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## Safety Advice No. 21

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# Medical Oxygen and Medical Air Cylinders Used in Diving Operations with Self-contained Underwater Breathing Apparatus (SCUBA) or with Free Diving Operations

## ANZIGA

ANZIGA is the peak industry group for the manufacture and distribution of gases in Australia and New Zealand. As a leading industry association, ANZIGA promotes the highest standards of safety, quality and reliability.

### ANZIGA aims to:

- consult with government authorities and organisations that make policy or prepare regulations and standards which govern the production, transportation, storage, handling and use of gases.
- collaborate with other industry and trade organisations on safety and technical matters, including public programs that relate to the gases industry.
- produce information that promotes the safe storage, handling and use of gases.

The members of ANZIGA produce and distribute gases for the health and medical, manufacturing, food, scientific and hospitality industries.

### Notice of Safety Advice

In general a notice of Safety Advice is intended to provide information and relevant recommendations on a safety concern relating to the production, transportation, storage, handling and use of gases.

## Removal of Medical Oxygen & Medical Air Cylinders Used in Diving Operations

This Safety Advice addresses concerns relating to the use of medical oxygen and medical air cylinders in the diving industry with SCUBA and SSBA (Surface Supply Breathing Apparatus) other than for medical or resuscitation purposes. For diving applications, the purity levels defined in AS/NZS 2299.1 are applicable.

### Safety Concern

The Australia wide gas industry roll out of the pin indexed medical oxygen valve change (AS 2473.3) and medical cylinder colour change (AS 4484) has highlighted to the Healthcare sector of the Medical Gas industry that medical oxygen and medical air cylinders are being used in environments and applications other than those for medical purposes.

Specific standards apply and define the purity of Breathing Air and Breathing Oxygen for use in non medical related applications. Such applications include SCUBA in the diving industry.

In the provision of medical gases to the Healthcare sector, patient safety is the paramount concern. The use of medical oxygen and medical air cylinders in inappropriate environments may compromise the ability of the medical gas industry to guarantee the delivery of a suitable quality product and a package that is “fit for patient use”.

Notwithstanding the medical application argument, there are particular hazards associated with decanting of medical oxygen at high pressure, a practise commonly employed in the diving industry. The new pin index outlet (changed to PIN from type10 for large medical oxygen cylinders) is not designed for flows experienced during the decanting process thus creating a risk of ignition.

***Note: Procedures for decanting from medical gas cylinders at 200 bar pressure are not recommended or endorsed by any Standard, and shall not be performed without the formal authorisation of the cylinder owner.***

**ANZIGA does not endorse or support the decant filling of gas cylinders by untrained and unqualified people and that any such operation be carried out with consideration to equipment specifically designed for this purpose.**

Some of the safety concerns include, but are not limited to:

- An industrial environment can lead to the external contamination of the gas cylinders by oils, grease and other compounds not normally found in clean healthcare environments.
- Cylinders left unused for long periods of time in an unhygienic environment may impede future operations of valves, in particular if they have minimum pressure retention devices.

- Cylinders left in aggressive environments may contribute to parts seizure, contamination ingress and corrosion.
- Standards relevant to occupational diving operations (referenced below) specify the quality of Breathing Air and Breathing Oxygen to be used in such applications (instead of medical grade products being used).
- The risk of an oxygen fire during the decanting process from medical oxygen cylinders is increased now pin index valves are used in medical cylinders.

## Compliance Issue

There are specific Australian Standards covering the requirements of both the purity and correct source of breathing oxygen and breathing air for diving operations with SCUBA.

- AS/NZS 2299.1 requires that medical gas cylinders at diving sites be managed such that their inadvertent misuse is mitigated from providing breathing gas for diving.
- AS/NZS 2299.1 clearly specifies the purity of breathing air required for diving which is not fully compatible with medical grade air.
- AS 3848.2 recommends that breathing air for diving purposes be sourced from air compressors able to produce air to a quality compliant with AS/NZS 2299.1.

## Advantages of Non Medical Breathing Oxygen and Breathing Air for Use in Diving with SCUBA

- Compliance with AS/NZS 2299.1 with regard to the correct purity for diving use, and AS 3848.2 with regard to the correct source for these breathable gases.
- No requirement to clean and paint cylinders to the new medical cylinder colour scheme in compliance with AS 4484.
- No requirement to upgrade cylinders valves to pin index valves to comply with AS 2473.3 for SCUBA units or fit yoke connections to the units.

***ANZIGA recommends the appropriate source and quality of Breathing Air and Breathing Oxygen for use in diving and with SCUBA as defined in relevant industry standards. Medical oxygen and medical air cylinders must only be used for medical treatment or resuscitation purposes. If further clarification is required regarding the use of Medical Oxygen or Medical Air for anything other than medical treatment, contact your Medical Gas Supplier.***

## References

**AS 2299.1** – *Occupational diving operations Part 1: Standard operating practice.*

**AS 3848.1** – *Filling of portable gas cylinders Part 1: Decant filling of medical air and oxygen into portable cylinders – Safe procedures*

**AS 3848.2** – *Filling of portable gas cylinders Part 2: Filling of portable cylinders for self-contained underwater breathing apparatus (SCUBA and non-underwater self-contained breathing apparatus (SCBA) – Safe procedures.*

**AS 2473.3** – *Valves for compressed gas cylinders Part 3: Outlet connections for medical gases (including pin-indexed yoke connections.*

**AS 4484** – *Gas Cylinders for industrial, scientific, medical and refrigerant use – Labelling and colour coding.*

**ANZIGA Safety Advice No.18** – *Decant filling of gas cylinders*

Yours sincerely,

The Australia New Zealand Industrial Gas Association

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