



DRISCOPLEX[®] 6400 PIPING SYSTEMS OIL PATCH CATALOG



Bulletin: PP 675

DRISCOPEX[®] 6400 Piping Systems Oil Patch

Performance Pipe

PERFORMANCE PIPE is the functional successor to the operations of Plexco¹ and Driscopipe². On July 1, 2000, Chevron Chemical Company and Phillips Chemical Company were joined to form Chevron Phillips Chemical Company LP. Performance Pipe, a division of Chevron Phillips Chemical Company LP, succeeds Plexco and Driscopipe as North America's largest producer of polyethylene piping products for gas, industrial, municipal, mining, oilfield, and utility applications.

Performance Pipe offers more than forty years of polyethylene piping experience, nine ISO Certified manufacturing facilities throughout the United States, and one manufacturing facility in Mexico.

To enhance the outstanding quality and performance of Performance Pipe polyethylene piping, Chevron Phillips Chemical Company LP further strengthens Performance Pipe with over four decades of quality polyolefin plastic resin production.



¹ Formerly - Plexco, a Division of Chevron Chemical Company

² Formerly - Phillips Driscopipe, A Division of Phillips Petroleum Company

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A Commitment to Quality and Performance

Performance Pipe's DriscoPlex® 6400 PE 3408 piping system succeeds Driscopipe 6400 and Plexco Oil and Gas Gathering pipe as the product of choice for energy and environmental applications. DriscoPlex® 6400 piping system meets or exceeds the requirements of the American Petroleum Institute's Specification 15LE (Third Edition April 1, 1995), "Specification for Polyethylene Line Pipe (PE)" and ASTM D2513-93, "*Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings*". By meeting the requirements of these important specifications, DriscoPlex® 6400 piping system is well qualified to meet the demanding needs of the energy market in applications such as oil and gas gathering systems, methane recovery from coal seams and landfills, and water supply lines for oil recovery systems. The polyethylene compounds used to manufacture DriscoPlex® 6400 piping system are listed by the Plastics Pipe Institute (PPI) for service temperatures up to 140°F (60°C).



DriscoPlex® 6400 Polyethylene Piping Systems offer the energy industry and the environmental engineer economic, innovative and modern solutions to age-old problems. This DriscoPlex® 6400 piping system provides proven engineered answers to many traditional problems and new applications. Polyethylene resins for piping applications were developed in the early 1950's and one of the first applications was in oil and gas gathering piping systems. DriscoPlex® 6400 piping system is for use in oil and gas gathering applications that are not jurisdictional under Federal codes. It is not approved for natural gas distribution applications. See the Department of Transportation Pipeline Safety Regulations, 49 CFR Part 192 for details.

Research and Testing

Performance Pipe's ISO certified quality assurance program assures that new products and product improvements are thoroughly tested before release. Both incoming materials and outgoing products are evaluated to ensure that all products meet Performance Pipe's own exacting standards as well as applicable industry standards and governmental standards and regulations.

From the Wellhead to the Tank Battery and Beyond

DriscoPlex® 6400 pipe systems are the systems of choice in the Oil Patch. DriscoPlex® 6400 piping system is used to transport all three production phases - crude oil, gas and brine or produced water in gathering & return applications before and after separation. It is used for produced water, waste or drain water, acidic or alkaline water. DriscoPlex® 6400 piping system does not rust, rot, or corrode. The smooth surface does not support the growth of microorganisms, and is resistant to the adherence of scale and other deposits such as paraffin, especially under moderate and higher flow conditions. DriscoPlex® 6400 piping system can be used in CO₂ service and in sour gas (H₂S) operations as well as in replacement for old oilfield service lines by insertion lining.

Methane Gas Recovery

As governmental and EPA standards governing landfill operations become increasingly stringent, greater emphasis may be placed on the collection and disposal of methane gas. This methane gas can be an important energy resource and increasing numbers of operators are using this previously neglected energy resource as a key to more profitable operations. DriscoPlex® 6400 piping system provides a high quality, dependable, strong piping system capable of the demanding installation in landfills and coal seam gas recovery.

Heat Fused Joints



DriscoPlex® pipe and fittings are usually joined using heat fusion. Properly made heat fusion joints are reliable, leak-free, fully restrained, and as strong as the pipe itself. Heat fusion joints are made using simple, visual procedures based on controlled temperature and pressure. DriscoPlex® 6400 pipe can be joined using butt fusion, socket fusion or electrofusion. Lateral connections are installed using sidewall saddle fusion fittings. Contact Performance Pipe for recommended joining procedures.

