



# Packing, Handling and Storage of Polyethylene Pipes and Fittings

## INTRODUCTION

Polyethylene pipes and fittings are light in weight and easy to handle compared to many other materials. They have considerable resilience, flexibility and resistance to impact. However, PE pipes and fittings can be scored by sharp edges and can be distorted under load, particularly at higher temperatures. Therefore, in general, PE pipes and fittings shall not be dropped, indented, crushed, or impacted and shall not be subjected to rough handling during loading and unloading operations.

## GENERAL

Pipes and fittings shall not be stored or transported adjacent to heat sources, such as engine exhausts, boilers, naked flames or hot water or steam lines. While PE is very resistant to low temperatures, as the temperature drops below 0°C the impact resistance will slowly reduce, and therefore more care should be taken to avoid damage by impact.

**Care shall be taken in handling pipes and fittings in wet or frosty conditions as they may become slippery.**

- As with all pipe materials, contact with oils, petrol, solvents, or chemicals that might have an adverse effect on future performance should be avoided.
- Typically, scores or scratches to a depth of more than 10% of the wall thickness should be avoided for pressure applications.
- During coiling care shall be taken to maintain the coil diameter at or above the specified minimum to prevent kinks. In uncoiling or recoiling care shall be taken that sharp objects do not score the pipe.
- Polyethylene is combustible, but there are no restrictions on the type of fire extinguisher which can be used.
- Generally, only webbing slings should be used to lift PE pipes by crane. Vacuum lifting may be used, but chains, wire ropes and hooks shall be avoided.
- In the storage and issuing of pipe and fittings the principle of 'first in, first out' should preferably be observed.
- Pipes of colour other than black should be protected from elevated temperatures and direct sunlight during storage and transport, particularly if they are to be stored for more than 2 years.

## LIFTING, HANDLING, STORAGE AND TRANSPORT OF STRAIGHT LENGTHS

Lifting of individual pipes or packs up to 6 m in length may be performed by a forklift. To prevent drooping of long packs or individual pipes and subsequent scuffing of pipe ends, two lifting points or spreader bars should be used for pipes or pipe packs exceeding 6 metres in length.

Appropriate personnel exclusion zones shall apply when lifting PE pipes in order to avoid injury if the pipe slips.

Straight pipe lengths stacked for storage or transport should be continuously and evenly supported to minimise distortion. Stacking of pipes during storage shall be in accordance with manufacturer's recommendations.

Differential heating and cooling of exposed PE pipe length due to the tracking of sunlight may cause pipe stored on racks to move and possibly fall causing serious injury or death. When storing pipe in elevated racks ensure the pipe is well restrained and unable to fall.

Timber framed packs should be stacked with the frames close together and alternating evenly. Packs with widely differing frame spacing should not be stacked. Do not align the bearers vertically as the stacks are likely to be unstable. In such load bearing stacks the maximum free height should be such that the pipe is not permanently deformed, having regard to sideways stability. For larger diameter pipes it may be necessary to brace the ends of the pipe with internal supports to prevent end distortion. Sharp sections bearing against the pipes should be avoided as these can cause indentations in, or scoring of, the pipe wall.

Pipes with end treatments such as belling, forming, flanging or pre-assembled fittings should be stacked so that the ends are free from loading, if necessary, they should be protected from damage. Pipes cut and squared for butt fusion should be given special attention to ensure that they are always handled, particularly in transit, in a manner that keeps the pipe ends free from damage.

If different SDR's of pipe are kept in the same stacks, then the lowest SDR (thickest wall) should always be at the bottom. Pipes may be nested inside each other for transport or storage provided distortion does not occur. When being transported, pipes should not be restrained in a manner likely to result in damage to them.

## LIFTING, HANDLING, STORAGE AND TRANSPORT OF COILS

Larger diameter coiled polyethylene pipes, for example those of diameters equal to or greater than 63mm can be very heavy and pose particular handling and storage risks. The consequences of coils falling or slipping should always be considered as serious injury can occur. This is particularly the case for coils stored in a vertical or near vertical position. For unloading heavier coils, delivery sites should be equipped with cranes or forklifts or crane-trucks should be used.

Coiled pipe can be stored and transported by being laid flat on a continuous surface such as pallets but stored only to such a height that the bottom convolutions do not become distorted. Pipe coils can also be stored and transported in a near vertical position. Care shall be exercised to ensure the support against which the coils are leant are strong enough to withstand the load. Care should also be taken to ensure the external loops of the vertically supported coil are not damaged or flattened in transport.

