

Material Handling Guide for HDPE Pipe & Fittings

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Foreword

MATERIAL HANDLING GUIDE FOR HDPE PIPE & FITTINGS

This guide was developed and published with the technical help and financial support of the members of PPI (the Plastics Pipe Institute). The members have shown their interest in quality products by assisting independent standards-making and user organizations in the development of standards, and also by developing reports and guides on an industry-wide basis to help engineers, code officials, specifying groups, contractors and end-users.

The purpose of this guide is to provide important safety information on handling, lifting, loading, storing and installing polyethylene pipe and fittings. As in almost all industries, the handling, transportation and installation of polyethylene pipe and fittings present the potential for serious injury or even death. This guide seeks to raise awareness of the potential hazards involved in the polyethylene piping industry. By adhering to these and other safety guidelines, it is the sincere hope of PPI and its members that the number and frequency of serious accidents and injuries can be kept to a minimum.

This report has been prepared by PPI as a service to the industry. The information in this report is offered in good faith and believed to be accurate at the time of its preparation, but is offered “as is” without any express or implied warranty, including WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. It does not purport to address all of the product applications or construction practices that could be used, nor all of the safety practices necessary to protect persons and property. It is the responsibility of the users of this guide and the installers of polyethylene piping systems to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before any use or installation. The information in this report is offered for consideration by industry members in fulfilling their own compliance responsibilities. PPI assumes no responsibility for compliance with applicable laws and regulations. Consult the manufacturer for additional safety information regarding the use of its specific piping products.

PPI intends to revise this report from time to time in response to comments and suggestions from users of this report. Please send suggestions to the address below. Information on other publications can be obtained by contacting PPI directly or visiting the web site.

The Plastics Pipe Institute, Inc.
<https://plasticpipe.org/>

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MATERIAL HANDLING GUIDE

1.0 INTRODUCTION

Polyethylene pipe and fittings have been used safely in thousands of applications. Still, there are precautions that should be adhered to when handling and transporting any product, and polyethylene pipe and fittings are no exception.

This Material Handling Guide covers a wide range of safety issues regarding the handling, loading, transportation and installation of polyethylene pipe and fittings. Job site safety, storage guidelines, unloading guidelines, heat fusion joining and installation guidelines are just a few of the important topics covered in this guide.

As valuable as this guide may be, it does not purport to address all of the product applications or construction practices that could be used, nor all of the safety practices necessary to protect persons and property. It is the responsibility of the users of this guide and the installers of polyethylene piping systems to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before any use or installation.

2.0 PERSONAL SAFETY

Field working conditions can be dangerous. Each worker should take responsibility for his or her own personal safety. This includes wearing personal protective equipment and being aware of the potential hazards involved with a given task, and work environment. Potential hazards of the operation, materials, equipment and environment should be defined before work begins, and plans should be made to minimize these hazards.

2.1. Personal Protective Equipment

When handling pipe and other materials, wear adequate personal protective equipment. Personal protective equipment such as hard hats and steel-toed safety shoes, gloves and safety glasses helps to prevent injuries during product handling.

Hard hats shall always be worn when loading, unloading or handling PE pipe and fittings. Hard hats not only protect your head, but also give motorists and equipment operators an eye-level warning of your presence. As a general rule, steel-toed safety shoes should be worn at all times. They are especially important if there is any possibility that falling objects could land on your feet.

Eye protection shall be worn at all times, especially when operating cutting and joining equipment. Protective eyewear shall meet minimum requirements of ANSI Z87.1.

Work gloves help prevent cuts and bruises from sharp or rough edges on pipe, fusion equipment and other objects. When moving or lifting boxes, pipe drums and other heavy items, place your hands carefully to avoid getting them pinched or caught. Never place your hands inside of the pipe during handling. Tag lines and pipe handling tools allow workers to control the attitude of pipe during handling in a “hands off” handling procedure.

Long-sleeved shirts and trousers or coveralls minimize cuts, bruises and abrasions while also protecting against sunburn and/or poison ivy. Wear high-visibility vests when working at or near a public street or highway or when working at night. This reduces your chance of being hit by a vehicle, or equipment while on the job site.

2.2. Job Site Safety

Numerous hazards exist on every job site. While no summary of safe working practices can cover all aspects of safety, there are a number of important guidelines that should always be followed.

Before work begins potential hazards should be identified. Check the work site for hazards created by unguarded machinery, chemicals fumes or gases, fuels, heat sources, excessive noise, nearby equipment, buried pipes and /or power lines. Many hazards are difficult to identify. Materials, equipment, and the work environment should all be considered. Specific plans should be made to minimize such hazards. Documenting these plans and posting them in a public place may be beneficial to those involved in the operations.

Field personnel should avoid working alone or arrange for periodic safety contacts. So that if you are injured, a co-worker can assist you or call for emergency medical service.