When heat fused DriscoPlex® 6400 pipe is used there are no gaskets to leak, joint restraints are not required, and thrust blocks are necessary only under unusual circumstances. The leakage allowance common to gasketed bell-and-spigot joined pressure pipes is unnecessary with the Performance Pipe PE 3408 pressure piping system. Heat fusion joints are fully restrained and as strong as the pipe itself. Because water pressure cannot push heat-fused fittings off the pipe end, thrust blocks are rarely required. Thrust anchoring may be required to control Poisson effect forces or forces resulting from temperature changes where PE pipes are connected to bell and spigot piping.

DriscoPlex® 6400 pipe and fittings can also be joined together or transitioned to other materials with flanges, mechanical connections or transition fittings that are designed for PE pipe. These connections must be made in accordance with the connection manufacturer's instructions. Some connections such as mechanical OD compression couplings may require a stiffener in the pipe bore.

DriscoPlex® piping products cannot be joined with adhesive or solvent cement. Threaded joining and joining by hot air (hot gas) or extrusion welding techniques are not recommended for pressure service.



Toughness

DriscoPlex® 6400 piping is "tough". Its "toughness" is derived from many of the chemical and physical properties of the material. The pipe is ductile. It flexes, bends and absorbs impact loads over a wide range of conditions. This inherent resiliency and flexibility of DriscoPlex® 6400 piping allows the pipe to absorb surge pressure, vibration and stresses caused by soil movement. It is flexible and can be heat fused to install joint free piping systems.

DriscoPlex® 6400 piping has excellent abrasion resistance, low notch sensitivity, and high tear strength. Using techniques developed in the natural gas distribution industry, smaller diameter pipe can be squeezed-off (pinched-off) to stop flow by flattening the pipe between parallel bars. The relative toughness of DriscoPlex® 6400 piping is one of its outstanding engineering characteristics that permit innovative piping design.

Lightweight - Flexible

Because of its lightweight, DriscoPlex® 6400 piping can typically be moved, handled and placed in the ditch using smaller and less expensive construction equipment than necessary for handling traditional piping products. Long length coils and standard joint lengths of 40 feet or longer reduce the number of joints and speed installation. Usually, manpower requirements are also reduced.

Where terrain or other obstacles present installation problems, the combination of lightweight and flexibility provides opportunity to join the pipe in a convenient work area and pull it into position. The pipe can be joined above ground and rolled or lowered into the trench, allowing the use of smaller trench widths, and minimizing the need to place men and equipment inside the trench. Such installation methods can dramatically reduce the time required for installation in many instances.

The flexibility of DriscoPlex® 6400 piping often allows it to be curved over, under or around obstacles, reducing the need for some fittings and lowering installation costs. The minimum allowable bending radius depends on the dimension ratio of the pipe and the presence or absence of fittings in the bend.

TABLE 1

Pipe DR	Allowable Cold Bending Radius
13.5 or lower	20 times pipe OD
> 13.5 to 21	25 times pipe OD
> 21	30 times pipe OD
Fitting or flange present in bend	100 times pipe OD

Chemical Resistance

DriscoPlex® 6400 piping has outstanding chemical and corrosion resistance and will tolerate most downhole corrosion inhibitors, hot soils and sour gas. It is used in crude oil service, low-pressure gas operations, acidic or alkaline water service, and brine service. Naturally occurring chemicals in the soil will not attack DriscoPlex® 6400 pipe or cause it to degrade. It does not rot, rust or corrode by electrolytic action or require cathodic protection. DriscoPlex® 6400 piping is resistant to the buildup of scale and other deposits, especially under moderate to high flow conditions and does not support the growth of algae, bacteria, fungi, or other marine life. Dry, gaseous hydrocarbons have no adverse effect on expected service life. Liquid hydrocarbons will permeate the wall and reduce hydrostatic strength, but normally will not degrade the material. Permeation is discussed further in the section titled, "Crude Oil Service". For a complete discussion on chemical and environmental effects and a list of chemicals tested in polyethylene, see the *Performance Pipe Engineering Manual Book 1*.

Temperature

Operating service temperature for DriscoPlex® 6400 piping may be -50°F or lower and up to 140°F. The system operating temperature will affect the allowable design parameters of DriscoPlex® 6400 piping systems. Detailed temperature rating information is provided in the "Design (Working) Pressure" in Book 1, Chapter 1, Page 4 of the *Performance Pipe Engineering Manual*.

