JAIN HDPE PIPE

JOINTING - HANDLING - STORAGE
INSTALLATION GUIDELINES

Jain® PE Pipes
Solution for Generations®

Jain Irrigation Systems Ltd.
Small Ideas. Big Revolutions.®

HDPE PIPE ADVANTAGES

Jain PE pipes, manufactured strictly in accordance with National and International Standards compounded UV stabilized PE63, PE80 and PE100 HDPE raw material. These pipes have been installed worldwide and thousands of kilometers of pipelines are in service in numerous Irrigation, Water Supply, Sewerage, Dredging, Mining, Fire Fighting, Desalination Plant piping, Seawater intake and brine/effluent/treated sewerage outfall piping and gas conveyance Systems.

JISL offers a complete range of Jain PE piping systems with fittings and accessories along the design, technical and installation support combained with efficient after sales service.

The key success factor of the Jain HDPE Pipe was to give safety and reliability to even convey gases underground through them making them environmentally friendly and increasing the lifetime to 100 years for pipes.

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2012-07-20

Confirmation

Dear Mr. Sarode!

The PE 80 and PE 100 pipes produced by JAIN Irrigation Systems Ltd. (Jalgaon, India) are tested in our institute according to DVGW GW 335-A2, which are according to the requirements similar to the standards EN 12201-2, DIN 8074 and DIN 8075.

Within the above mentioned standards, test on the raw material being used in the pipes and the product itself are executed, which are proving the service life-time of at least 100 years at a reference temperature of 20 °C. The most significant ones are the MRS-classification according to EN ISO 9080 and the internal pressure tests done on pipes.

Because of the executed test, I can herewith confirm, that the PE 80 and PE 100 pipes produced by JAIN Irrigation Systems Ltd. (Jalgaon, India) have – when installed properly and operated according to the conditions in table 8 up to table 13 of the DIN 8074:1999 – a minimum service-life-time of 100 years (at 20 °C).

With kind regards

Dipl.-Ing. Udo Pappler
Piping department

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SWIFT/BIC: BKAUATWW; IBAN: AT 84 12000 52085 521 211, Handelsgericht: Wien,
Firmenbuch-Nr.: FN 230299 a, UID: ATU 56534913, Gerichtsstand: Wien

Life 100+ years

lowest Life Cycle Cost

Leak Proof Joint

Corrosion Resistant

Tough, Ductile, Flexible

Superior Seismic Resistance

BUTT FUSION JOINTING

This is the most common & widely used method for joining individual Length of PE pipe to pipe & pipe to PE Fittings by heat fusion. The principle of heat fusion is to heat two surfaces to a required temperature and then fuse them together by application of designed force. This force causes the melted materials to flow & mix, there by resulting in fusion. After certain time period, the joint cools down near to ambient temperature and are ready to use. When fusion is completed as per the standard lay down procedure, the joint becomes as strong as pipe or stronger than the pipe it self for tensile & pressure properties. This technique produces a permanent, economical & Flow efficient Connection. Quality butt fusion joints are produced by using well trained Operator & proper machine

Principles

The pipes to be joined are held in clamps which grip and re-round the pipe. Clamps are operated either manually or hydraulically. Clamp movement is controlled by the operator as per the pre set values. Pipe ends are prepared by planning with an electrically driven trimmer, and then heated using an electrically powered non-stick heater plate. When molten, the pipe ends are brought together and held under pressure until cooled.

Pipe Selection

Check that both pipes to be joined are of the same size, SDR (standard dimension ratio) and material. Only compatible sizes and materials should be joined together. In case one need to connect the two pipes or fittings having different SDR, one should machine the ends of pipe / fitting inner surface of lower SDR to match with the wall thickness of higher SDR pipe / fitting before jointing. If in doubt, seek advice from the pipe manufacturer. Pipe information is marked on the pipe at appropriate intervals.

Pre-jointing Checks

Use only equipment which has been regularly serviced and is in good condition. Ensure the correct jointing parameters for the machine and pipe being welded are known and understood. Ensure that the generator is of sufficient capacity. Check that fuel is sufficient for the work to be done. Check that the heater plate is clean - wash only when cold with clean water and dry with a clean lint-free cloth or paper towel.

Machines should be capable of

1) Aligning the pipe ends
2) Clamping the pipes
3) Rerounding the pipes
4) Facing the pipe ends parallel & square to the centreline
5) Heating the pipe ends
6) Applying the proper fusion force

Welding Cycle

The welding cycle is divided in 5+1 different phases:

PHASE 1: Bead formation time t1

PHASE 2: Heating up time t 2 at pressure (p2)

PHASE 3: Change over time t3

PHASE 4: Bringing up pressure (p1) time t4

PHASE 5: Cooling down under pressure (p1) time t5

PHASE 6: Cooling down out of the machine time t6

t1 = Time required for the bead formation with the Specified wall thickness

t2 = Time required for the continual heating

t3 = Time required for the change over

t4 = Time required for bringing up the pressure

t5 = Time required for cooling down under pressure

p2 = pressure during the continual heating

p1 = pressure during the bead formation and the cooling down.

BUTT FUSION JOINTING - DO'S & DONT'S

Butt Fusion Do's

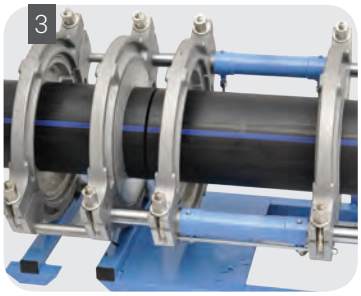
- Always weld inside a shelter and on a suitable base board or ground sheet.
- Check size, SDR and pipe material to ensure compatibility.
- Always ensure pipes are aligned correctly and supported on pipe rollers to minimise drag.
- Cover pipe ends to eliminate wind chill of the heater and joint interface.
- Clean pipe surfaces inside and out (approx. 300 mm), clean pipe ends and clamps before inserting pipe in machine.
- Always use equipment that has been regularly maintained and calibrated.
- Position pipes into the clamps with the pipe marking uppermost and aligned.
- Wash the heater plate when cold before every welding session
- Clean trimmer discs before use with lint free cloth
- Ensure that, when trimming, a continuous ribbon of material of pipe wall thickness is produced from both pipe ends before commencing the feathering operation.
- Replace the trimmer in the stand provided.
- Remove swerve from underneath pipe ends and chassis.
- Check visually that both pipe ends are completely trimmed.
- Always check pipes for alignment and gaps around the entire circumference of the abutted pipes.
- On completion of satisfactory alignment checks, proceed with the welding cycle without delay.
- Number/code the joint and bead using an indelible marker.

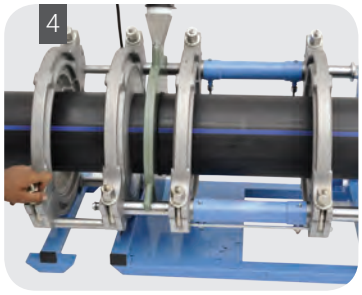
Butt Fusion Don'ts

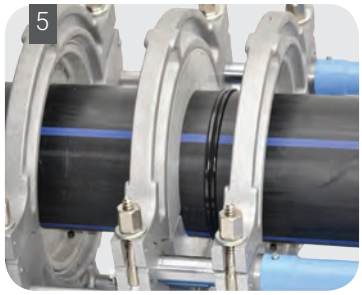
- Attempt to use equipment unless trained to do so.
- Attempt to weld pipes of incompatible materials or SDR
- Leave swerve inside pipe or on chassis.
- Introduce dirt onto trimmed pipe ends whilst removing swerve.
- Touch trimmed pipe or fitting ends.
- Remove pipes from machine before the cooling time has elapsed.
- Cut corners in any part of the welding cycle.
- Attempt to install pipe until fully cooled.

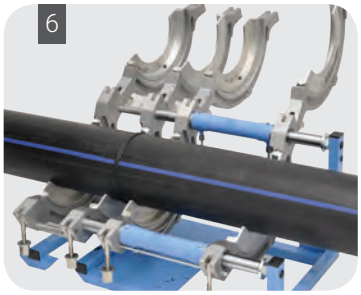
The Six Steps Involved In Making a Butt Fusion Joint.

1) Clean, Clamp & Align the pipe Ends To Be joined.
2) Clean the face ends, face the pipe end.
3) Align the pipe ends.
4) Melt the pipe inter faces.
5) Join the two pipe ends together by applying the proper fusion force.
6) Cool the joint and remove the joint from machine.









BUTT FUSION JOINTING - QUALITY TEST

Quality Assurance Testing for PE Butt Joint

Quality is engineered into the pipe and fitting product during the entire manufacturing process. The three phases of quality control for the pipe manufacturer involve the incoming raw material, the pipe or fitting production and the finished product. The combination of all three areas ensures that the final product will fulfil the requirements of the specification to which it was made.

