevant PremAire(s).

Composite Compressed Air Cylinder with Pressure Reducer Valve (S-Cap-Air)



Figure 3 Overview composite compressed air cylinder with pressure reducer valve (S-Cap-Air)

- | | |
|--|---|
| 1 Handwheel | 5 Paint coating of cylinder body: yellow, white or transparent for compressed air |
| 2 Valve body | 6 Outlet connection |
| 3 Paint coding of cylinder shoulder: black/white for air | 7* Screw plug (not included in the picture) |
| 4* Integrated cylinder label with markings (not included in the picture) | |

For proper use, refer to the operating manual of the relevant S-Cap-Air(s).

2.2 Valve Types

Standard Valve

- Handwheel opposite the cylinder socket

Standard Valve with Pressure Gauge

- Handwheel opposite the cylinder socket
- Cylinder pressure permanently visible

Standard Valve Lightweight Construction

- Handwheel opposite the cylinder socket
- Weight-reduced construction

Standard Valve with Increased Impact Resistance

- Handwheel opposite the cylinder socket
- Airtight even at an impact load of 120 joules

Cross Valve

- Handwheel opposite the outlet connection
- With impact protection

Cross Valve with Pressure Gauge

- Handwheel opposite the outlet connection
- Cylinder pressure permanently visible

Right-Angle Valve with Impact Protection

- Handwheel, cylinder socket, and outlet connection at an angle of 90 degrees to each other

Right-Angle Valve without Impact Protection

- Handwheel, cylinder socket, and outlet connection at an angle of 90 degrees to each other

Pressure Reducer Valve

- PremAire
- Handwheel opposite the cylinder socket
- With and without autostart

Pressure Reducer Valve with Constant Dosing

- S-Cap-Air
- Handwheel opposite the cylinder socket
- With autostart

M1 TwinPack

- Handwheel opposite the cylinder socket
- Two connectors with angle piece

2.3 Optional Accessories (Not Available for All Valve Types)**Excess Flow Valve (EFV)**

- Safety device to prevent excessive leakage of breathing air in case of a valve breakage or unintentional opening
- With protective tube or sinter filter to protect from dust and particles
- Always with blue handwheel
- Not suitable for inflating jumping rescue equipment

MSA Flow Restrictor

- Safety device to prevent excessive leakage of breathing air in case of a valve breakage
- With protective tube or sinter filter to protect from dust and particles
- **Without** blue handwheel
- Suitable for inflating jumping rescue equipment as the leakage of breathing air is only limited in case of valve breakages

Two-Wing Safety Handwheel

- Locking
- Non-locking

Protective Tube

- Protection from dust, particles, and condensation

Protective Tube with Sinter Filter

- Protection from dust, particles, and condensation

Rigid Standard Handwheel

- Locking
- Non-locking

Rigid Standard Handwheel with Integrated Slipping Clutch

- Protection from excessive torque when opening and closing the valve

Locking / Locking Handwheel

- Protection from unintentional closing

Bursting Cap / Bursting Disc

- Protection from overpressure in the breathing air cylinder

Transponder

- Mounted in handwheel
- Mounted around cylinder neck

3 Transport and Storage

WARNING!

Bursting cylinder due to improper packaging!

Inadequate packaging may cause damaged cylinders during transport and storage. Strong damage may lead to accidents and bursting of the cylinder causing severe injuries or death.

- Use adequately robust packaging (e.g. pallets, cartons, crates) to package the cylinder.
- Use sufficiently stable packaging that is able to resist the conditions of transport and storage.
- For selecting suitable packaging methods, also consider the weight of the cylinder.

Failure to follow these warnings can result in serious personal injury or death.

NOTICE

Freezing cylinder and respiratory protective device failure due to strong humidity!

Impermissible high humidity contents may lead to freezing of the cylinder and respiratory protective device failure during use. Variations in storage temperature may lead to condensation water formation.

- Protect the cylinder from humidity.
 - To avoid entering humidity, seal the cylinder connection.
 - For storage outdoors, take additional protective precautions.
 - Close the valves of unpressurised cylinders.
-

3.1 Transport

Transport Instructions

- Do not throw, strike, drag, or roll the cylinder.
- Do not leave the cylinder unattended on the floor.
- Do not use the cylinder with force.
- Secure the cylinder from rolling, moving, or falling.
- Transport the cylinder in a safe position.
- Ensure that other parts of the cargo do not strike at or hit against the cylinder.
- Never seize the cylinder by the valve hand wheel but by the valve housing only. Otherwise, there will be the risk of turning the cylinder valve open unintentionally.
- For transport in a cylinder cart, the upright position (cylinder valve upturned) has proven best. This reduces the risk of valve damage by falling or lateral crashing.
- For transport on public roads, cylinders filled to more than 2 bar pressure are subject to the hazardous material transport regulations of GGVSE and ADR. The cylinders or the transport package, respectively must be labelled with the hazard label No. 2.2 (see Section 5.2.2.2 ADR).
- The individual components of a hazardous material cargo must be stowed and secured on a vehicle so that a movement that changes the orientation of the cylinders or that leads to damage of the cylinders is avoided. If transportation aids (e.g. belts, harnesses) are used, they must not be overstretched in order to avoid damage of the cylinders (see Section 7.5.7.1 ADR).
- A particular protection of the cylinder valves with suitable packaging is required, e.g. by protective crates or – frames, since breathing air cylinders for compressed air respiratory protective device due to their design and

intended use do not have protection caps nor collars
(see Section 4.1.6.8 ADR).