Because of its toughness and flexibility DriscoPlex® 6400 can handle conditions of freezing water much better than traditional metal; piping. However, it is not designed to operate under those conditions. In the event that water does freeze inside DriscoPlex® 6400 pipe the line should be carefully and fully thawed before placing it back in service. Excessive heat will damage the pipe. Do not use open flames, torches or concentrated heat sources to thaw frozen polyethylene pipelines. Do not use pressure to attempt to "blow out" ice plugs. Serious damage, and possible injury to personnel may occur. To prevent freezing, the line may be insulated and may be heat traced if necessary. Heat tracing equipment should not exceed 120°F (49°C).

Weatherability

DriscoPlex® 6400 piping contains finely divided carbon black to provide protection against degradation caused by ultraviolet rays from direct sunlight. Carbon black is the most effective single additive for enhancing the weathering characteristics of plastic materials. Weatherability tests indicate that DriscoPlex® 6400 pipe is suitable for applications where there is long-term, direct exposure to ultraviolet light. This includes all surface, suspended, and above grade applications.

Permeation

Under extended exposure, liquid hydrocarbons will permeate (solvate) polyethylene pipe, reducing pressure ratings. In liquid hydrocarbon service DriscoPlex® 6400 pipe's pressure rating is reduced by 50% when compared to water or brine service. Liquid hydrocarbon permeation should be considered when the fluid in the pipe has a 2% or greater liquid hydrocarbon concentration, or where liquid hydrocarbon condensates can form in gas pipelines. Liquid hydrocarbon permeation may cause some swelling. All types of hydrocarbons (aromatic, paraffinic, etc.) have a similar effect, and the relative effect on different polyethylene pipe resins is essentially the same.

Caution: Once polyethylene pipe has been permeated with liquid hydrocarbons, joining by heat fusion or electrofusion is not recommended. The hydrocarbons will leach out during heating and contaminate the joint. Polyethylene pipe that has been permeated with liquid hydrocarbons should be joined using suitable mechanical connection methods.

Aboveground Life Expectancy

External forces may damage polyethylene pipe installed above ground.

To protect against ultraviolet degradation, DriscoPlex® 6400 contains a minimum 2% carbon black. DriscoPlex® 6400 is suitable where there is direct, long-term exposure to sunlight. This includes above ground, surface and suspended piping applications. Exposure to the sun increases operating temperatures, especially during summer months and may require utilizing elevated temperature service ratings. Above ground piping can be damaged by some manpowered equipment, fire and external forces.

Polyethylene Material Properties

DriscoPlex® 6400 piping is made from high-density polyethylene with a minimum cell classification number of 345464C per ASTM D3350-01. This material meets or exceeds the typical engineering requirements for oil and gas production applications.

The resin is listed in PPI TR-4 with recommended hydrostatic design basis (HDB) rating of 1600 psi at 73°F and 800 psi at 140°F. When elevated temperature operating conditions are anticipated DriscoPlex® 6400 piping can be used with a high degree of certainty of performance. In addition, the polyethylene used has greater than 100 hours slow crack growth resistance per ASTM F1473 (PENT).

ASTM Test Values

The ASTM Test Methods and nominal values for the polyethylene material used in the manufacture of DriscoPlex® 6400 are shown in the chart below.

TABLE 2

Resin Material Property	Cell Value per ASTM D3350	ASTM Test Method	Nominal Value for DRISCOPEX® Piping PE 3408
Density, gm/cm ³	(3)	D 1505	0.955 gm/cm ³ (black)
Melt Index, gm/10 min	(4)	D 1238	0.1 gm/10 Minutes
Flexural Modulus, psi	(5)	D 790	110,000 psi
Tensile Strength at Yield, psi	(4)	D 638	3,200 psi
PENT, hours	(6)	F 1473	>100 hours
Hydrostatic Design Basis, psi	(4)	D 2837	1,600 psi (PE 3408)
Color & UV Stabilizer	(C)	D 3350	2% carbon black minimum
Linear Thermal Expansion		D696	9x10 ⁻⁵ inch/inch/ °F
Elastic Modulus		D638	110,000 psi
Brittleness Temperature		D746	<-180 ⁰ F
Vicat Softening Temperature		D1525	225 ⁰ F
Hardness		D2240	64 Shore D

NOTICE – This table provides typical physical property information for polyethylene resins used to manufacture PERFORMANCE PIPE polyethylene piping products. It is intended for comparing polyethylene pipe grade resins. It is not a product specification, and it does not establish minimum or maximum values or manufacturing tolerances for resins or for piping products. These typical physical property values were determined using compression-molded plaques prepared from resin. Values obtained from tests of specimens taken from piping products can vary from these typical values. Performance Pipe has made every reasonable effort to ensure the accuracy of this data sheet, but this data sheet may not provide all necessary information, particularly with respect to special or unusual applications. This data sheet may be changed from time to time without notice. Contact Performance Pipe to determine if you have the most recent edition.