Polyethylene piping systems commonly require the use of heat fusion equipment. Before the first fusion, the work crew should establish safety procedures for working around the fusion machine. The procedures may include proper hand signals to be used when hauling, lifting or moving pipe and machinery. Heater plates can reach temperatures in excess of 400°F. Caution should be used to prevent burns. Clothing made of synthetic materials should be avoided when working near any fusion machine. These materials will melt if contact is made with the heater plate and will stick to the skin, potentially causing severe burns. Around the fusion machine, watch out for pinch points on rotating machinery and sharp edges on the trimmer blades. Remove any loose clothing or dangling straps that may get caught in the equipment. Never remove guards from the fusion machines as they are designed to protect the operator and others on the job site.

Before entering a confined area of trench, make sure that proper shoring and timbering is in place in compliance to OSHA and industry standards. Proper entry procedures should be followed and a confined space permit may be required. Monitor trench environment for presence of harmful gases before entry and while working.

Establish the location of fire equipment. When using a portable heater in a joining shelter, have an adequately sized Class ABC fire extinguisher on hand. Always keep flammable liquids such as gasoline and isopropyl alcohol stored in approved containers and away from any open flames and other hot surfaces such as heater plates. Most fusion equipment is not explosion proof and sparks may be generated in motors or during machinery operations.

Preparation and training are essential to any job. Each worker should know what steps to take in the event of an emergency. Field personnel should have an understanding of basic first aid and CPR. Each worker should know the location of the nearest phone as well as the phone numbers for the local police, fire and EMS departments. If a worker is injured, medical attention and first aid should be sought immediately.

2.3. OSHA Guidelines for Marking Hazards

When marking objects, machinery, or areas which present a danger, OSHA has prescribed certain color codes: red shall designate fire protection equipment and danger. Emergency stop bars and stop buttons on hazardous machines shall be red. Yellow shall designate caution and for marking physical hazards such as striking against, stumbling, falling and tripping hazards, which may be relevant near stacks of pipes or fittings. 29 C.F.R. §1910.144. OSHA also regulates the shape and design of danger signs, caution signs, slow-moving vehicle signs, and safety instruction signs. 29 C.F.R. §1910.145.

3.0 DELIVERY INSPECTION

- 3.1. Packing List shall be checked to confirm product being received matches the product ordered. MSDS shall be furnished and reviewed.
- 3.2. The sequence of taking away or removal of loading straps must be fully understood. The positioning of chocks or dunnage boards along with their purpose should be identified before any unloading procedures are started.
- 3.3. Recommended items to check are pipe or fitting diameter, DR, resin type, pressure rating, cell classification, manufacturers name and required labeling or markings such as PW/AWWA, FM or similar project requirements.
- 3.4. Evaluate load for evidence of shifting during transportation, along with any damage that may have occurred during transportation or previous handling.
- 3.5. If damage is observed the supplier/shipper and the carrier should be notified immediately upon receipt of shipment. Pipe or fittings should be repaired or replaced as necessary to maintain quality control and quality assurance.

4.0 LIFTING AND HANDLING PE PIPE AND FITTINGS

4.1. Manual Lifting and Handling

OSHA Guidelines

OSHA standards for personal protective equipment suggest that protective footwear should be considered for pipe fitters. Safety shoes or boots with impact protection are required any time an employee is engaged in lifting or carrying heavy objects which, if dropped, might fall onto the feet, or when handling objects like pipes, which may roll over an employee's feet. 29 C.F.R. § 1915 Subpt. I, App. A (10).

OSHA requires that employers of pipe fitters should routinely consider eye and face protection when working with pipe. 29 C.F.R. § 1915 Subpt. I, App. B (8). Such eye and face protective equipment should fit properly, be kept clean and well maintained. 29 C.F.R. § 1915 Subpt. I, App. B (10)

Where an employee is handling long dimensional objects such as ducts and pipes in areas near exposed live electrical parts, OSHA requires employers to institute work practices such as the use of insulation, guarding, and material handling techniques which will minimize the electrical hazard. 29 C.F.R. § 1910.333(c)(6)

Where employees are is handling objects manually, OSHA has taken the position that the employer must analyze and apply the principles of ergonomics in an effort to reduce musculoskeletal complaints by employees. 29 U.S.C.A. § 654(a)(1) et seq.

Lifting with Your Legs

When lifting or lowering pipe by hand, the knees and the back should be as straight as possible. Squatting places the weight on your leg and thigh muscles, instead of your abdominal and back muscles. Remember to squat whether you work alone or as part of a team, and whether or not you use a mechanical aid, such as a carrying bar.

Lifting Fittings

Handling fittings can be as individual pieces or multiple fittings ie; boxed, stacked in wire bins, gaylords, or on pallets.

Think about the load, can you lift it alone? Is it awkward and require a team lift or does it require mechanical assist from a forklift.

If you can lift fitting by yourself - Remember:

1. Plan your lift.
2. Keep a shoulder-width stance.
3. Squat-bend at the knees.
4. Tighten stomach muscles.
5. Maintain your back's natural curves.
6. Lift with your legs.
7. Minimize the weight you must lift.