Testing the incoming resin is the first step in the quality control program. It is usually checked for contamination, melt flow rate and density. Any resin that does not meet the raw material specification is not used for the production of specification-grade pipe or fitting.

During the manufacturing step, the pipe or fitting producer routinely performs quality control tests on samples. This verifies that proper production procedures and controls were implemented during production.

Once the product has been produced, it undergoes a series of quality assurance tests to ensure that it meets the minimum specifications as required by the appropriate standard.

The typical QC/QA tests found in most standards are described below.

Physical Property Tests

Several tests are conducted to ensure that the final fittings product complies to the applicable specification. Depending upon the specification, the type and the frequency of testing will vary. Following test are conducted for fittings as per the IS, ISO, ANSI standard.

Dimensions

Pipe diameter, wall thickness, ovality, and length are measured on a regular basis to insure compliance with the prevailing specification. All fittings have to comply with the appropriate specification for proper dimensions and tolerances.

Hydraulic proof test

Hydraulic test shall be conducted as per the prevailing std. joint shall withstand the specified test pressure at specified temperature for the specified time period. Joint shall not show any sign of localized swelling, leakage or weeping and shall not burst during the prescribed test duration.

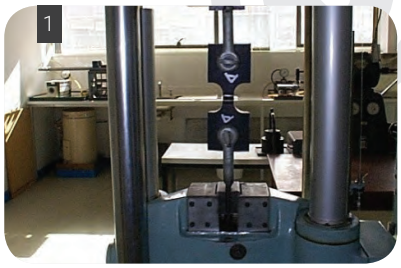
Tensile test

It is one of the most widely used mechanical tests. A tensile test helps to determining the properties such as tensile strength, yield point or yield strength and modulus of elasticity.

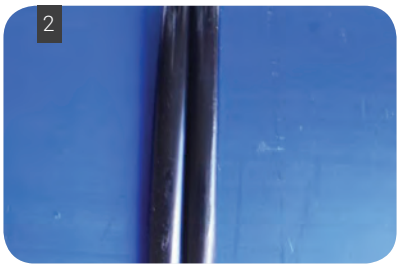
Evaluation of Butt Joint Quality

Welds will be evaluated on the following criteria:

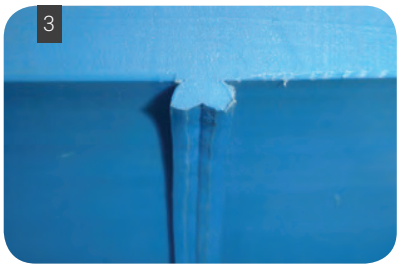
- Visual inspection of welds.
- Welding within agreed welding procedures.
- Weld records to be maintained so that checking of actual weld parameters used can be made against target weld parameters.
- Any welds that are made without the required records being made and supplied to the Engineer are rejected.



Tensile Testing

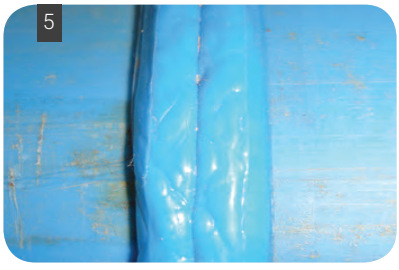


Good Weld



No Heat Soak

Misalignment



Water Cooled

Hot Heater Plate 250°C

BUTT FUSION JOINTING - QUALITY TEST

Visual Inspection

Each joint will be visually inspected to check that:

- Both fusion beads are of the same size and shape and project evenly above the outside diameter of the pipe.
- There are no cracks in the beads.
- The bead width is within the parameters

Bead width is calculated by the formula.

Min. W = (t x 0.5) + 3

Max. W = (t x 0.75) + 5

Where ,

W = Bead width

t = Thickness of pipe / fittings

Accurate Pressure - Good Weld

Low Pressure - Poor Weld

Over Pressure - Poor Weld

Weld Inspection

External weld beads are inspected to see that they are evenly formed, fully rounded and symmetrical. Variation in bead formation may indicate problems with plate temperature, heat soak times or excessive changeover times.

Marking

All fittings shall be clearly marked with below details

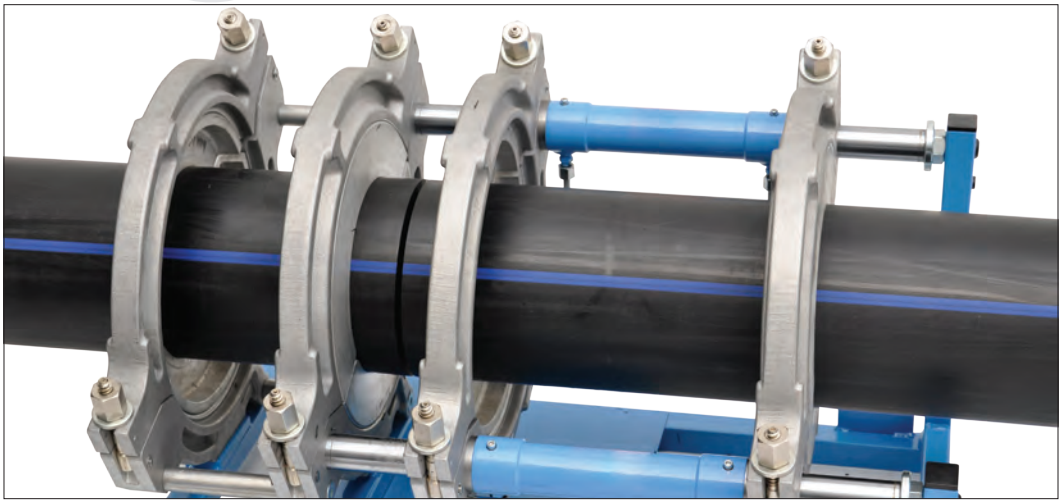
1) QA logo
2) Size and Specification
3) Batch no. XX XXX XX X

   XX Corresponding to last two digit of the year

   XXX Corresponding to the day of the year

   XXX Corresponding to the M/c No & Shift.

e.g. 10118002 (Year 2010), Day 118 (28.04.2010), 002 (second shift)



BUTT FUSION WELDING MACHINE SELECTION GUIDELINES

There are three types of butt fusion welding machines namely,

Manual butt fusion:

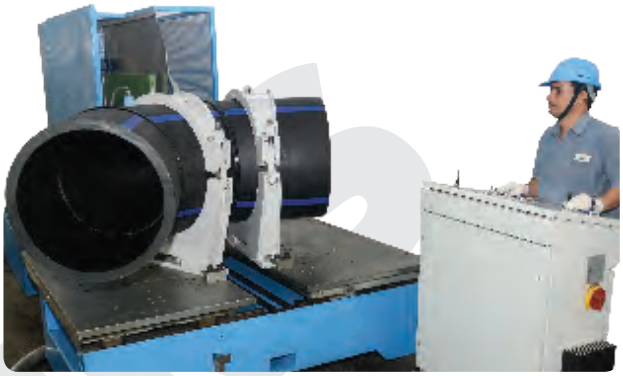
Machines where each step requires manual intervention by the welder. Here the skill of the welder is utmost important to achieve a Good quality joint

Semi-automatic butt fusion:

Machines which automate some functions of the machine, such as setting of the hydraulic ram pressures to achieve the correct interface pressure between the pipe ends during welding. Trimer and heater insertion and removal is manual.

Fully automatic butt fusion:

Machines which automate the welding process, specifically the heating of the pipe ends, ejection of the heating plate and subsequent welding and cooling of the molten pipe ends.



Factors affecting Weld Quality:

Following are the important parameters which play a crucial role in deciding the welded joint strength

Cleanliness:

While welding, no matter what the material, cleanliness matters and should be emphasized throughout the process. Machines should be clean. Pipe should be clean. Welding area should be protected on the construction site. All these things are designed to prevent contaminants getting into the weld which might reduce the lifetime of the asset being installed.

Heat energy:

To make a satisfactory weld the pipe must be heated such that all the material at the end of the pipes to be joined has achieved the target temperature for the operation, and holds this temperature whilst the heater plate is removed and the pipe ends pressed together. Too much heat may degrade the material, too little heat affects the weld strength, so the key to achieve the weld quality is to provide just the required heat energy set out in the specifications

BUTT FUSION WELDING MACHINE SELECTION GUIDELINES

Pressure:

The pressure, referred to as the interfacial pressure applied on the pipe ends when they are butted against each other, is very important. Pressure is used to ensure the molten pipe ends are fully squeezed together to form a monolithic connection. Too much pressure can be a bad thing as it squeezes all the molten material out of the welded area and too little pressure may result in a nonhomogeneous joint.