CLP Label



UN 1002 Air, Compressed		
<p>Luft, verdichtet - Pressluft / Lucht, gecomprimeerd / Air, comprimé Aire, comprimido / Aria, compressa / Powietrze, sprężone Nitrogen (N₂) 78,1% (Vol.-%) CAS-No 7727-37-9 H280 Oxygen (O₂) 20,9% (Vol.-%) CAS-No.7782-44-7 H270</p> <p>Hazard statement H280 - Contains gas under pressure; may explode if heated.</p> <p>Gefahrhinweis H280 - Enthält Gas unter Druck; kann bei Erwärmung explodieren.</p> <p>Gevarenaanduiding H280 - Bevat gas onder druk; kan ontploffen bij verwarming.</p> <p>Mention de danger H280 - Contient un gaz sous pression; peut exploser sous l'effet de la chaleur.</p> <p>Indicación de peligro H280 - Contiene gas a presión; peligro de explosión en caso de calentamiento.</p> <p>Indicazione di pericolo H280 - Contiene gas sotto pressione; può esplodere se riscaldato.</p> <p>Zwrot określający rodzaj zagrożenia H280 - Zawiera gaz pod ciśnieniem; ograniczenie grozi wybuchem.</p>	<p>Precautionary Statement P410 - Protect from sunlight..</p> <p>Sicherheitshinweis P410 - Vor Sonnenbestrahlung schützen.</p> <p>Veiligheidsaanbeveling P410 - Tegen zonlicht beschermen.</p> <p>Conseil de prudence P410 - Protéger du rayonnement solaire.</p> <p>Consejo de prudencia P410 - Proteger de la luz del sol.</p> <p>Consiglio di prudenza P410 - Proteggere dai raggi solari.</p> <p>Zwrot określający środki ostrożności P410 - Chronić przed światłem słonecznym.</p>	
<p>MSA Produktion Deutschland GmbH Thiemannstr. 1, 12059 Berlin Germany Phone.: +49 30/68886-0</p>		<p></p> <p>10172430</p>

Figure 4 CLP label

3.2 Storage

WARNING!

Bursting cylinder due to high or extremely low temperatures!

Impermissible temperatures may lead to bursting of the cylinder and accidents causing severe injuries or death. Temperatures below the permissible operating ranges may lead to changes of the mechanical properties and the strength of the cylinder.

- Do not expose the cylinder to direct flames.
- Do not expose the cylinder to high or extremely low temperatures.
- Observe the permissible operating temperature range of the cylinder without valve (TS; see element 14 in Section 9.1 Cylinder Label).
- Observe the permissible operating temperature range of the cylinder and valve assembly (TS; see element 9 in Section 9.1 Cylinder Label).

Failure to follow these warnings can result in serious personal injury or death.

Storage Instructions

- Keep the cylinder under control. In depot, protect the cylinder from falling down. If the cylinder is stored in horizontal or vertical position, secure the cylinder from rolling, moving, or falling. Never let cylinder unsecured.
- Protect the cylinder and valve assembly from mechanical load and soiling.
- Store the cylinder in clean and dry standard atmosphere free from contaminants and protected from direct sunlight and heating up. The storage area must be cool, dry, free from dust, and moderately ventilated. A storage temperature between +15 °C and +25 °C and a relative humidity less than 65% are ideal (see also ISO 2230 / DIN 7716 "Rubber products – Guidelines for storage").

- Always close the cylinder valve outlet connections with a screw plug matching the cylinder test pressure (see ["Tightness Tests"](#)). This avoids entering of foreign substances into the cylinder valve and supports accident prevention if a cylinder valve is opened unintentionally.
- Do not store the cylinder in areas where they may be exposed to electricity (e.g. near electric welding appliances).
- Store the cylinder with tightly closed valve at the "minimum pressure" (MSA recommends a pressure between 20 bar and 30 bar).

4 Installation

4.1 Removing the Valve

WARNING!

The valve **MUST** be removed only by authorised personnel!

Failure to follow this warning can result in serious personal injury or death.

4.2 Installing the Valve

WARNING!

The valve **MUST** be installed only by authorised personnel!

Failure to follow this warning can result in serious personal injury or death.

5 Use

WARNING!

Bursting cylinder due to high or extremely low temperatures!

Impermissible temperatures may lead to accidents and bursting of the cylinder causing severe injuries or death. Temperatures below the permissible operating ranges may lead to changes of the mechanical properties and the strength of the cylinder.

- Do not expose the cylinder to direct flames.
- Do not expose the cylinder to high or extremely low temperatures.
- If necessary, use protection against heat exposure (e.g. MSA Nomex® cylinder covers).
- Observe the permissible operating temperature range of the cylinder without valve (TS; see element 14 in Section 9.1 Cylinder Label).
- Observe the permissible operating temperature range of the cylinder and valve assembly (TS; see element 9 in Section 9.1 Cylinder Label).

Failure to follow these warnings can result in serious personal injury or death.

NOTICE

Freezing cylinder and respiratory protective device failure due to strong humidity!

