

Guideline 2 – Restraining gas cylinders for transport inside a cylinder pallet

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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.

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Loading cylinders into cylinder pallets

When loading/unloading cylinders into and out of pallets, adopt the correct manual handling techniques.

- Use mechanical aids in preference to direct handling of cylinders (ramps, trolleys)
- Familiarise yourself with and observe appropriate safe lifting techniques/postures prior to manually handling heavy large gas cylinders
- Assess the load weight and dimensions before attempting any lift
- Wear suitable personal protective equipment (PPE) – wear safety footwear and leather gloves to protect against falling or slipping cylinders, crushing hands or feet during moving

General guidelines for loading cylinders into pallets are as follows:

- Load cylinders centrally within the pallet. Nest cylinders to prevent movement when secured inside the pallet. See diagrams 1 and 2 for examples of nested cylinders correctly restrained in pallets.
- Load pallets with cylinders of the same size wherever possible - if this is not practical, see the guidelines for mixed cylinder loads below.
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Note: The minimum standard is one strap only, a second strap is optional.

Illustrations in this guideline show pallets with two straps fitted. Should a second strap be fitted it should be done up correctly or properly secured to the pallet to minimise the risk of the strap becoming entangled with other objects causing an incident during loading or unloading.

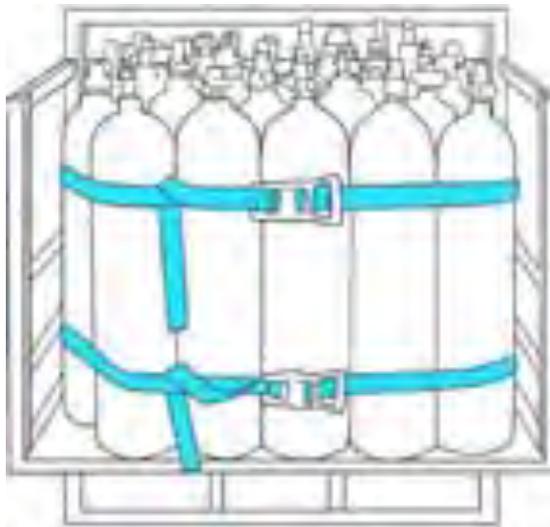


Diagram 1 - Pallet loaded with cylinders of the same size

- Cylinders must not overhang the base of the pallet.
- Load part loads, as far as practical, in a central position towards the rear of pallet for reduced manual handling effort and stability of the pallet.

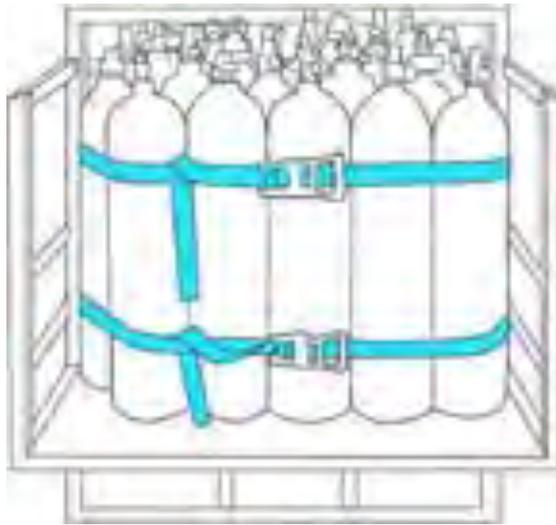


Diagram 2 - Partly loaded pallet

- Do not place a cylinder on top of the valve of another cylinder as this may cause damage to the valve.
- Do not stack cylinders directly on top of each other in a pallet unless the cylinder is designed to allow this via a base, which engages into the valve shroud of the cylinder underneath.

No more than two layers of cylinders stacked in this manner should be placed in the pallet.

Loading mixed cylinders

Mixing varying cylinder heights in a pallet should be avoided wherever possible.

However, if mixing cylinder sizes is necessary, the following guidelines should be followed:

- Ensure the load is stable.
- Place taller cylinders at the back of the pallet with shorter cylinders placed against the taller cylinders.
- Avoid placing small cylinders amongst larger cylinders wherever possible
- Use two webbing straps whenever possible.

Examples of pallets loaded with cylinders of mixed sizes are shown in diagrams 3 and 4.