Time:

This is the final element, each of the cycle times has a design intent behind it, whether this is ensuring adequate time for heat to soak into the pipe ends, ensuring they don't cool down too quickly when heater plates are removed and so forth. But what also matters is allowing the joint to cool properly in clamps when the weld has been made, the material has to reform its crystalline structure to allow it to be handled without damage.

Based on all above parameters which are directly or indirectly related to achieve a good or bad quality of joint are directly associated with the type of machine being used to make a butt joint. So it's always recommended to use a good quality automatic machine rather than using shortcuts.

Generator capacity Requirement

Generator Capacity Required*			
Sr. No.	Pipe Size	Generator capacity in KVA	
	mm	Single Phase	Three phase
1	200	5	-
2	315	7 - 10	-
3	400	10	-
4	500	-	15
5	630	-	15 – 20
6	800	-	30
7	1200	-	50
8	1600	-	62
9	2000	-	125

* May vary with change in machine model & make

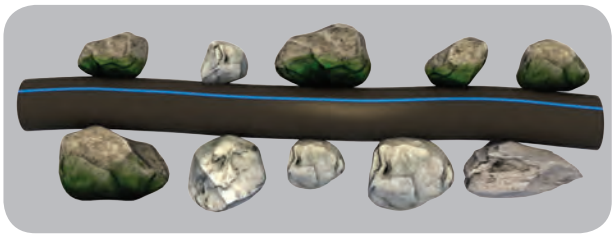
INSTALLATION OF PE PIPING SYSTEM

Trenching

The trench width should be as narrow as possible. The maximum width should be no more than the diameter of the pipe plus two feet. If possible, the trench can be made as narrow as the pipe itself plus one foot. The importance of the trench width is not so much as the cost of the trenching, which is of course is a factor. But for more working efficiency of the finished system, Trenches should be as straight-sided as is practical and flat-bottomed to facilitate the proper consolidation and packing of the filling materials (See Figure).

In ground that is coarse grain with many large rocks or protrusions, it may be necessary to over-cut and lay a bed of fine gravel in the base of the trench to allow for stress-free bedding of the pipe. It is not recommended that ordinary sand be used for this purpose, as it is possible to be washed away, leaving the pipe unsupported. The formation of the base of the trench is of great importance. It should be as flat and level as possible or graded to the correct slope where specified. An installation where this is significant would be a gravity flow system. Grading can be accomplished by the use of gravel or finely crushed stone.

If the condition of the soil is poor due to standing water in a high water table area, it may be required to establish more stabilization to the base of the trench after having drained the area first. In rocky terrain, the installation should be made such that the pipe is not laid in direct contact with the hard surface. The trench should be cut to a depth of six inches to one foot below the required level and then brought back to grade with soil or fine gravel. Ditches in soil that is loose may require a slope to the top edges of the trench to prevent the collapsing of the sides and filling of the trench (See Figure) In some cases it may be preferable to excavate a trench having a wider top section cut straight down to the intended top position of the pipe. This trench configuration is represented in Figure . In either case, the backfilling of the trench will not result in higher earth load on the pipe.



Improper Backfill

Proper Backfill

Backfilling

Not only is backfill utilized to fill the trench, but it also serves a very specific design function. The main purpose of the backfill material is to provide adequate support and protection for the pipe. By ensuring the backfill is solid and continuous, damage can be prevented from surface traffic, falling rock or lifting due to the trench

filling with water. The soil used for backfill can be the original soil excavated from the trench or foreign soil that has been transported. It is recommended that the hunching and the initial backfill material be free of any rocks, hard lumps, frozen material or clay. It should also be sufficiently friable to readily flow into the haunches of the pipe. It is important that the initial backfill be consolidated to ensure continuous contact and support of the pipe. This can be achieved by using fill material that is of fine sand or clay based materials. These materials should only be used in dry areas where it is unlikely to be washed out.

Recommended Testing Procedure

Leak Testing

The intent of leak testing is to find unacceptable faults in a piping system. If such faults exist, they may manifest themselves by leakage or rupture. Leakage tests may be performed if required in the Contract Specifications. Testing may be conducted in various ways. Internal pressure testing involves filling the test section with a non flammable liquid or gas, then pressurizing the medium. Hydrostatic pressure testing with water is the preferred and recommended method.

Other test procedures may involve paired internal or end plugs to pressure test individual joints or sections, or an initial service test. Joints may be exposed to allow inspection for leakage. Liquids such as water are preferred as the test medium because less energy is released if the test section fails catastrophically. During a pressure test, energy (internal pressure) is applied to stress the test section. If the test medium is a compressible gas, then the gas is compressed and absorbs energy while applying stress to the pipeline. If a catastrophic failure occurs, both the pipeline stress energy and the gas compression energy are suddenly released. However, with an incompressible liquid such as water as the test medium, the energy release is only the energy required to stress the pipeline.

Warning

1) Pipe system pressure testing is performed to discover unacceptable faults in a piping system. Pressure testing may cause such faults to fail by leaking or rupturing. This may result in catastrophic failure. Piping system rupture may result in sudden, forcible, uncontrolled movement of system piping or components, or parts of components.

24x7 House Service Connection

2) Pipe Restraint. The pipe system under test and any closures in the test section should be restrained against sudden uncontrolled movement from catastrophic failure. Test equipment should be examined before pressure is applied to insure that it is tightly connected. All low pressure filling lines and other items not subject to the test pressure should be disconnected or isolated.
3) Personal Protection. Take suitable precautions to eliminate hazards to personnel near lines being tested. Keep personnel a safe distance away from the test section during testing.

Pressure Testing Precautions

The piping section under test and any closures in the test section should be restrained or otherwise restricted against sudden uncontrolled movement in the event of rupture. Expansion joints and expansion compensator should be temporarily restrained, isolated or removed during the pressure test. Testing may be conducted on the system, or in sections. The limiting test section size is determined by test equipment capability. If the pressurizing equipment is too small, it may not be possible to complete the test within allowable testing time limits. If so, higher capacity test equipment, or a smaller test section may be necessary. If possible, test medium and test section temperatures should be less than or equal to pipe design temperature of 27°C. At temperatures above 27°C, reduced test pressure is required. Before applying test pressure, time may be required for the test medium and the test section to temperature equalize. Contact the pipe manufacturer for technical assistance with elevated temperature pressure testing.

INSTALLATION OF PE PIPING SYSTEM

Test Pressure

- Valves, or other devices may limit test pressure, or lower pressure rated components. Such components may not be able to withstand the required test pressure, and should be either removed from, or isolated from the section being tested to avoid possible damage to, or failure of these devices. Isolated equipment should be vented.
- For continuous pressure systems where test pressure limiting components or devices have been isolated, or removed, or are not present in the test section, the maximum allowable test pressure is 1.5 times the system design pressure at the lowest elevation in the section under test.
- If the test pressure limiting device or component cannot be removed or isolated, then the limiting section or system test pressure is the maximum allowable test pressure for that device or component.
- For non-pressure, low pressure, or gravity flow systems, consult the piping manufacturer for the maximum allowable test pressure.

Test Duration

For any test pressure from 1.0 to 1.5 times the system design pressure, the total test time including initial pressurization, initial expansion, and time at test pressure, must not exceed eight (8) hours. If the pressure test is not completed due to leakage, equipment failure, etc., the test section should be de-pressurized, and allowed to relax for at least eight (8) hours before bringing the test section up to test pressure again.

Pre-Test Inspection

Test equipment and the pipeline should be examined before pressure is applied to ensure that connections are tight, necessary restraints are in-place and secure, and components that should be isolated or disconnected are isolated or disconnected. All low pressure filling lines and other items not subject to the test pressure should be disconnected or isolated.

Hydrostatic testing

Hydrostatic pressure testing is preferred and is strongly recommended. The preferred testing medium is clean water. The test section should be completely filled with the test medium, taking care to bleed off any trapped air. Venting at high points may be required to purge air pockets while the test section is filling. Venting may be provided by loosening flanges, or by using equipment vents. Re-tighten any loosened flanges before applying test pressure.

Hydro Testing

1) Connect Blind flange & Rubber Gasket with Nut, Bolt
2) Connect flow control valve and Hose pipe for water filling and fill water in to pipe line
3) Connect Testing pump and increase pressure up to testing pressure and Do the Hydro testing.
4) Release pressure and remove the water from pipe line after Hydro testing completion.

Release pressure and remove the water from pipe line after Hydro testing completion.

GUIDELINE FOR BURIED PIPELINES

Trenching and Bed Preparation

The trench width will vary with its depth and the type of soil present. The bed width should allow for adequate compaction around the pipe. The excavated material, if it is rock free and well broken up by the ditcher, may provide a suitable bedding material. Maximum particle size of Class I or Class II materials used for bedding, haunching, or initial backfill should be kept to ½" for smaller pipe (< 8") and a maximum size of 1" aggregate for pipe diameters greater than 8".