Impermissible high humidity contents may lead to freezing of the cylinder and respiratory protective device failure during use.

- Protect the cylinder from humidity.
- Close the valves of unpressurised cylinders.

NOTICE

Compressed air cylinders must not be emptied (depressurised) entirely. The residual pressure needs to be less or equal 2 bar.



This operating manual refers only to cylinder and valve assemblies used with SCBA's. For PremAire and S-Cap-Air valve operation, refer to the relevant operating manuals.

5.1 Use as One-Cylinder Device / M1 TwinPack

To take breathing air from the cylinder, perform the following steps:

- (1) Connect the extraction device to the valve outlet.
- (2) To open the valve completely, slowly turn the handwheel counterclockwise until the handwheel blocks.
 - a) If the valve is equipped with a locking handwheel, the locking handwheel lifts and lowers automatically during opening the valve. Turn the locking handwheel back counterclockwise at the stop until the locking handwheel locks.
- (3) To close the valve, turn the handwheel clockwise.
 - a) If the valve is equipped with a locking handwheel, lift the locking handwheel and turn the locking handwheel clockwise simultaneously to close the valve. This mechanism is designed to avoid the unintentional closing of the valve.



To prevent humidity from entering the cylinder, always close the valve immediately after using the cylinder.

- (4) Disconnect the extraction device from the valve outlet.
- (5) To prevent dirt and humidity from entering the valve, close the valve outlet with the screw plug (e.g. for the transport of the cylinder).

5.2 Use as Two-Cylinder Device in Connection with a T-Piece

To take breathing air from the cylinder, perform the following steps:

- (1) Connect the extraction device T-piece to the valve outlet.
- (2) To open the valve completely, slowly turn the handwheel counterclockwise until the handwheel blocks.
 - a) If the valve is equipped with a locking handwheel, the locking handwheel lifts and lowers automatically during opening the valve. Turn the locking handwheel back counterclockwise at the stop until the locking handwheel locks.
- (3) Open the second valve carefully.

If the two cylinders are filled with different pressures, there will be a pressure compensation between the two cylinders if the two cylinders are used at the same time in the same device.

- (4) To close the valve, turn the handwheel clockwise.
 - a) If the valve is equipped with a locking handwheel, lift the locking handwheel and turn the locking handwheel clockwise simultaneously to close the valve. This mechanism is designed to avoid the unintentional closing of the valve.



To prevent humidity from entering the cylinder, always close the valve immediately after using the cylinder.

- (5) Disconnect the valve outlet from the extraction device T-piece.
- (6) To prevent dirt and humidity from entering the valve, close the valve outlet with the screw plug (e.g. for the transport of the cylinder).

6 Maintenance and Cleaning

6.1 Filling the Cylinder

WARNING!

The cylinder **MUST** be filled only by authorised personnel!

Failure to follow this warning can result in serious personal injury or death.

WARNING!

For filling all-composite cylinders, observe that the filling time is equal or less 30 bar per minute to avoid strong warming-up. When rapid filling appliances (e.g. QuickFill) with filling times of approx. 60 seconds are used, the filling temperature is increased. Check cylinders filled with such appliances for tightness at the next standard filling process in the depot.

Failure to follow this warning can result in serious personal injury or death.



The compressed air must meet the requirements to breathing air according to EN 12021.

6.2 Testing the Cylinder

Periodic Inspections

WARNING!

The cylinder **MUST** be inspected only by authorised personnel!

- Present the cylinder in regular intervals to a certified or appointed authority in the sense of the Directive 2014/68/EU. Legal basis for the periodic inspections are the national regulations!

The periodic inspection intervals are determined by the certified authority (e.g. in Germany: TÜV). In Germany, the current interval for the first periodic inspection is 3 or 5 years, respectively, depending on cylinder type (see indication in manufacturer's type approval or cylinder label). Depending on cylinder type, the life is limited to 15, 20, or 30 years or is unlimited.

The life of the valves is not limited. It is recommended to maintain the valves after 10 years of use. With high-frequency use (more than 2,000 opening cycles and closing cycles), MSA recommends to increase the maintenance frequency.

- Observe the national regulations in the country of use!

Failure to follow these warnings can result in serious personal injury or death.

Visual Checks

WARNING!

A defective cylinder must be taken out of service immediately. The cylinder must be emptied (depressurised) in a safe area and must be presented to authorised personnel!

Failure to follow this warning can result in serious personal injury or death.

Visual checks must be performed after each use of the cylinder (e.g. after emergencies or rescue operations) and before refilling the cylinder.

- Remove the cylinder from the extraction device (e.g. pressure reducer).



This does not apply to cylinders with pressure reducer valves.

- Ensure that the cylinder is in proper condition.
- Check the cylinder carefully for outside damage (abrasion, impact, dents, cuts, delamination, etc.).
- Check the cylinder for damage (damaged cylinder, slanted valve, inclined handwheel, leaking valve, cracks in handwheel, damaged cylinder connection, etc.).
- Check the validity of periodic inspection (e.g. TÜV).

Tightness Tests

To perform a tightness test, follow the operating manual of the device the cylinder is used with.

6.3 Cleaning the Cylinder

Cleaning Instructions

The cylinder must be cleaned after each use (e.g. after emergencies or rescue operations) and before refilling the cylinder.