**When releasing coils and uncoiling PE pipe, it should be remembered that the coil is under tension and shall be released in a controlled manner.** The end of the coil shall be restrained at all times, then the straps released steadily, one at a time. If the coil has bands at different layers of the coil, then they shall be released sequentially starting from the outer layers. The amount of energy stored in the coil will depend on the size of pipe, the class of the pipe, and the size of the coil. The amount of energy can be substantial and cause significant injury, death or damage if released in an uncontrolled manner. The person releasing the restraining straps shall stand at a safe position at the side of the coil.

## **LIFTING, HANDLING, STORAGE AND TRANSPORT OF DRUMS**

Where drums are available, they should be used to transport pipe because their radius bearing surface is designed to protect the pipe from indentations. Before handling drums a risk analysis shall be completed to identify potential hazards.

The same stored energy is found in drums as with coils, except that the pipe is under more control when it is restrained on a drum. It is therefore necessary to restrain the end of the pipe to make sure it is under control, and to see that the drum is restrained so that it cannot turn freely and allow the pipe to unravel.

Drums are very heavy and shall not be manhandled but should always be handled with the appropriate equipment.

Drums shall be stored on flat, stable ground to make sure they will not topple over, and should be controlled, e.g., by the use of chocks, to ensure they do not roll out of position.

When lifting drums from the vehicle, they should be lifted by use of a strap placed under the plate carrying the pipe, and not through the outer rim of the drum, as this may bend the rim inwards and damage both the drum and the pipe.

If lifted by a fork, the tines should be fitted inside the drum under the cross members, making sure the length of the tine is sufficient to fit through the drum to support both sides.

Under no circumstances shall a drum be allowed to drop from the back of a vehicle on to the ground, or even on to a stack of tyres or other buffer system. When lifting steel drums, care shall be taken to make sure they do not come in contact with overhead wires.

## LIFTING, HANDLING, STORAGE AND TRANSPORT OF COMPRESSION, MECHANICAL AND FABRICATION FITTINGS

Compression, mechanical and fabricated fittings shall be stored, handled, and transported in a manner that does not cause undue scoring to the body of the fitting or damage to any sealing surfaces. Wherever possible, fittings should be retained in their original packaging until ready for use. In order to eliminate the risk of damage to the fitting or injury to personnel, larger fittings may be strapped to pallets to prevent their moving or falling.

## LIFTING, HANDLING, STORAGE AND TRANSPORT OF ELECTROFUSION FITTINGS

Electrofusion fittings are usually packaged and transported in cardboard cartons on wooden pallets. Cartons and pallets shall be handled using standard safe working practices.

Electrofusion fittings are typically supplied individually sealed in transparent PE plastic bags and additionally packed in cardboard boxes to protect the welding surface from dirt, dust and other forms of contamination, as well as the negative affect of UV radiation induced photo-oxidation from direct sunlight exposure. The fitting should be stored in its original packaging until immediately before use to prevent contamination and UV damage of the fusion zone. Fittings should also be stored undercover in a clean, dry, and shaded environment, to prevent dirt, liquids and other contamination of the fitting fusion zone, given the potential for causing joint failure after installation.

Any fitting which becomes contaminated, or has a broken or damaged bag, should be thoroughly cleaned prior to use with a manufacturer approved alcohol wipe, in accordance with PIPA POP001. Spigot fittings exposed to extended UV exposure shall also be peeled prior to use.

Coupler fittings should be stored resting flat on the mouth of the socket to prevent heating wire dislocation and ovality deviation.



Fittings with geometry characteristics i.e., 90° Elbows and Tee's, shall be stored resting flat against the body of the fitting, not standing up vertically on the mouth of the socket.

Elevated storage temperatures should be avoided, and as far as practical, not exceed 50°C.

**Note: Black PE fittings exposed to direct sunlight can reach a surface temperature upwards of 80°C due primarily to solar heat absorption.**

When fittings are stored appropriately, a fitting shelf life of more than 10 years may be achieved from the manufactured date. Check shelf-life characteristics with the fitting manufacturer. For sub-optimal storage conditions consult with the fitting manufacturer.

**Elevated temperatures, stacking with an applied load, or a combination of both can produce significant changes to the fitting geometry which may hinder installation or alignment during installation. If the fitting can be installed in accordance with PIPA POP001, then the fitting has not been affected by storage practices and is fit for purpose.**

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## REFERENCES

AS/NZS 2033 Installation of polyethylene pipe systems

Technical Manual, Piping Systems in Utilities – GF Piping Systems

POLlplex Design Textbook – Iplex

Polyethylene Pipe Systems Technical Manual – Vinidex



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