Refer to PPI Technical Report TR-31, ASTM D2321, and ASTM D2774 for more information on underground installation.

The trench bottom should be relatively smooth and free of rock. Objects that may cause point loading on the pipe should be removed and the trench bottom padded using 4-6 inches of tamped bedding. If an unstable soil condition exists, the trench bottom should be undercut and filled to proper trench depth with a selected material.

Unless specified, accurate leveling of the trench bottom is unnecessary for most pressurized systems.

The slope should be graded evenly in gravity flow systems.

When joined by the heat fusion method, polyethylene pipe is a joint free piping system. Typically, polyethylene pipelines do not require thrust blocks. Good soil compaction around fittings such as elbows or tees is usually sufficient. If thrust blocks are used, sufficiently sized concrete encasement or concrete bearing surfaces set in undisturbed soil will provide adequate protection.

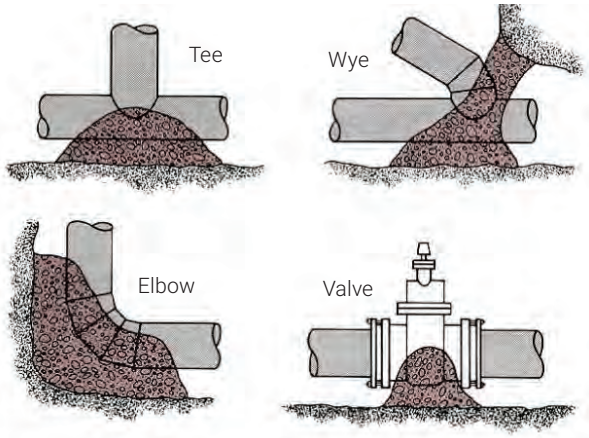
The encasement or thrust block should be constructed of reinforced concrete and act as an anchor between the pipe or fitting and the solid trench wall.

Figure below illustrates various types of concrete blocking and encasement of fittings.

*50 to 110 psi = 3.5 Kgf/cm² to 7.5 Kgf/cm². concrete strength = 207 kgf/cm²

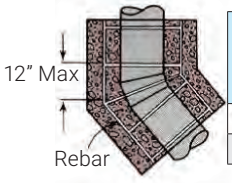
Refer to Figure below for terms associated with burial of polyethylene in a trench.

- The trench bottom should be smooth, dry, and stabilized as necessary.
- If a bedding material is required, it should be of a suitable material as identified by ASTM D 2321. The material should be levelled and compacted to a minimum of 85% Standard Proctor Density.

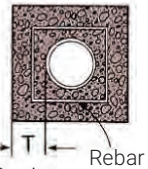


- Place backfill material under the pipe haunches.
- Tamping is required around the haunches using suitable tools.
- Primary and secondary backfill should be placed evenly in layers not exceeding 12 inches, and each layer should be compacted to a minimum of 85% Standard Proctor Density.
- The primary backfill should normally extend to a height equal to 75% of the pipe diameter. If the pipe is to be placed below the water table, consult the project engineer to determine the height of this zone.
- The secondary backfill should normally be 12 to 18 inches above the crown of the pipe. Consult the project engineer to determine if additional material is required.
- The final trench backfill, or trench spoil, should be of material which is free of large stones or other foreign matter.
- Adequate compaction should be obtained before any equipment is driven over the pipe. Consult the project engineer before burial of any pipe to determine backfill specifications and special conditions.

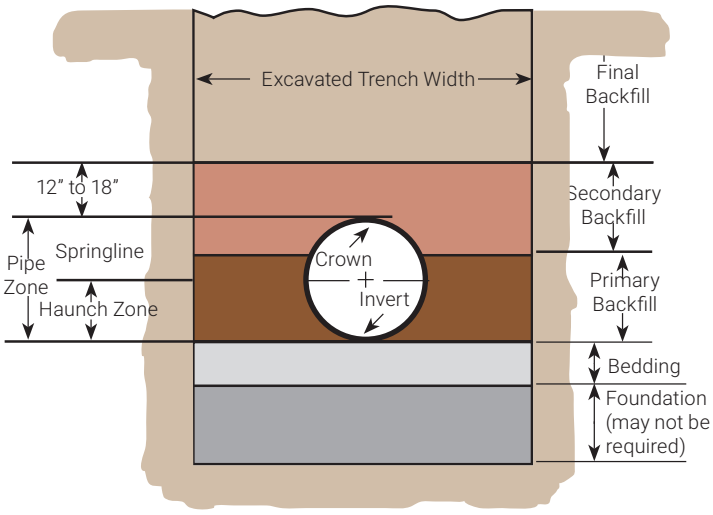
Thrust Blocks and Bearing surfaces



Pipe Pressure psi	Concrete* Thick (T)	Rebar Thick
50 to 110	9"	3/8"
Over 110	12"	1/2"



*Concrete strength to be 3000 psi



Typical Pipe Installation

Trench Construction and Terminology

Pipe Laying

Polyethylene pipe can be joined at ground level and lowered into the ditch. Excess stress or strain should be avoided during installation. Flanged connections should be used as necessary to facilitate the handling of pipe and fittings into and out of the fusion machine and during installation.

The length of pipe which can be pulled into position depends on the pipe size and wall thickness. The pulling force that can be applied to a pipe on level ground can be estimated with the following formula:

$F = SA$

Where: F = Maximum pulling force, lbs
S = Maximum allowable stress (conservatively 1000-1600 psi)
A = Cross-sectional area of pipe wall, $in.^2$

When pulling pipe, use care to prevent the pulling cables from damaging the pipe. Never pull the pipe by the flanged end! Refer also to ASTM F1804, Standard Practice for Determining ATL on PE Gas Pipe.

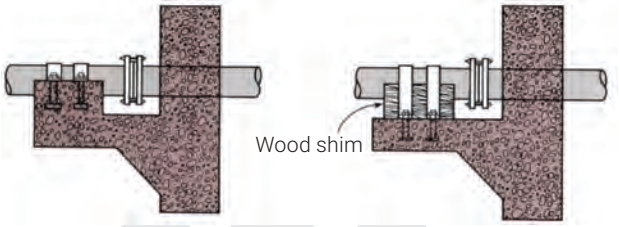
Fitting Installation

When fittings are connected to rigid structures, movement or bending should be prevented. The backfill must be compacted to provide full support, or a concrete support pad should be constructed beneath the pipe and fitting. Particular attention should be given to the compaction achieved around the fittings and extending several pipe diameters beyond the ends of the fitting. Compaction of 90% Proctor Density or greater in these areas is recommended. If a concrete pad is used to provide support, it should be rigid and extend one pipe diameter or a minimum of 12" from the flanged joint.

Concrete Supports for a Flanged Connection

The bolts in the flanged connection as well as the clamps in a support pad should be retightened before burial. Surface connections can be observed while in operation.

Polyethylene pipe or fittings can be encased in concrete if required by the design. Reinforced concrete encasement can be used to raise pressure rating of fittings, to stabilize heavy valves or fittings, and to control thermal expansion or contraction.



CAUTION: JAIN pipe fabricated fittings are manufactured by fusing together pipe segments to obtain the desired fitting. In most cases, the pressure rating of a fabricated fitting is 75% of the rating of a molded fitting with the same thickness. Precautions must be taken when installing them into a piping system.

Fabricated fittings, after being fused to the pipe, can be damaged by excessive strain created by improper handling. JAIN pipe resins are very tough; however, the tensile strength of polyethylene is much less than steel, and it will not support the excessive lifting and pulling forces that can be exerted by powered installation equipment. If pipe is fused to the three sides of a tee and lifted without supporting the weight of the pipe, the tee may be torn apart. Fabricated fittings must not be allowed to carry the weight of the pipe!

Installation procedures should minimize lifting and moving of assembled pipe and fabricated fittings. If it is necessary to pull the assembly into position, the fabricated fitting, flange adapter or stub end should never be used as the point of attachment for the pulling line. It is difficult to fusion join a fabricated tee or wye into a system because the assembly is complicated by the third side. Handling becomes a problem when pipe is joined to the third side. Final handling and positioning of these assemblies requires additional precautions.

Manufacturer's Recomended Alternate Method

The potential for damage to a fabricated tee or wye can be minimized by including a flanged connection on the branch side of the fabricated fitting. This allows final positioning to take place before the branch side is connected. It is strongly recommended that flanged connections be used on the branch side of fabricated tees and wyes and on one end of elbows, especially in sizes above 24".