- Clean the cylinder and the cylinder's components.
- Allow the cylinder and the cylinder's components to dry thoroughly.
- Do not expose the cylinder to heat sources to speed up drying.
- To dry a cylinder that is wet from the outside, do neither use heat sources nor steam jets.
- To speed up drying, use a clean air jet with a temperature of up to 60 °C.
- Do not use organic solvents or acidic/corrosive substances that could damage the cylinder.
- **Humidity and slight dirt:** Clean the cylinder with a solution of water and mild detergent. Rinse the cylinder carefully with pure water. To remove solid dirt particles, rinse the cylinder.
- **Oil and grease:** Remove greasy dirt using soapy water.

7 Disposal

WARNING!

Bursting cylinder due to disposing of pressurised cylinder!

- Never dispose of the cylinder in pressurised condition.
- Before disposing of the cylinder, check if the cylinder is entirely empty.
- To avoid refilling a defective cylinder, make a cylinder to be disposed of unserviceable by drilling or sawing.

Failure to follow these warnings can result in serious personal injury or death.

Disposal Instructions

- To scrap a cylinder safely, make it unusable.
- Do not dispose the cylinder into the natural environment.
- Properly dispose the cylinder according to applicable regulations and observe the national regulations.
- Cylinders are made of carbon fibers and/or glass fibers and/or aramid fibers, aluminium and/or steel, rubber and/or polyester. Valves are made of brass and/or steel, rubber and/or polyester. These materials can be recycled.

8 Technical Data / Approvals

Operating pressure	: 200 bar	300 bar
Test pressure	: 300 bar	450 bar
Cylinder life	: See cylinder label	
Water capacity	: See cylinder label	
Weight (cylinder without valve)	: See cylinder label	
Temperature range	: See cylinder label	
Valve thread	: See cylinder label	
Torque for cylinder valve installation	: See cylinder label	
Materials of compressed air cylinder with aluminium liner	: Overwrap: carbon fibre / glass fibre / epoxy resin	
Materials of all-composite compressed air cylinder with synthetic liner and aluminium elements	: Overwrap: carbon fibre / glass fibre / epoxy resin Cylinder bottom and top are fitted with impact protectors made of energy absorbing foamed material.	
Intended application	: Pressure vessels of respiratory protective devices	
Certified fluids of group 2 according to Directive 2014/68/EU	: Breathing air according to EN 12021	

The compressed air cylinder is manufactured and CE-marked in accordance with the requirements of the Pressure Equipment Directive 2014/68/EU and the applicable harmonized standards for compressed air cylinders.

The cylinder valves are manufactured and π-marked in accordance with the requirements of the European Standard EN 144 and the Transportable Pressure Equipment Directive (TPED) 2010/35/EU and the applicable harmonized standards for cylinder valves. The cylinder valves are marked according to the Transportable Pressure Equipment Directive 2010/35/EU.

The cylinder in combination with the cylinder valve or pressure reducer valve assembly is tested by MSA and corresponds to the provisions of directive 2014/68/EU and the applicable harmonized standards and it is controlled according to Module H (full quality assurance) of Directive 2014/68/EU by a notified body (for MSA: CE 2266, DEKRA).

An EU Declaration of Conformity will be given to the customer on request.

A general Declaration of Conformity can be downloaded from www.MSAafety.com/DOC.