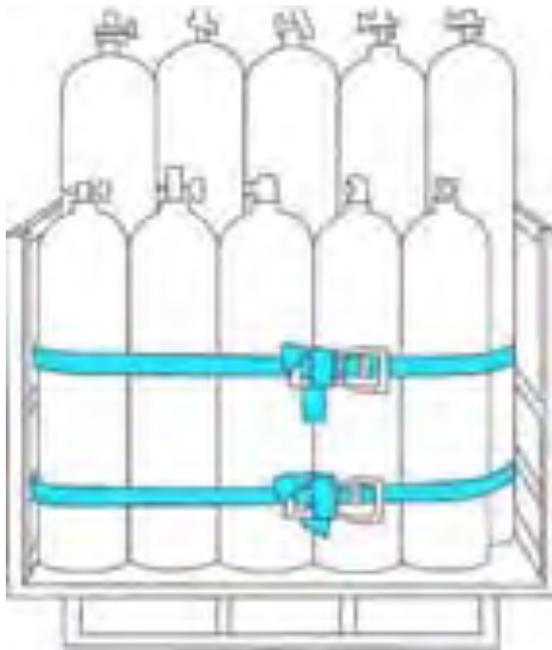


Diagram 3 – Pallet loaded with large and medium sized cylinders

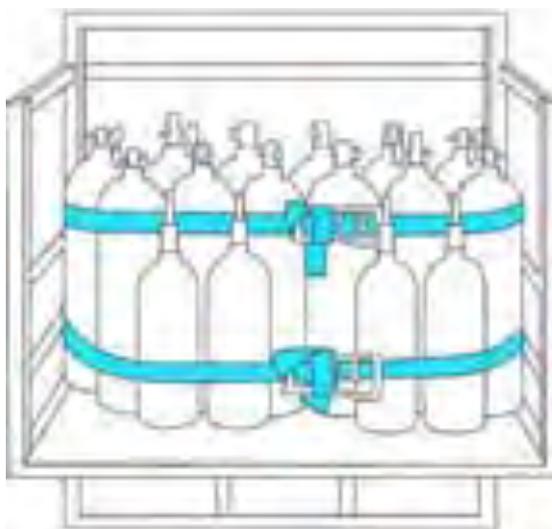


Diagram 4 – Pallet loaded with medium and small cylinders

Loading small cylinders

Accidents have occurred where small cylinders, which have not been properly loaded and secured, have fallen from pallets while being transported.

The guidelines for loading small cylinders into pallets are as follows:

- Use the internal strap to restrain small cylinders in pallets wherever possible.
- Always ensure the cylinders are upright in the pallet.

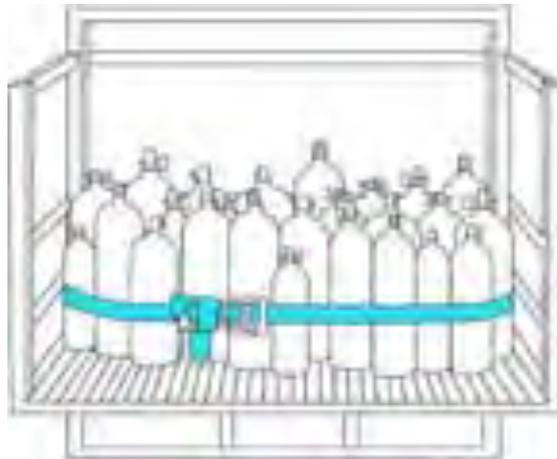


Diagram 5 - Correctly loaded pallet



Diagram 6 - Incorrectly loaded pallet (upper layer cylinders are inverted)

Restraining and releasing cylinders in pallets

Restraining cylinders with webbing straps

Restrain cylinders in a pallet with webbing straps as follows:

- **Pallet must be on firm level ground.**
- Check the pallet frame and webbing straps for obvious signs of damage, especially at the anchor points. If webbing is weakened or substantially damaged it must not be used. Check pallet for flat floor and webbing damage.
- Keep straps inside the pallet frame.
- Do not pass straps through the sides of adjacent pallets.
- Locate the straps to centralise the load as far as practicable. Use the pallet J hooks/anchor hooks to wrap the straps around if necessary. Keep the straps tight to prevent slackening.
- Secure the webbing straps first, to prevent the possibility of the taller cylinders falling while restraining the shorter cylinders.

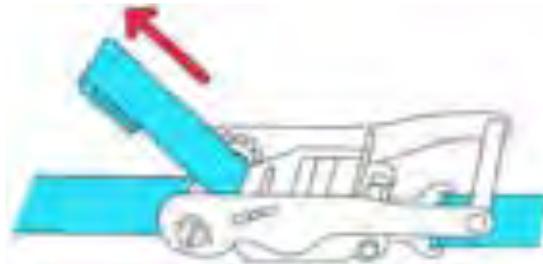
Note: Secure the straps approximately level with the anchor points—securing the straps at an excessive angle allows the potential for strap slippage and loosening.

When restraining small cylinders only, restrain the small cylinders with the lower strap and also fasten the top strap.