HDPE PIPELINE PRESSURE TESTING

JAIN PIPE systems should be pressure tested before being put into service. Water is the preferred test medium. After all free air is removed from the test section; raise the pressure at a steady rate to the required pressure. The pressure in the section shall be measured as close as possible to the lowest point of the test section.

The pressure test can be conducted before or after the line is backfilled. The pipe should be covered at intervals, particularly at curves to hold it in place during pressure tests. Flanged connections may be left exposed for visual leak inspection.

Test pressure should not exceed 1.5 times the rated operating pressure of the pipe or the lowest rated component in the system. Initially, the pipe should be raised to test pressure and allowed to stand without makeup pressure for a sufficient time to allow for expansion of the pipe. This usually occurs within 2-3 hours. After equilibrium is established, the test section is pressurized to 1.5 times operating pressure, the pump is turned off, and the final test pressure is held for 1, 2, or 3 hours.

Polyethylene pipe holds pressure by developing stress in its walls. This process continues throughout the test period and the pipe increases slightly in diameter. Pressure drop will occur due to continued expansion of the pipe during the second phase of the test. A drop in pressure during the test phase is common and does not prove with absolute certainty that a leak or failure is present in the system.

Polyethylene pipe is tested by measuring the "make up" water required to return the section to test pressure. Allowable amounts of makeup water for expansion during the pressure test are shown in Table from PPI Technical Report TR 31. If the test pressure is not returned within the allowable volume of water, the test fails. If there are no visual leaks or significant pressure drops during the final test period, the pipeline passes the test.

Testing of non-pressure, gravity flow pipes, whether above or below ground, may be accomplished by closing all openings below the top of the section to be tested. For test purposes, provide a means to raise the water level to a height of at least 3-5 feet above the highest point in the line being tested. The water level should be maintained for a time long enough to determine if leaks are present. If it is impractical to raise the water level as suggested, the line can be pressurized with low pressure water.

Normally, pressure should not exceed 5-10 psi (0.3 to 0.7 kgf/cm^2) over a time period of 5-10 minutes.

CAUTION: Changes in temperature will increase or decrease the apparent test pressure in any piping system. The effect depends on the rate of expansion of the pipe wall compared to the water in the pipe. Polyethylene has a higher rate of expansion and contraction than water. When a JAIN pipe system becomes heated (e.g. on a sunny day), the system pressure will decrease. When a sealed JAIN pipe system becomes cooler, the system pressure will increase. When possible, testing should be done during periods of relatively stable atmospheric temperatures. Early mornings and late afternoons are good times to test the pipe when it has not been buried.

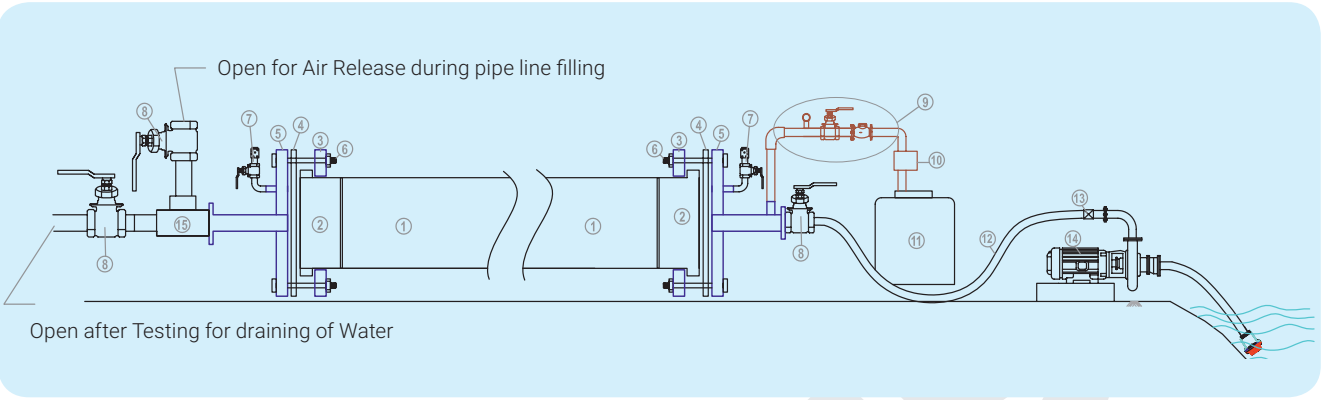
Under no circumstances shall the total time under the test exceed eight (8) hours at 1.5 times the pressure rating of the lowest rated component in the system. If the test is not completed due to leakage, equipment failure, etc., the test section shall be allowed to "relax" for eight (8) hours prior to the next test.

Do's and Don'ts - Installed Pipeline Pressure Testing

- Pressure testing should be done either in early morning or late evening to get uniform temperature during the test.
- Test pressure should be selected in line with the design temperature of pipe line and the actual surrounding temperature during testing
- Required temperature de-rating factor to applied test pressure should be applied in case temperature during test is more than pipe design temperature.
- Proper air venting should be provided before hydro test to avoid air entrapment
- Complete air should be bleed off from the test line
- Enough time should be provided before pressurizing the system to achieve temperature equilibrium of pipe and test water.
- No shortcut to test procedure is allowed.

HDPE PIPELINE PRESSURE TESTING

TYPICAL PIPELINE TESTING ARRANGEMENT LAYOUT



TEST COMPONENTS

① HDPE Pipe ,
② HDPE Stub End,
③ MS Slip on (split up) Flange,
④ 6mm thk neoprine rubber gasket,
⑤ MS Test flange (Blind flange)
⑥ MS Nut bolts with washer,
⑦ ¾" SS Ball Valve & ¾" Air Valve,
⑧ 4" flanged Ball Valve,
⑨ Pressure guage, connection accessories for pressure pump to test flange,
⑩ Test Pump,
⑪ 500 lit water tank,
⑫ Hose pipe of required size,
⑬ Non Return Valve of required size,
⑭ Electric Pump 10 or 15 HP,
⑮ MS/GI Tee

Connect Testing pump and increase pressure up to testing pressure and Do the Hydro testing.

DO'S & DON'TS FOR HANDLING, STORAGE, CUTTING & JOINTING OF HDPE PIPES AT SITE

Inspect received materials for sharp edges, burrs and rough or slippery surfaces.

- Get a firm grip on the material while lifting manually.
- Keep fingers away from pinch points, especially when putting materials down.
- Keep hands away from the ends to prevent them from being pinched.
- Wipe off greasy, wet, slippery or dirty objects before trying to handle pipes
- Polyethylene pipe is extremely slippery when wet , frosty or covered in snow. Be careful at all times, especially in rainy or snowy weather.
- Always be cautious before handling pipe that has been exposed to direct sunshine (could be too hot)
- Material Should be lifted utilizing equipment with sufficient capacity to handle safely
- Do not stand under or around the material while it is being lifted
- All lifting equipment & accessories must be inspected regularly for signs of damage.
- Discard and replace or repair faulty accessories
- Specially designed pipe tongs can also be used to lift pipe. They provide lifting support as the pipe weight increases.
- Do not exceed the design capacity of lifting and handling equipment and accessories.
- People not involved in the loading/ unloading process should remain clear of the area.
- When using fork trucks, the bundles should be picked up one at a time under their midpoint. For load stability, the forks should be as far apart as possible. Forks should have sufficient length to safely support the bundles.
- Do not roll or drop pipe / coil off the truck.
- Do not stand on loaded truck of pipe while removing bands. Standing on the load and cutting bands is extremely dangerous.
- Do not use unsafe material handling equipment to push or pull the load off the trailer. This is dangerous to unloading personnel and may damage pipe.
- Always unload one layer at a time.
- Do not release truck straps securing a layer until that layer is specifically ready to be unloaded.
- The storage area should provide adequate protection against physical damage to material.
- Storage area should be large enough to accommodate piping components as well as allow handling equipment to move about freely.
- The storage area should have a relatively smooth, levelled surface free of stones, debris or other materials that could damage the pipe or fittings.
- When cutting the pipe with chain saws or other power equipment, keep your feet in the clear and block the pipe so it will not move during cutting.
- Always use good quality cutting tools recommended for application.
- The pipe cutting ground should be levelled properly so that pipe is kept perfectly in horizontal position and uniformly supported.
- Before start of cutting operations, ensure that sufficient ground clearance is available to make full cutting in 360 degrees.
- During cutting operation, do not lift the pipe unbalanced and unsupported.
- Partly cut pipe becomes Notch sensitive and may result in premature Brittle failure if improperly handled resulting in jerky movement.
- Wear protective equipment and never leave tools lying unattended.
- Always level the two pipes to be jointed in perfect axial alignment.
- Welding should not be done in open space when it is too windy, low temperature or raining
- Use tent or suitable covers in case of unfavourable site conditions while welding
- Pipe portion to be welded should be cleaned off from any foreign matter before welding starts
- Always use standard equipment for perfect welding.
- Do not use shortcut methods while doing welding operations
- Welding should always be done by a well trained operator.