9 Labels and Markings

9.1 Cylinder Label

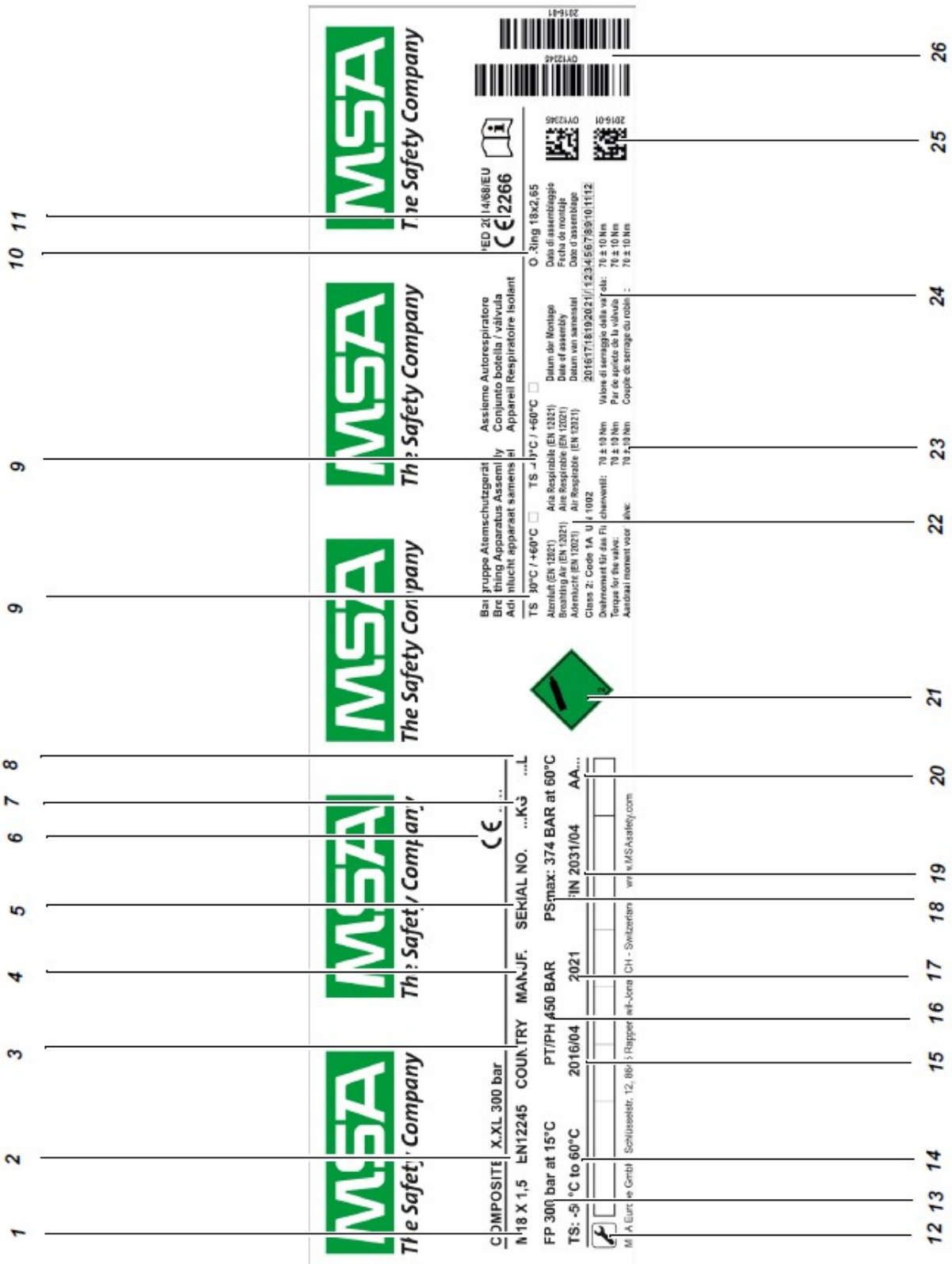


Figure 5 Cylinder label

	Marking	Explanation
1	M18 x 1,5	Thread identification
2	e.g. EN 12245	Applied standard for the cylinder design. Corresponds to the cylinder type and used material. For details, see cylinder label.
3	COUNTRY	Country of origin
4	MANUF.	Manufacturer
5	SERIAL NO.	Serial number
6	CE.....	Cylinder manufacturer marking according to Directive 2014/68/EU
7	...KG	Weight (empty cylinder without valve and protective caps), kg
8	...L	Water capacity, l
9	TS: -40 °C / +60 °C	Operating temperature (cylinder and valve assembly)
10	O-Ring 18x2,65	Dimension of sealing O-ring between cylinder and valve
11	Respiratory protective device assembly CE 2266	CE Marking for the cylinder and valve or pressure reducer assembly according to Directive 2014/68/EU
12	Dates of cylinder retests	Dates of cylinder retests
13	FP 300 bar at 15 °C	Operating pressure at 15 °C
14	TS: -50 °C to 60 °C	Operating temperature (cylinder without valve)
15	2016/04	Date of first cylinder inspection
16	PT/PH 450 BAR	Test pressure (1.5 x filling pressure)
17	2021	Date of first cylinder retest
18	PSmax: 374 BAR at 60 °C	Maximum permissible pressure at 60°C
19	FIN 2031/04	Cylinder life in year and month (if cylinder life is limited)
20	AA...	Aluminium alloy
21	Hazardous material symbol and UN 1002	In conformity with GGVSE/ADR (Road and rail transport of hazardous materials, Germany and Europe)
22	Breathing air (EN 12021)	Compressed gases quality for respiratory protective device
23	Torque for the valve: 70±10 Nm	Allowable torque of the cylinder and valve assembly
24	Date of assembly	Date of assembly (cylinder and valve assembly) Format: Year (and month and day)
25	2D barcode	2D datamatrix barcode for serial number and manufacturing date
26	Barcode 128 (type B)	Barcode for serial number and manufacturing date

CAUTION!

If the cylinder label has been removed, tampered with, damaged, or is partially unreadable, remove the cylinder from service immediately. Discharge the gas content and reject the cylinder.

Failure to follow this caution can result in minor or moderate injury.

Additional labels on the cylinder might be required by national regulations (e.g. PL, DE, AT).

9.2 Valve Markings

VTI

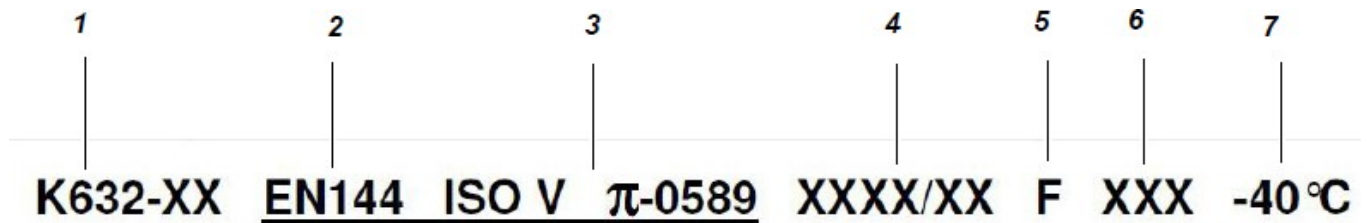


Figure 6 VTI marking

	Marking	Explanation
1	K632-XX	Valve type / valve series
2	EN 144	European standard
3	ISO V π-0589	Coded marking for the standard EN 10297:2014 Marking according to Directive 2010/35/EU
4	XXXX/XX	Manufacturing date (year/month)
5	F	Fire service
6	XXX	Cylinder connection
7	-40 °C	Operating temperature (range) (cylinder and valve assembly)

