Safety Advice No. 18

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Decant Filling of Gas Cylinders

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 industries, 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, handing and use of gases.

Summary

The safe filling of gas cylinders requires that persons (or organisations) performing the operation have detailed and expert knowledge of gas properties, cylinder design, plant operations, material compatibility, equipment pressure ratings and relevant legislation. It also requires expert knowledge of the appropriate equipment to be used and shall be performed in compliance with the requirements of Australian Standard AS 2030.1.

Failure to take all these aspects into consideration can result in accidents causing serious injury and fatality.

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

This Safety Advice is a guide to the key safety, quality and regulatory concerns we would like to bring to your attention.

Decant filling must not be performed without the written authority of the decanted and the filled cylinder owners.

Medical gases for therapeutic use are subject to regulatory controls and shall only be filled by GMP licensed manufacturers unless otherwise granted an exemption by the Therapeutic Goods Administration Australia or Medsafe New Zealand.

Note: *Decant filling from medical gas cylinders may invalidate the medical status of the gas. It shall not be performed without the formal authorisation of the decanted and filled cylinder owners.*

Safety Hazards of decant filling

- Compressed gas cylinders contain a lot of stored energy. Equipment used for decant filling must be able to contain the pressure and energy stored. If not, a violent rupture of equipment can occur, causing serious injuries or fatalities to people in the vicinity.

- Materials used must be compatible with the gas. The use of pressure equipment, gas cylinders and cylinder valves not compatible with the gases to be filled can cause ignition in the system, rupture of equipment, serious leakage of gases, all scenarios which can cause serious accidents.

- Incorrect handling of flammable or oxidizing gases can cause an ignition, in turn causing a sudden pressure increase and consequently, a catastrophic rupture. Released flammable gases can ignite causing fire or vapour cloud explosion.

- Released gases can, depending on the properties of the gas, cause poisoning, asphyxiation, explosions or oxygen enrichment. Enrichment of oxidizing gases may in itself not be dangerous, but the risk and intensity of any consequent fire will increase considerably – many non-flammable materials will burn fiercely in an oxygen enriched atmosphere.

- The cylinder being filled may be unsafe and may not meet the regulatory requirements.

- Any waste gas if not vented safely may create a dangerous environment dramatically increasing combustion, ignition and asphyxiation risks. Some gases may have detrimental environmental impacts.

Cylinder safety during decant filling by emergency services and the aviation industry

ANZIGA acknowledges the need for emergency services and the aviation industry to decant gas. Written approval of the gas supplier must be obtained prior to any decanting operation. Under this approval the following steps should be taken:

- The gas cylinder must be inspected before each filling to ensure that it is safe to be used for the intended gas, and the cylinder, and all equipment used as part of the decant filling operation, do not contain any residue or contaminants such as water, oil or grease.

- The filling pressure must be correct for the cylinder working pressure and the final fill temperature and pressure must be calculated to ensure the filled cylinder is safe for use.

- The cylinder valve must be free of any damage, contaminants and the functionality checked.
- The material compatibility and pressure rating of all cylinder package components and the filling equipment (hose, gauges, pressure regulators, etc.) must be positively verified as being suitable.
- Check the next inspection date of the cylinder: Never fill gas into a cylinder that is beyond the retest date. (The retest of the cylinder must be done by a registered test station in accordance to AS2337.1 and AS2337.3).
- The gas cylinder must be inspected after each filling to ensure that it is not leaking and is safe to be used.

Quality & Regulatory concerns of decant filling

- Cylinders which have not been filled in compliance with AS 2030 pose a safety risk.
- There is no traceability of the product once it has been decanted. This can impact the effectiveness of a product recall.
- Decant filling may affect the quality of the gas, thus making it unsafe for its intended use.
- The gas in the cylinder being decanted may be of a specification which is not suitable for the intended use of the cylinder being filled.
- Filled cylinders must be labelled to comply with Dangerous Goods, Labelling of Workplace Hazardous Chemicals and/or Labelling of Medical Products regulations. Failure to comply with these requirements may subject the person or organisation to legal liabilities.
- Medical gases for therapeutic use are subject to regulatory controls and shall only be filled by Therapeutic Goods Administration licensed manufacturers.

References:

AS3848.1	Filing of portable gas cylinders Part 1: Decant filling of medical air and oxygen into portable cylinders – Safe procedures
AS2030.1	Gas Cylinders – Part 1: General Requirements
AS2337.1	Gas cylinder test stations – General requirements, inspection and tests – Gas cylinders
AS2337.3	Gas cylinder test stations – Transportable gas cylinders – Periodic inspection and testing of composite cylinders (ISO 11623: 2002, MOD)

Australian Dangerous Goods Code

Labelling of Workplace Hazardous Chemicals - Code of Practice

PIC/s Guide to Good Manufacturing Practice for Medicinal Products (PIC/s Code of GMP)

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