UNLOADING INSTRUCTIONS

Before unloading the shipment, there must be adequate, level space to unload the shipment. The truck should be on level ground with the parking brake set and the wheels chocked. Unloading equipment must be capable of safely lifting and moving pipe, fittings, fabrications or other components.

Unloading Site Requirements

The unloading site must be relatively flat and level. It must be large enough for the carrier's truck, the load handling equipment and its movement and for temporary load storage.

Handling Equipment

Appropriate unloading and handling equipment of adequate capacity must be used to unload the truck. Safe handling and operating procedures must be observed.

Pipe must not be rolled or pushed off the truck. Pipe, fittings, Fabrications and other components must not be pushed or dumped off the truck, or dropped.

Although polyethylene piping components are lightweight compared to similar components made of metal, concrete, clay, or other materials, larger components can be heavy. Lifting and handling equipment must have adequate rated capacity to lift and move components from the truck to temporary storage. Equipment such as a forklift, a crane, a side boom tractor, or an extension boom crane is used for unloading.

When using a forklift, or forklift attachments on equipment such as articulated loaders or bucket loaders, lifting capacity must be adequate at the load centre on the forks. Forklift equipment is rated for a maximum lifting capacity at a distance from the back of the forks. If the weight-center of the load is farther out on the forks, lifting capacity is reduced.

Before lifting or transporting the load, forks should be spread as wide apart as practical, forks should extend completely under the load, and the load should be as far back on the forks as possible.

WARNING: During transport, a load on forks that are too short or too close together, or a load too far out on the forks, may become unstable and pitch forward or to the side, and result in damage to the load or property, or hazards to persons.

Lifting equipment such as cranes, extension boom cranes, and side boom tractors, should be hooked to wide web choker slings that are secured around the load or to lifting lugs on the component. Only wide web slings should be used. Wire rope slings and chains can damage components, and should not be used. Spreader bars should be used when lifting pipe or components longer than 6m.

WARNING: Before use, inspect slings and lifting equipment. Equipment with wear or damage that impairs function or load capacity should not be used.

Pre-Installation Storage

The size and complexity of the project and the components, will determine Pre-installation storage requirements. For some projects, several storage or staging sites along the right-of-way may be appropriate, while a single storage location may be suitable for another job.

The site and its layout should provide protection against physical damage to components. General requirements are for the area to be of sufficient size to accommodate piping components, to allow room for handling equipment to get around them, and to have a relatively smooth, level surface free of stones, debris, or other material that could damage pipe or components, or interfere with handling. Pipe may be placed on 4-inch wide wooden blocks, evenly spaced at intervals of 4 feet or less.

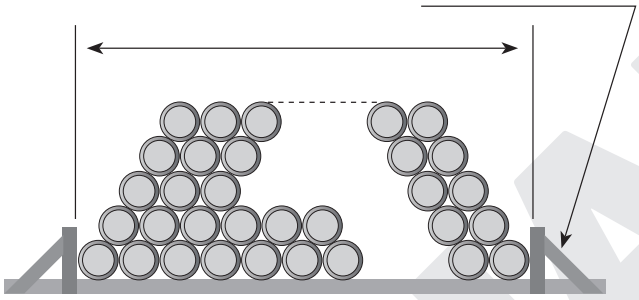
Table 1 – Suggested Jobsite Loose Storage Stacking Heights

Pipe Size (mm)	Suggested Stacking Height* - Rows	
	DR Above 17	DR 17 & Below
110	15	12
140	12	10
160	10	8
200	8	6
250	6	5
350	5	4
355	5	4

UNLOADING INSTRUCTIONS

Table 2 - Suggested Jobsite Loose Storage Stacking Heights

Pipe Size (mm)	Suggested Stacking Height* - Rows	
	DR Above 17	DR 17 & Below
400	4	3
450	4	3
500	3	3
560	3	2
630	3	2
710	2	2
800	2	2
900	2	1
1000	1	1
1200	1 Support Bracket	1
1400	1	1
1600	1	1
2000	1	1
2500	1	1



Loose Pipe Storage
Straight Pipes not tangled up or crossing over each other

Pipe Stacking Heights

Coiled pipe is best stored as-received in silo packs. Individual coils may be removed from the top of the silo pack without disturbing the stability of the remaining coils in the silo package.

Individual pipes may be stacked in rows. Pipes should be laid straight, not crossing over or entangled with each other. The base row must be blocked to prevent sideways movement or shifting. (See Figure 1, Table 1, and Table 2.) The interior of stored pipe should be kept free of debris and other foreign matter. For bigger diameter pipes 800 mm and above it may be necessary to support the pipe with internal supports to prevent deformation. Sharp sections bearing against the pipe should be avoided as these can cause indentations in / or notching of the pipe wall.

Exposure to UV and Weather

Polyethylene pipe products are protected against deterioration from exposure to ultraviolet light and weathering effects. Color and black products are compounded with antioxidants, thermal stabilizers, and UV stabilizers. Color products use sacrificial UV stabilizers that absorb UV energy, and are eventually depleted. In general, non-black products should not remain in unprotected outdoor storage for more than 2 years, however, some manufacturers may allow longer unprotected outside storage. Black products contain at least 2% carbon black to protect the material from UV deterioration. Black products with and without stripes are generally suitable for unlimited outdoor storage and for service on the surface or above grade.

Cold Weather Handling

Temperatures near or below freezing will affect polyethylene pipe by reducing flexibility and increasing vulnerability to impact damage. Care should be taken not to drop pipe, or fabricated structures, and to keep handling equipment and other things from hitting pipe. Ice, snow, and rain are not harmful to the material, but may make storage areas more troublesome for handling equipment and personnel. Unsure footing and traction require greater care and caution to prevent damage or injury. Walking on pipe can be dangerous. Inclement weather can make pipe surfaces especially slippery.

HANDLING, LIFTING AND STORAGE OF STRAIGHT LENGTH PIPES

Jain HDPE pipes and fittings are light in weight and easy to handle compared to many other conventional materials pipes such as MS, DI, Concrete etc. They have good resilience, flexibility and resistance to impact. However pipes and fittings can be damaged/ ruined by sharp edges and can be distorted under load. Therefore, in general pipes and fittings should not be dropped, indented, crushed or impacted and should not be rough handled during loading and unloading operations.

Also the pipes cut at site for any reasons should be handled with care. Pipe cutting operation should be performed on level ground using proper cutting tools. While cutting pipes, both ends of pipes should be equally supported on level ground apart from supports all along the pipe length. Partly cut pipes should not be lifted abruptly this may result in excessive localised stresses (pipes self weight and lifting jerk) and ultimately pipe breakage.

Always flat belts or specifically designed slings should be used to lift HDPE pipes by crane. Do not use chains, wire ropes or hooks to lift the pipes.

In case the pipes are lifted by using forklift, the forks should be kept apart at distance and locking cage / straps should be used to avoid the roll-over or slippage of pipes.

Pipes and fittings must not be stored or transported adjacent to heat source. Care should be taken in handling pipes and fittings in wet or frosty conditions as they may become slippery. Apart from that please refer the chemical resistance chart for HDPE pipes to get a know how about pipe suitability with different materials in contact before stacking it adjacent to any material.

Typically pipes with notches or scratches to a depth of more than 10% of the wall thickness of pipe, should be avoided for pressure application.

In case similar pipe diameter but different SDR rating pipes are stored together, in that case care should be taken such that the lower SDR pipes are kept at bottom and higher SDR pipes are kept above it.

Different diameter pipes can also be stacked by nesting smaller diameter pipe into bigger diameter pipe. Only care to be taken is to avoid excessive loading which could distort / deform the pipe shapes.

Pipes should be protected from elevated temperature and direct sun light in case it has to be stored for prolonged time by using suitable coverings.

HANDLING, LIFTING AND STORAGE OF STRAIGHT LENGTH PIPES

Lifting, Handling, Storage and transport of coils

HDPE pipes up to a diameter of 160mm can be supplied in coil form. HDPE coils are not only heavy (due to its longer length) but bulky as well which calls for special skills and lifting tools to handle it. Mishandling and careless transport of coils poses serious danger and may result in serious injuries. For handling the heavier coils suitable crane, forklift or fork truck should be used along with suitable slings and belts.

While lifting coil, slings must be placed around the entire coil. If coils are lifted by a fork truck / fork lift, contact points must be protected properly and the lift must be performed on the entire coil. Forks should not be inserted between windings in a coil.