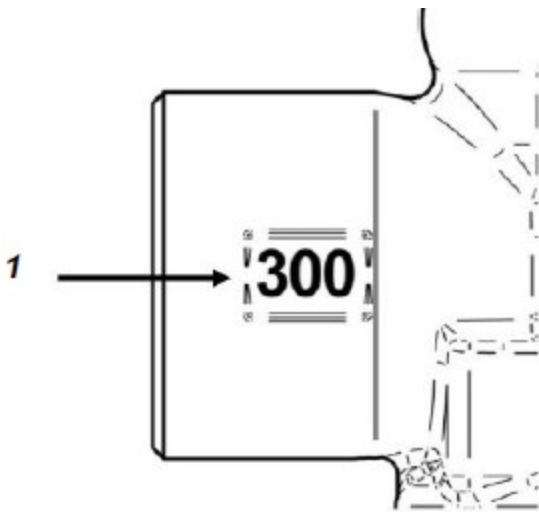


Figure 7 VTI operating pressure marking at the outlet connection

	Marking	Explanation
1	300	Operating pressure of 200 bar or 300 bar marked at the valve outlet

Teknovalves Valves

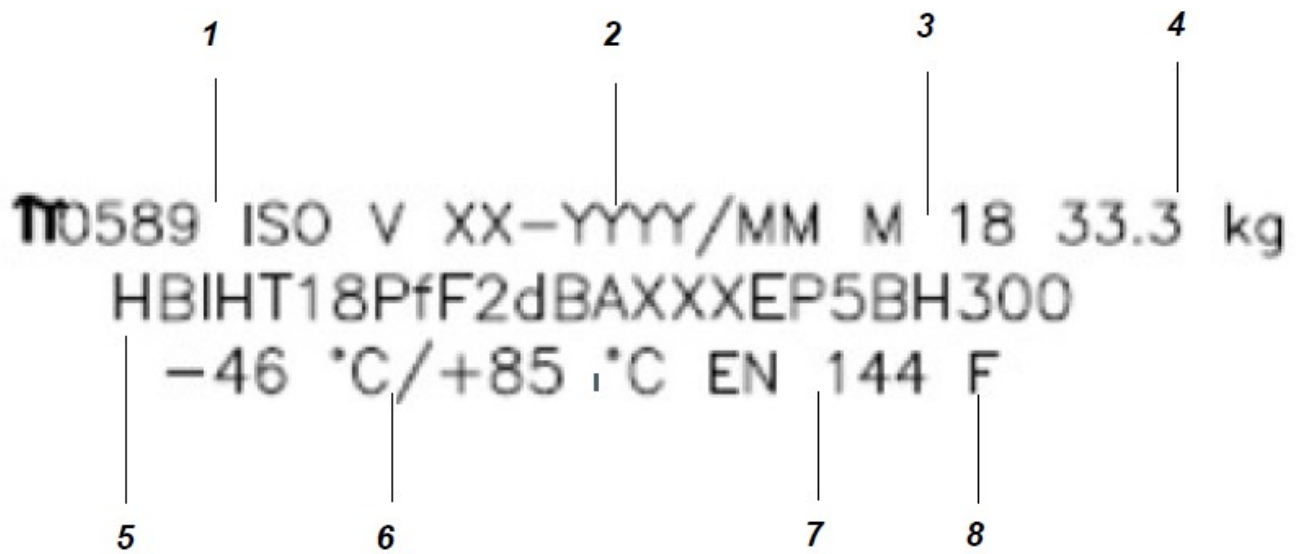


Figure 8 Tekno valves marking

	Marking	Explanation
1	π-0589 ISO V	Marking according to Directive 2010/35/EU Coded marking for the standard EN 10297:2014
2	XX-YYYY/MM	Manufacturing date (day-year/month)
3	M 18	Cylinder connection
4	33.3 kg	Maximum weight (cylinder and valve assembly)
5	HBIHT18PfF2dBAXXEP5BH300	Valve type / valve series
6	-46 °C / +85 °C	Operating temperature (range) (cylinder and valve assembly)
7	EN 144	European standard
8	F	Fire service

