



Safe use of gas cylinders

Gas cylinders (also called gas-bottles, containers or tanks) are pressure vessels designed to contain compressed gases; normally with filling pressures up to 300 bar (4350 psi). Strict design and re-qualification rules apply to these pressure vessels to ensure the safety of the users. However, legal requirements do not cover everything: safety also depends on how cylinders are handled.

Gas cylinders are used onboard ships in all shapes and sizes.

- Fixed cylinders which are part of a bigger system; such as accumulators.
- Cylinders that are considered part of the ships inventory; such as fire extinguishers and cylinders that are part of the fixed fire-fighting systems.
- Gas cylinders for exchange; such as oxygen, acetylene and refrigerant cylinders.

The last two groups will be transported on a regular basis and thus need extra attention.

What are the risks?

- **Heavy weight**

A 50 litre cylinder can weigh approximately 80 kg and can be difficult to move. Cylinders are normally stored vertically, so it is best to transport them in a vertical position. Furthermore, some gases such as acetylene have to be stored in vertical cylinders, otherwise liquid acetone can be expelled from the cylinder when used.

The best solution is to use approved trolleys, or to roll cylinders on their base while holding them vertically. During transport, cylinders should be secured to stop them moving during sudden changes in speed or bends in the roads. The larger cylinders have a high centre of gravity and tip over easily. In storage, always use straps or chains or special brackets with quick-release mechanisms. On board, central distribution systems with cylinders stored in fixed cabinets are a much safer alternative than having individual cylinders in several locations.

- **High pressure**

The pressurised gas inside cylinders can propel the cylinder when it is suddenly and uncontrollably released, for example if the valve is damaged during transport or if the valve is accidentally opened. A cylinder can “fly” up to several hundred metres and reach speeds of 50 km/h.

This can also happen with special quick-release valves if they are not secured against accidental release with securing pins, wires or safety caps. A valve protection (safety) cap must always be fitted. Oil and grease must not be used on the threads of the valve and the safety cap/neck ring. Some gases, like oxygen, can react violently with oil and grease. High velocity gas from a high-



pressure cylinder can easily penetrate the skin and create internal injuries even when the gas is considered non-toxic.

- **Risk to human life**

The contents of cylinders can cause risks to human life. Products like oxygen with its fire-sustaining properties, or nitrogen which can cause asphyxiation, show how important it is to understand the properties of gases inside cylinders. Material Safety Data Sheets (MSDS) are a quick and effective reference to understand these properties.

- **Corrosion**

Cylinders are generally made of low-alloy steel, so can easily rust when stored under unfavourable conditions. Always store cylinders in a dry environment, preferably a roofed storage, and ensure that the cylinders are not standing in pools of water. Acids and other chemicals can cause also severe corrosion.

Reducing the risks

In order to easily identify gases, all cylinders are colour-coded according to the accepted convention for the marine industry. In addition, Unitor-branded cylinders containing flammable, oxidizing and inert gases have different threads on the valve outlets to avoid mixing up the gases.

The temperature of cylinders and its contents should remain below 50 degrees Celsius. Extreme temperatures can cause the safety device to activate, leading to uncontrolled release of the gas contents. Cylinders should not be used for anything other than the storage of gas, as this could damage the integrity of the cylinder and reduce its strength. Although it is very tempting, never weld on a cylinder. When discovered, it will lead to the immediate scrapping of the cylinder.

With more than 100 years experience in supplying gases and refrigerants in cylinders to the marine market, we take safety very seriously. We see it as our responsibility to assist our customers with safety instructions and the right products to enable them handle cylinders safely.



Safety poster available on request from Customer Services

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