Coiled pipes can be stored and transported by being laid flat on a continuous surface 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 must be exercised to ensure the supports against which the coils are supported, are strong enough to withstand the load. Care should also be taken to ensure the external loops of the vertically supported coils are not damaged or flattened in transport.

When releasing / uncoiling the HDPE coiled pipe, it must be done in a controlled manner as the coil is under tension and needs to be released with care. The ends of the coil must be restrained at all times and then the straps are released steadily one at a time. If the coil has bands at different layers of the coil, then they should be released sequentially starting from outer layer. The amount of energy locked up in the coil will depend on the size of the pipe, SDR and the coil length. The amount of energy can be sufficient and may cause significant injuries or damages if released uncontrolled. The person doing this job should be aware of all this and must take precautionary measures accordingly.

Lifting, handling and transport of Drums/ Bobbins

Drums are designed to protect the coiled pipe from indentation and its always safer to transfer the coil with drum. Drums must be stored on flat stable grounds to make sure they will not topple over and should be controlled by using stoppers to ensure they do not roll out of position.

When lifting drums, they should be lifted by use of a strap placed under the plate carrying the coil and not through the outer rim of the drum, as this may bend the rim and damage to both i.e coil and drum.

If lifted by fork truck / fork lift, the forks should be inserted inside the drum under the cross members ensuring that the length of forks is sufficient enough to pass through drum and support both ends.

Drum should not be allowed to drop from a vehicle on the ground in any situation. While lifting the drums, ensure that neither drum nor lifting equipment touches the overhead wires. While uncoiling the drummed coil, similar care should be taken as explained above for normal coiled pipe. Apart from that, care should also be taken that the drum does not rolled out freely due to stored energy of coil, when freed instantly. This may cause an accident. The drum should be properly secured / fixed. Apart from that proper equipment should be used to handle the drums

JOINTING METHODS - HDPE PIPE

1) Butt Fusion

Butt fusion is a welding process used to join two different pieces of a thermoplastic pipes. This process involves heating both pieces simultaneously and pressing them together. The two pieces then cool together and form a permanent bond. When done properly, the two pieces become indistinguishable from each other.

2) Saddle Fusion

This technique consist of simulteneously heating & melting the external surface of a pipe and the internal surface of saddle pipe end (Branch pipe), inserting the pipe end into the main pipe. It uses the concave & canvex heaters for heating the pipe ends.

3) Electrofucion

Electrofusion is a method of joining MDPE, HDPE and other plastic pipes using special fittings that have built-in electric heating elements which are used to weld the joint together.

4) Compression fitting joint

A joint between two pipes made by tightening a threaded nut on to a HDPE Pipe, the compression thus caused creating the seal.

5) Sure Loc Joint

An innovative locking arrangement hold the joint intact against tensile load coming on the joints and the external ribs take care of torsion forces (i.e. the torque developed at the start and stop of pump).

6) Shoulder Groove Joint

It is the method of jointing two HDPE pipes using the shoulder grooved fitting with rubber seal.

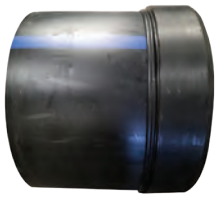
7) Threaded joint

Threaded joints are the most common type of releasable connections. Threaded joints are detachable joints of two or more component parts either directly connected with each other or by standardized fasteners

8) Snap Joint

A snap fit is an assembly method used to attach flexible parts, usually plastic, to form the final product by pushing the parts interlocking components together. Snap fits are an alternative to assembly using screw and have the advantages of speed and no loose parts.

JOINTING METHODS - HDPE PIPE



9) Transition Joint

i) **Repair / Coupler -** In some cases where the damage is slight but has severed the pipe, the line can be shut off and a small section of the pipe cut out to install a Transition Coupler in the damaged area. This can also be used as a coupler to connect two pipes.

ii) **Transition Coupler -** A coupler use to connect pipes of two different materials e.g. PVC to Metal pipe, HDPE to Metal pipe etc

iii) **PE Adopter Joint -** By using this type of joint we can connect preinstalled Cement, MS or DI Pipe with newly installed HDPE Pipe.

iv) **Flange Adopter Joint -** By using this type of joint we can connect PVC / HDPE Pipe with MS or DI Pipe.

v) **Mechanical Joint -** Mechanical joint is the method of jointing the HDPE Pipe to another pipe material, valves and fittings etc.

vi) **Transition Joint - PE to Metal -** Transition joint is the process of inserting the nipple in to the HDPE coil by heating the coil in the ceramic heater box. PE pipe may be joined to other pipe materials by means of compression fittings,flanges, or other qualified types of manufactured transition fittings..

LIMITED WARRANTY HDPE/PVC PIPES

JAIN IRRIGATION SYSTEMS LIMITED, JALGAON (HERE IN AFTER REFERRED AS "THE COMPANY") OFFERS LIMITED WARRANTY FOR THE SUPPLIED QUANTITIES OF HDPE/PVC PIPES BY THE COMPANY AS FOLLOWS.

1) THE COMPANY UNDERTAKES TO REPAIR OR REPLACE ANY PORTION OR THE ENTIRE COMPONENT/S WHICH WAS / WERE SUPPLIED AND WAS / WERE ORIGINALLY DEFECTIVE IN MATERIAL OR WORKMANSHIP. IF SUCH DEFECTS ARE NOTICED, AT THE TIME OF TAKING DELIVERY OR DURING INSTALLATION/ERECTION OF THE SYSTEM AND IN ANY CASE NOT LATER THAN 18 MONTHS (EIGHTEEN MONTHS) FROM THE DATE OF INVOICE OR 12 MONTHS (TWELVE MONTHS) FROM THE DATE OF COMMISSIONING WHICHEVER IS EARLIER.
2) SUCH DEFECTS, IF NOTICED, SHOULD BE REPORTED TO 'THE COMPANY' WITHIN A WEEK'S TIME OF OCCURRENCE. IF 'THE COMPANY' IS SATISFIED THAT THE DEFECTS ARE NOT DUE TO IMPROPER USAGE, NEGLIGENCE, IMPROPER DESIGN, NON-STANDARD INSTALLATION PRACTICES, ANY MODIFICATIONS/ ALTERATIONS DONE IN ASSEMBLY, INSTALLATION OR DESIGN BY UNAUTHROISED PERSONS, OR ANY OTHER REASON BEYOND THE CONTROL OF 'THE COMPANY', THEN FULL REPLACEMENT SHALL BE GRANTED AGAINST THE RETURN OF THE DEFECTIVE MATERIAL TO 'THE COMPANY'.
3) THE REPAIRS OR THE REPLACEMENT SHALL BE CARRIED OUT BY 'THE COMPANY' OR ITS AUTHORISED DEALER OR REPRESENTATIVE ONLY.
4) THIS LIMITED WARRANTY, IN NO CASE, SHALL EXTEND TO PAYEMNT OF ANY MONITORY CONSIDERATION AND DOES NOT COVER ANY CONSEQUENTIAL OR RESULTING LIABILITY, DAMAGES OR LOSS TO THE PURCHASER.
5) THIS LIMITED WARRANTY DOES NOT COVER THE DAMAGE INFLICTED BY INSECTS, WORMS, BEETLES, CRICKETS, RODENTS, SQUIRRELS AND / OR ANY OTHER ANIMALS / CREATURES OR BY MISCREANTS AND / OR DUE TO NATURAL CALAMITIES LIKE HAILSTORMS, FLOOD, EARTH-QUAKE, ETC OR ABUSE, MISHANDLING, ACCIDENTS, NEGLIGENCE AT THE END OF THE PURCHASER.
6) 'THE COMPANY' WILL NOT BE RESPONSIBLE FOR ANY KIND OF BREAKAGES OR LOSSES IN TRANSIT.
7) THIS LIMITED WARRANTY AUTOMATICALLY BECOMES NULL AND VOID ON EXPIRY OF THE WARRANTY PERIOD.

HDPE PIPING SYSTEMS- APPLICATIONS

Jain PE Pipe and Fittings are widely used in following applications.