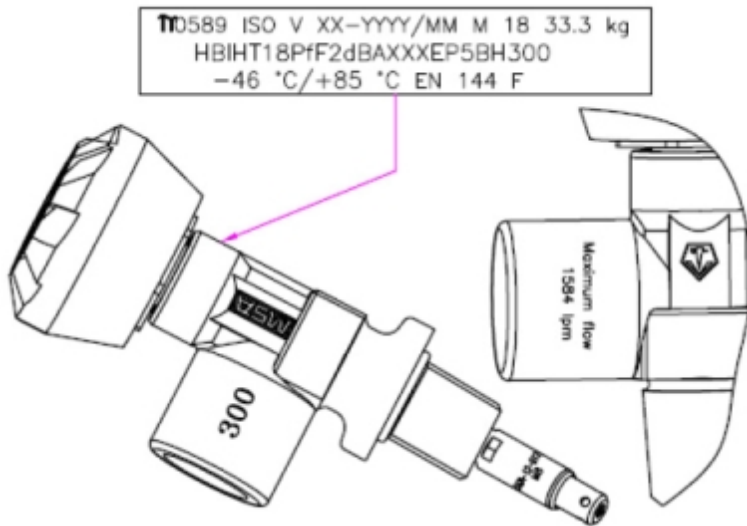


Figure 9 Position of tekno valves marking

Ceodeux

Marking	Explanation
C 31100002	Valve type / valve series
π-0029	Marking according to Directive 2010/35/EU
ISO V	Coded marking for the standard EN 10297:2014
-40 °C / +80 °C	Operating temperature (range) (cylinder and valve assembly)
33 kg	Maximum weight (cylinder and valve assembly)
18 P	Cylinder connection
F	Fire service
YYYY/MM	Manufacturing date (year/month)
DIN3174	German standard
EN 144	European standard
300	Operating pressure (200 bar or 300 bar)
03 D 45	Equipped with MSA flow restrictor

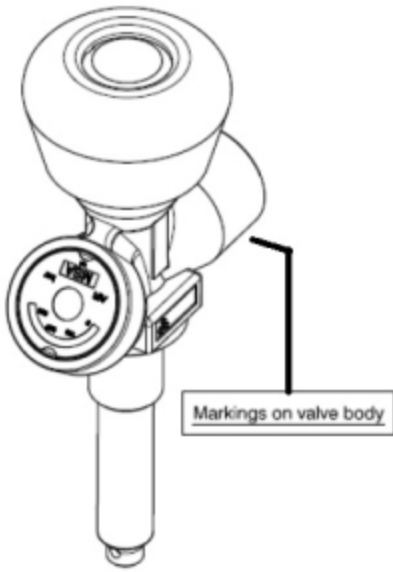


Figure 10 Position of Ceodeux marking

Marking Example



Figure 11 Marking example

	Marking	Explanation
1	03 D 45	Equipped with MSA flow restrictor

Valves that are equipped with an MSA flow restrictor are marked with "03 D 45" on the valve body (spanner flat).

M1 TwinPack

Marking	Explanation
EN 144	European standard
300bar	Operating pressure (300 bar)
-40 °C / +65 °C	Operating temperature (range) (cylinder and valve assembly)
MM/YYYY	Manufacturing date (month/year)
SN xxxxxx	Serialnumber

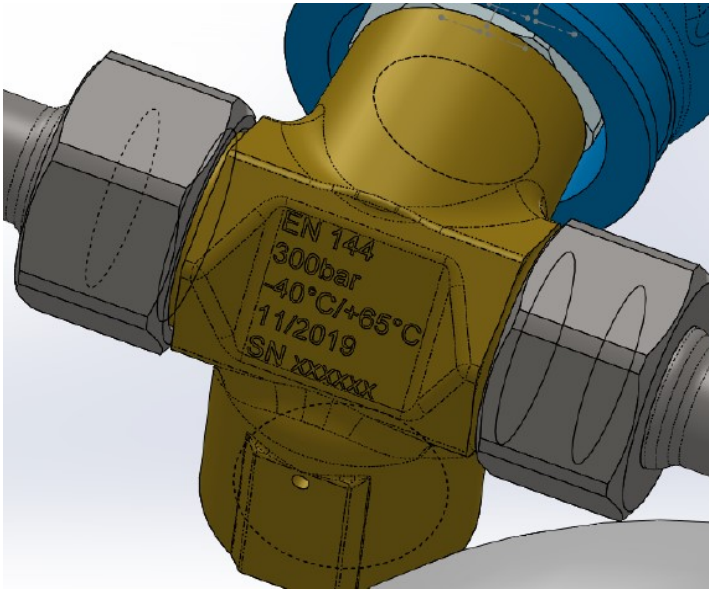


Figure 12 M1 TwinPack Marking

10 Ordering Information

10.1 Available Cylinders, Valves, and Valve Accessories

Composite Compressed Air Cylinders (300 bar)

No.	Manufacturer	Cylinder Type	Volume (L)	Material	Colour	Design Life	Temperature Area	Accessories
A	BTIC	EN6830A1	6.8	Composite	Yellow Transparent	15 years	-50 °C/+60 °C	-
B	CTS	0060_300 Rev.2	6.0	All-composite 1	Transparent	unlimited (NLL)	-40 °C/+60 °C	Protective caps
C	CTS	0068_300 Rev.2	6.8	All-composite 1	Transparent	unlimited (NLL)	-40 °C/+60 °C	Protective caps
D	CTS	0072_300 Rev.3	7.2	All-composite 1	Transparent	unlimited (NLL)	-40 °C/+60 °C	Protective caps
E	CTS	0090_300 Rev.1	9.0	All-composite 1	Transparent	unlimited (NLL)	-40 °C/+60 °C	Protective caps
F	Luxfer	L45X ²	4.7	Composite	Yellow White Transparent	15 years	-50 °C/+60 °C	Optional: Protective caps
G	Luxfer	L58F	6.0	Composite	Yellow White Transparent	15 years	-50 °C/+60 °C	
H	Luxfer	L58G	6.0	Composite	Yellow White Transparent	30 years	-50 °C/+60 °C	
I	Luxfer	L65B ²	6.8	Composite	Yellow White Transparent	30 years	-50 °C/+60 °C	Optional: Protective caps, shrink wrap sleeve
J	Luxfer	L65C ²	6.8	Composite	Yellow White Transparent	15 years	-50 °C/+60 °C	Optional: Protective caps, shrink wrap sleeve
K	Luxfer	L65E ²	6.9	Composite	Yellow White Transparent	20 years	-40 °C/+60 °C	Optional: Protective caps, shrink wrap sleeve
L	Luxfer	L65F ²	6.9	Composite	Yellow	15 years	-50 °C/+60 °C	Optional:

No.	Manufacturer	Cylinder Type	Volume (L)	Material	Colour	Design Life	Temperature Area	Accessories
					White Transparent			Protective caps, shrink wrap sleeve
M	Luxfer	L65N ²	6.8	Composite	Yellow White Transparent	15 years	-50 °C/+60 °C	Optional: Protective caps, shrink wrap sleeve
N	Luxfer	L87A	9.0	Composite	Yellow White Transparent	15 years	-50 °C/+60 °C	Optional: Protective caps
O	Luxfer	L87N	9.0	Composite	Yellow White Transparent	30 years	-50 °C/+60 °C	Optional: Protective caps
P	Luxfer	L66N	6.8	Composite	Yellow / Transparent	15 years	-50 °C/+60 °C	Optional: Protective caps
Q	Luxfer	L66H ²	6.8	Composite	Yellow White/ Transparent	unlimited (NLL)	-50 °C/+60 °C	Optional: Protective caps, shrink wrap sleeve
R	Luxfer	L66R	6.8	Composite	Yellow / Transparent	unlimited (NLL)	-50 °C/+60 °C	Protective caps
S	Worthington	5033.10	6.8	Composite	Yellow	unlimited (NLL)	-50 °C/+60 °C	Protective caps
T	Worthington	5033.30	6.8	Composite	Yellow	30 years	-50 °C/+60 °C	-

¹ The use of valves with sinter filter is not permitted with all-composite compressed air cylinders!

² The retrofitting of Luxfer composite compressed air cylinders with protective caps in the appropriate size by authorised/trained personnel is generally permitted.

Valves (300 bar)

No.	Manufacturer	Valve Type	Handwheel Type	Handwheel Position	Handwheel Colour	Temperature Area	Gauge	Bursting Disc
1	VTI	K44-99.0	Round locking	Straight	Black Blue ¹	-40 °C/+65 °C	No	Yes No
			Round non-locking					
			2-Wing non-locking					
2	VTI	K632-32.0	Round non-locking	Straight	Black Blue ¹	-40 °C/+65 °C	Yes	Yes No

No.	Manufacturer	Valve Type	Handwheel Type	Handwheel Position	Handwheel Colour	Temperature Area	Gauge	Bursting Disc
			2-Wing non-locking					
3	VTI	K632-42.0	Round locking Round non-locking	Cross	Black Blue ¹	-40 °C/+65 °C	No	Yes No
4	VTI	K632-93.0	Round locking	90-Degree	Black Blue ¹	-40 °C/+65 °C	No	No
5	VTI	K800-181.0	Round locking Round non-locking	Straight	Black	-40 °C/+65 °C	No	No
6	Ceodeux	C311	Round locking Round non-locking	Straight	Black	-40 °C/+80 °C	Yes	Yes No
7	Tekno valves	HBA-10/1	Round locking Round non-locking	Straight	Black Blue ¹	-46 °C/+85 °C	No	No
8	MSA M1 TwinPack	2-Wing	Non-locking	Straight	Blue	-40 °C/+60 °C	No	No

¹ Excess flow valves are used in combination with blue handwheels only.

Valve Accessories (Optional)

No.	Type
A1	Non
A2	Water tube
A3	Water tube / Excess flow valve ¹
A4	Water tube / Discharge protection
A5	Sinter filter ² / Water tube
A6	Sinter filter ² / Excess flow valve ¹
A7	Sinter filter ² / Discharge protection

¹ Excess flow valves are used in combination with blue handwheels only.

² The use of valves with sinter filter is not permitted with all-composite compressed air cylinders!

10.2 Cylinder-Valve Matrix

Component		Compressed Air Cylinders Types																			
Pressure (in bar)	Pressure (in bar)	300																			
Cylinder Valve Types	No.	A	B	C	D	E	F	G	H	I	J	K	L	M	M	O	P	Q	R	S	
	1	Green	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	2	Green	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	3	Green	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	4	Green	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	5	Green	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	6	Green	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	7	Green	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	8	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red

	Non-permitted combination
	Non-permitted combination, if using a valve accessory with sinterfiller
	Permitted combination

Figure 13 Cylinder-valve matrix

10.3 Accessories

Description	Part number
Cylinder Cover Basic, 6–6.9 l, signal yellow	10155098
Cylinder Cover Basic, 6–6.9 l, black	10155097
Cylinder Cover eXXtreme, 6–6.9 l, black	10155096