Don't:

1. Bend at the waist or lift with your back.
2. Twist while lifting or carrying.
3. Try to lift more than you can handle.
4. Reach over your shoulder for a load.
5. Try to recover a falling load.

If the fitting is awkward and requires team lifting then:

1. Designate one person to direct the lift.
2. Lift at the same time.
3. Keep the load level while carrying.
4. Move smoothly together and unload at the same time.

If the fitting is in a bin and requires lifting out of the bin then:

1. Stand with feet at shoulder distance apart.
2. Slightly bend your knees.
3. Start to squat, bending with your legs at hip joints (not at the waist).
4. Slide the load close to the body.
5. Slowly raise the body using the leg/hip muscles.
6. Tighten the abdominal muscles as you begin lifting the article out of the container.
7. Rest the knees against the side of the bin.

If load is a bin, or pallet of fittings or the fitting/structure is large and requires a forklift or crane to lift then:

1. Load should be lifted utilizing equipment with sufficient capacity to handle safely.
2. Forks on forklift need to enter the pallet squarely before lifting, forks should be spread as wide apart as practical. Forks should extend completely under the load and the load should be as far back as possible on the forks.
3. Large fittings/structure should be lifted with web style slings. Do not use chains, wire rope or other devices that may damage the fitting.
4. Do not stand under or around the load while it is being lifted.

Short Lengths – One Person

Six general pointers should be considered when lifting loose joints:

1. Inspect materials for slivers, jagged edges, burrs and rough or slippery surfaces.
2. Get a firm grip on the objects.
3. Keep fingers away from pinch points, especially when setting materials down.
4. Keep hands away from the ends to prevent them from being pinched.
5. Wipe off greasy, wet, slippery or dirty objects before trying to handle them
6. Keep hands free of oil and grease.

Because of the physical differences that exist among individual workers, it is not practical to establish weight-lifting limits for loose joints. Emphasis should be given to correct lifting techniques. Workers should never lift more than can be handled comfortably and safely.

Long Lengths – Two People

When lifting pipe, take a firm grip. Don't lift until you are sure that your hold will not slip. If you are using carrying tongs or other similar devices, make certain that they grip the pipe securely.

When moving objects as a team, everyone must lift and turn together. Someone could get hurt if one member begins to lift or lower a load before the other crew members are ready.

To make it easier to work together, choose one crewmember to lead. This person gives the signals for lifting and lowering. At the signal, everyone moves together, avoiding sudden starts and stops.

Large or heavy pipe should be handled with a mechanical aid. If U-shaped carrying bars, carrying tongs, or pipe sticks are used, make sure that they are adequate for the pipe's size and weight. Do not use makeshift tools.

Extremely slippery when wet

Polyethylene pipe is extremely slippery when wet, frosty or covered in snow. Use caution at all times, especially in rainy or snowy weather.

Hot When Stored Outside

Black pipe will absorb light and convert this energy into heat. The heat will be retained in the pipe wall. This will cause the pipe to be hot to the touch. Always use caution before handling pipe that has been exposed to direct sunshine. Measure the pipe temperature with a thermometer or carefully ensure that the pipe temperature is cool enough to pick up.

Using Hand trucks, Dollies or Wheelbarrows

Many types of hand trucks and dollies such as two-wheeled, flat, platform, box and lift trucks can aid in material handling. No one truck is suitable for handling all types of materials found in the industry. Therefore, it is important to select the right equipment for the job.

Personnel using hand trucks and dollies should be trained to handle them safely, and should consider the following:

- Keep the center of gravity of the load as low as possible; place heavy objects at the bottom of the load.
- Place the load well forward so that the weight will be carried by the axle and not by the handles of the truck.
- Place the load so that it will not shift, slip or fall off. Load only to a height that will allow a clear view ahead.
- Let the truck carry the load. The operator should only maintain its balance and provide the motive power.
- Never walk backwards with a hand truck or pallet jack.
- When going down an incline, keep the hand truck ahead of you. When going up an incline, keep the hand truck behind you.
- Move trucks at a safe speed. Do not run; keep the truck constantly under control.

To decrease hazards to toes and feet, wheels should be as far under the truck as possible and employees should wear safety shoes.

In lifting a wheelbarrow or two-wheeled truck to operating position, the worker should follow safe lifting practices, using the power of the leg muscles and keeping the back straight. The same principal should be observed when setting a loaded truck or wheelbarrow down.

When pushing trucks, workers must use constant vigilance to avoid running a wheel off docks or platforms and to prevent collisions with other workers, trucks or obstructions.

4.2. Power Lifting Equipment

The use of power equipment is often required to lift and handle pipes greater than 8" in diameter. There is a wide variety of power lifting equipment available such as forklifts, cherry pickers, backhoes, front-end loaders and cranes. Their proper use will be discussed more fully in the next section. Excessive lengths, heavy loads or even specific site conditions can require the use of multiple pieces of lifting equipment.