Industrial & Infrastructure

Irrigation & Agricultural

- Open Canal Replacement
- Rising Mains
- Distribution Network
- Drip Irrigation
- Sprinkler Irrigation

Water

- Drinking Water Pipelines
- Pumping Mains and Gravity Lines
- WasteWater Treatment Plants
- Infiltration Gallery

Sewerage & Waste Water

- Pumping Main for Sewerage
- Gravity Main for Sewer
- Rehabilitation of Sewer Lines
- Aeration and Odour Control
- Untreated and Treated Effluent

Manufacturing

- Pulp & Paper
- Chemical Process Lines
- Corrosive Liquids
- Effluent Disposal
- Building & Construction
- Fertilizers
- Food Processing Industry
- Fire Fighting Systems
- Pneumatic Conveyance of Particulates

Marine

- Marine Intake and Outfall
- Desalination Plant
- Dredging & Sand Stowing
- Salt Pan

Mining

- Leach Lines
- Coal Decant Systems
- Mine Drainage
- Coal Tailings
- Slurry and Sludge Transport
- De-watering
- Dust Suppression
- Sand Stowing

Ports & Highways

- Stay Cable Pipe for Cable Stayed Bridges
- Culverts and Storm Water Drains

Power Generations

- Thermal & Nuclear Power Station
- Hydel Power Plants
- Fly-Ash Slurry and others

JAIN PIPES - SOLUTION FOR GENERATIONS®

Jain Polyethylene (PE) Drinking Water Distribution & House Service Connection Piping System

Range
Ø 20 to 2500 mm dia
Pressure Rating 2 to 25 kgf/cm²

Standards
IS 4984, ISO-4427, BS EN 12201

Length
Available in straight lengths of 6/12 meters for all sizes and in coils up to 160 mm. OD size.

Material Grade
• PE-80 & PE-100 (Blue Colour) • PE-80 & PE-100 (Black with Blue Stripes)

Applications
• Potable water distribution network & Rising Main
• House Service Connections

Jain Polyethylene (PE) Piping System

Range
Ø upto 2500mm dia.
Pressure Rating 2 to 25 kgf/cm²
Also available with tracer for easy detection

Standards
IS 4984, ISO 4427, BS EN 12201, DIN 8074 / 75 IS 14151

Length
Available in straight lengths of 6/12 meters for all sizes and in coils upto 160mm OD size.

Material Grade
• PE-63 • PE-80 • PE-100, PE-RT

Applications
• Marine & Sub-Marine Lines
• Lift & Gravity Irrigation
• Drip & Sprinkler Irrigation Systems
• Infrastructure, Building & Construction Industry
• Pumping Main & Distribution Lines
• Suction & Delivery Pipes
• Aquaculture & Salt Pan industry

Jain Polyethylene (PE) Pipes For Sewerage

Range
Ø 63 mm up to 1000 mm dia.
Pressure Rating 2.5 to 16 kgf/cm²
Also available with tracer for easy detection

Standards
IS 14333, ISO 4427

Length
Available in straight lengths of 6/12 meters for all sizes and in coils up to 160mm OD size.

Material Grade
• PE-63 • PE-80 • PE-100

Applications
• Municipal sewerage line
• Dumping Ground leachate collection

B-Sure PE Gas Piping Systems

Range
Ø 20 to 315 mm
SDR 9,11,13.6,17.6
* Sizes >315mm available on demand
Electro Fusion Fittings - Ø 20 to 355 mm, 7/12.5/16 kgf/cm2

Standards - IS 14885, ISO 4437

Length
Available in straight lengths of 6 /12 meters for all sizes and in coils up to 160 mm. OD size.
Material Grades
• PE- 80 (Yellow) • PE- 100 (Orange) • PE- 80 (Black)

Applications
• Natural Gas/ Vaporized LPG Conveyance and Distribution
• Industrial Gases Distribution
• Landfill & Leachate Gas Extraction and Conveyance

JAIN PIPES - SOLUTION FOR GENERATIONS®

Jain Polyethylene (PE) Injection Moulded & Fabricated Fittings

Range
Ø 20 to 2500 mm,
Pressure Rating upto 25 kgf/cm^2

Standards
IS 8008, IS 8360, ISO 4427, Company Standard

Material Grade
• PE-63 • PE-80 • PE-100

Applications
• Water supply lines
• Drinking water supply lines
• Sewerage lines

Jain PE/ PP Compression Fittings

Range
Ø 63 to 110 mm up to 16 kgf/cm^2

Standards
ISO 14236 / ISO 17885

Material Grade
• PE-100 / PP

Applications
• Water supply lines
• House Service Connections

Jain HSC Compression Fittings

Range
Ø 20 to 50 mm up to 16 kgf/cm^{22}

Standards
ISO 14236 / ISO 17885

Material Grade
• PE-100 / PP

Applications
• Water supply lines
• House Service Connections

Jain Polyethylene (PE) ElectroFusion Fittings

Range
Ø 20 to 315 mm
Pressure Rating upto 16 kgf/cm^2

Standards
ISO

Material Grade
• PE-100 (Blue & Black - For water, Yellow - For Gas

Applications
• Water supply lines
• House Service Connections

JAIN PIPES - SOLUTION FOR GENERATIONS®

B-Sure PE Corrugated Piping System

Range

Single/ Double Wall Corrugated (SWC/DWC) - OD/ID (mm)
Ø 63/52, 75/62, 90/77, 120/106, 125/103, 180/153, 200/173, 250/215mm
Double Wall Corrugated (DWC) - Nominal Internal Dia. (mm)
Ø 75, 100, 135, 150, 170, 200, 250, 300, 400, 500 mm
Available in SN-4 and SN-8 with integral socket

Standard - IS 16205 Part 24, IS 16098 (part 2), TEC GR No. GR/DWC-34-01 SEP 2007, EN 13476-3:2007(E)

Length - Available in straight lengths of 6/12 meters for all sizes and in coils upto 125 mm OD in different colours.

Applications

- Power Cable Conduit & Teleco Cable Duct
- Underground Drainage & Sewerage Systems
- Detention/ Retention Storm Water Lines
- Building & Construction
- Agriculture / Subsurface Drainage

Jain Silicoat® Polyethylene (PE) Optical Fiber Cable (OFC) Duct

Range

OFC Duct - 29/23, 32/26, 32/27, 32/28, 40/33, 40/34.2, 50/42, 50/43mm OD/ID
Also available with tracer duct for easy detection

Spirozoom - 38.8/33mm, 40/34.2 & 40/33mm

Also available with tracer wire for easy detection and pre inserted rope for cable pulling

Fittings: Pushfit OFC duct fittings

Standards - • BSNL (TEC) Specification, Company • TEC GR No. GR/MDS-01/01. FEB 2010
• TEC GR No.TEC/GR/ TX/CDS - 008/03 MAR-11

Length - Available in coils & drums

Material Grades - PE-63 & PE-80 in different colors

Applications

- Optical Fiber Cable (OFC) Ducting for Telecom & Data Networks
- Fiber To The Home (FTTH) application

Jain Silicoat® Polyethylene (PE) OFC Micro Duct

Range

Micro Duct - Ø3/1.5, 5/3.5, 7/5.5, 8/4.4,10/5.5, 10/7.6, 10/8,
12/8, 12/10, 14/10, 16/10 mm OD/ID

Multi - Micro Duct - 2 way to 8 way

Also available with tracer wire for easy detection and Ripcord for easy removal of sheathing

Fittings: Pushfit OFC duct fittings

Standards - • BSNL (TEC) Specification, Company • TEC GR No. GR/MDS-01/01. FEB 2010
• TEC GR No.TEC/GR/ TX/CDS - 008/03 MAR-11

Length - Available in coils & drums

Material Grades - PE-63 & PE-80 in different colors

Applications

- Optical Fiber Cable (OFC) Ducting for Telecom & Data Networks
- Fiber To The Home (FTTH) application

Be it Water or Sewerage, Telecom or Gas, Infrastructure or Irrigation...

Jain Pipe offers You End-to-End Piping Solutions

Applications

- Urban & Rural Drinking Water Schemes
- House Service Connections
- Lift and Gravity Irrigation Systems
- Drip & Sprinkler Irrigation systems
- Water Well Casing & Screen Pipes
- Column/ Riser Pipes for Submersible Pump
- Hot & Cold Plumbing Systems
- Soil, Waste & Rainwater in Building Construction
- Underground Drainage Systems
- Sewerage Pumping & Gravity Pipeline
- Sea/River Water Intake/Outfall & River Crossing
- Chemical/ Acid Conveyance
- Ash, Slurry, Mining & Dust Suppression System
- Marine & Submarine Pipeline
- City Gas Distribution pipeline
- Single/ Double Wall Corrugated Pipes
- Permanently Lubricated Ducts/ Micro Multi Ducts for Telecom OFC Backbone/ Data Networks

Available in sizes

- PVC upto 630 mm Ø
- PE upto 2500 mm Ø
- PE Corrugated upto 500 mm Ø
- Pressure Rating upto 25 Kgf/cm^2
- As per major National & International standards

Solutions for Generations

JAIN®
Jain Irrigation Systems Ltd.
Small Ideas. Big Revolutions

Jain Pipes™ | Jain® PE Pipes | Jain™ Column Pipe | Jain Plumbing™ | B-SURE GAS PIPE® | B-SURE CORRUGATED PIPE® | B-SURE SEWERAGE PIPE®

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