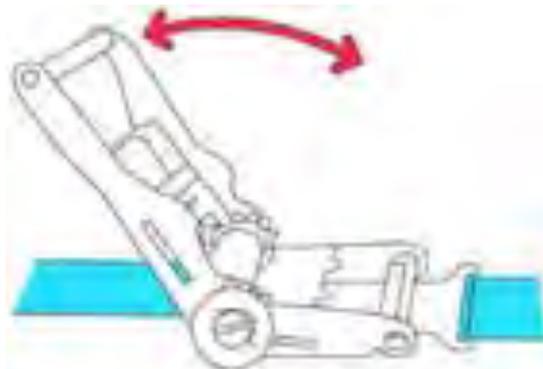
- Ensure the strap is not twisted in the ratchet mechanism. Twisting the strap can prevent it from becoming fully tightened, as the twisted part of the strap may become caught up in the ratchet mechanism.
- Engage the mating hook of the fixed strap around the bar on the ratchet.



- Tension the ratchet strap correctly. Pull the webbing through the spindle to take up the slack.



- Lift the locking latch to operate the handle back and forth until the webbing is properly tensioned.



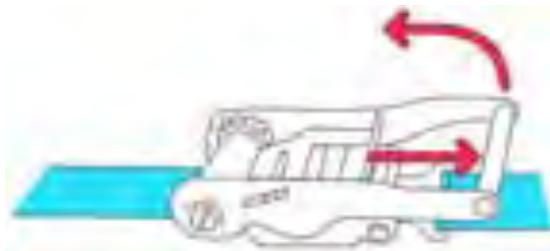
- Tighten the strap by pulling on the ratchet handle ratchet to securely hold the cylinders, but take care not to over tighten the ratchet.
If cylinder movement during tightening occurs, release tension on the strap, readjust cylinders and retighten. Excessive build up of webbing on ratchet spindle reduces its effectiveness of operation.
Note: A minimum of two and a half wraps of webbing material should be used around the ratchet spindle for secure tightening.
- Do not leave ratchet handles in the open position as they may become damaged when parking the pallet against a wall or up against another pallet.
- Wrap any slack around the rest of the webbing strap or place inside the pallet. Surplus webbing left trailing on the ground creates a tripping hazard and may also become trapped when lowering the pallet to the ground.
- When transporting empty pallets it is recommended that the pallet straps are passed around the pallet posts and fastened in order to indicate that the ratchet is functional and also to secure the pallet strap within the pallet.
- Do not lay the webbing straps over adjacent pallets. This may cause the straps to get caught when moving adjacent pallets.

Releasing cylinders restrained with webbing straps

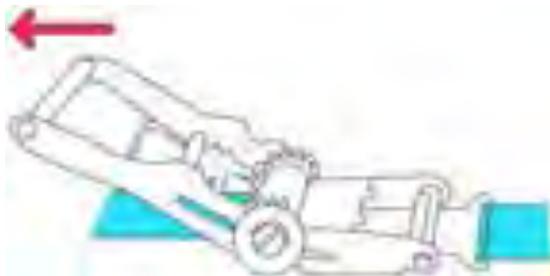
Warning: Pallet must be on level ground. Take care, because after transport, cylinders may move when straps are loosened.

Release cylinders from pallets as follows:

- Check the stability of the load.
- Undo the lower ratchet first (if fitted) to reduce the risk of cylinders falling over.
- **Caution: Carefully release the tension in the webbing by disengaging the ratchet's locking latch via the finger operated sliding plate and opening the ratchet by means of the handle.**



- **Caution: Ensure that the load appears and feels stable before pulling sufficient slack webbing through the ratchet to enable it to disengage from its mating hook.**



- Carefully move the webbing aside. If the pallet is to remain idle, the strap and ratchet should be parked on the storage hooks provided to prevent them from becoming a tripping hazard or becoming damaged on the floor.
- **Caution: Do not attempt to catch any cylinder that may fall.**

Unloading cylinders from pallets

Follow these guidelines when unloading cylinders from pallets:

- Ensure that the surface the pallet is to be loaded on is level and free of debris.
- When removing a cylinder, be careful not to knock adjacent cylinders as this may cause them to topple.
- Do not attempt to catch any cylinder that may fall.
- Contact your gas supplier if any cylinder is damaged during loading and transporting.
- Beware of trapping fingers between cylinders.
- Remove medium and large cylinders one at a time.

When loading/unloading cylinders into and out of pallets, adopt the correct manual handling techniques:

- Use mechanical aids in preference to direct handling of cylinders (ramps, trolleys)
- Ensure cylinders are positively secured to mechanical lifting/handling devices prior to moving cylinders
- Familiarise yourself with and observe appropriate safe lifting techniques/postures prior to manually handling heavy large gas cylinders
- Assess the load weight and dimensions before attempting any lift
- Wear suitable personal protective equipment (PPE) – wear safety footwear and leather gloves to protect against falling or slipping cylinders crushing hands or feet during moving
- Ensure a positive hand grip prior to commencing a manual lift
- Ensure that loads are equally shared when attempting two person lifts
- Be aware that footing may be compromised by uneven surfaces
- Note environmental conditions prior to handling cylinders – wet, hot or cold cylinders may diminish the quality of hand grip and footing may be compromised

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