
Safety Advice No. 18

Document No. 142-018 (Version 06)

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, handling and use of gases.

Summary

The safe filling of gas cylinders requires that the persons performing the operation have detailed and expert knowledge of in particular, 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 inspection of the cylinder to be filled.

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

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.

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 cylinder owner either for filling from, or filling to, a gas cylinder.

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.

Safety Hazards of decant filling

- Compressed gas cylinders contain a lot of stored energy. Equipment used for 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 if it has not been legally tested.
- Any waste gas if not vented safely may create a dangerous environment dramatically increasing combustion, ignition and asphyxiation risks.

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 cylinders must be inspected before each filling to ensure that they are safe to continue to use for the intended gas, and the cylinder, and all equipment used as part of the decant filling operation, does 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 is calculated to be safe for use.
- The cylinder valve has to 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 etc.) has to be positively verified.
- Check the next inspection date of the cylinder: Never fill gas into a cylinder that is beyond the retest date.

Quality & Regulatory concerns of decant filling

- There is no traceability of the product once it has been decant filled. This can impact the effectiveness of a product recall, thus potentially having a suspect medical product still in circulation with the real risk of causing patient harm.
- There is no analysis of the product after filling to confirm its composition meets the relevant pharmacopeia specification and is thus safe for its intended use.

Quality of the product cannot be assured.

- Filled cylinders must be labelled to comply with Dangerous Goods legislation and labelling standards. Failure to respect these requirements will subject the organisation to legal liabilities.

Medical gases for therapeutic use are subject to regulatory controls and shall only be filled by Code of GMP licensed manufacturers.

References:

AS3848.1 : 1999 Filing of portable gas cylinders Part 2: Decant filling of medical air and oxygen into portable cylinders – Safe procedures

AS2030.1 The verification, filling, inspection, testing and maintenance of cylinders for storage and transport of compressed gases - Part 1: Cylinders for compressed gases other than acetylene

Australian Dangerous Goods Code – 7th Edition (ADG7)
Australian code of good manufacturing practice for medicinal products (Code of GMP)

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