Design (Working) Pressure

The following formula is used to compute the Design (Working) Pressures for PE 3408 polyethylene piping systems (manufactured to controlled outside diameter). This formula is used for water, brine, crude oil and natural gas service at operating temperatures up to but not in excess of 140°F. For operating temperatures below 73°F, use 73°F Design (Working) Pressures.

$$P = \frac{2xHDB \times f}{(DR - 1)}$$

Where:

P	=	DESIGN (WORKING) PRESSURE IN POUNDS PER SQUARE INCH GAUGE (PSIG)
HDB	=	LONG-TERM HYDROSTATIC DESIGN BASIS (PSI) AT THE DESIGN SERVICE TEMPERATURE. (TABLE-3)
f	=	DESIGN (SERVICE) FACTOR FOR THE FLUID IN THE PLASTIC PIPE
DR	=	DIMENSION RATIO, WHERE

$$DR = \frac{OD}{t}$$

OD = PIPE OUTSIDE DIAMETER (IN)
t = PIPE MINIMUM WALL THICKNESS (IN)

Caution: Design (Service) Factor (f) selection and recommendation (and the resultant Design (Working) Pressure Ratings) are based on intended application or use, installation, environment, temperatures, hazard involved, desired piping system life expectancy, and desired degree of reliability. When Design (Service) Factors higher than those recommended here are used, (higher working pressures) the reliability of the piping system may be reduced. The use of Design (Service) Factors and Design (Working) Pressures higher than those recommended for each service (water, crude oil and natural gas) at the given operating temperature, shall be at the discretion and approval of the responsible design or field engineer.

TABLE 3

Hydrostatic Design Basis, (HDB) DRISCOPEX® 6400 Piping Systems	
Temperature	HDB (psi)
73°F	1600
100°F	1250†
120°F	1000†
140°F	800

† Interpolated in accordance with PPI TN-18.

TABLE 4

Design (Service) Factor, F	
Fluid in Pipe	Design (Service) Factor
Water, Brine, Dry Natural Gas††	0.50
Crude Oil, Water, and Natural Gas (with >2% oil or condensates)	0.25

†† Lines laid in Class 1 and Class 2 locations, and areas where federal codes are not applicable.

Maximum Design (Working) Pressures (psig)

The following charts provide maximum recommended working pressures for PE 3408 pipes for Water, Crude Oil, and Natural Gas service at the indicated operating temperatures. PE 3408 pipes with different outside diameter, but the same DR have the same Design (Working) Pressure Ratings. Minimum pipe wall thickness is determined by dividing the pipe average outside diameter (O.D.) by the DR number.

Design (Working) Pressures are calculated in accordance with federal codes and API 15LE specification. A check should be made to determine if these pressures meet state and/or local codes.

TABLE 5

DRISCOPLEX® 6400 Pipe Design (Working) Pressures for Water, Brine and Dry Natural Gas Gathering (Class 1, Class 2, and Non-Federally Regulated Areas — Design (Service) Factor, F = 0.50)				
DR Number	Operating Temperature			
	73°F	100°F	120°F	140°F
5.0	400 psig	312 psig	252 psig	200 psig
7.0	267 psig	208 psig	168 psig	133 psig
9.0	200 psig	156 psig	125 psig	100 psig
11.0	160 psig	125 psig	100 psig	80 psig
17.0	100 psig	78 psig	63 psig	50 psig
21.0	80 psig	63 psig	50 psig	40 psig

TABLE 6

Design (Working) Pressures for Crude Oil and Wet Natural Gas Gathering (Design (Service) Factor, F = 0.25)				
DR Number	Operating Temperature			
	73°F	100°F	120°F	140°F
5.0	200 psig	156 psig	125 psig	100 psig
7.0	133 psig	104 psig	83 psig	67 psig
9.0	100 psig	78 psig	63 psig	50 psig
11.0	80 psig	63 psig	50 psig	40 psig
17.0	50 psig	39 psig	31 psig	25 psig
21.0	40 psig	31 psig	25 psig	20 psig

Fluid Flow

DriscoPlex® 6400 polyethylene pipe has a smooth inside surface. It maintains high flow properties throughout its service life due to its excellent chemical and abrasion resistance. Because of smooth walls and the non-wetting characteristics of polyethylene, high flow capacity and reduced friction loss is possible with DriscoPlex® 6400 pipe. In many cases, this high flow capacity may permit the use of smaller diameter pipe. A "C" factor of 155 is used in water flow calculations in the Hazen-Williams Formula.

Formulas for the flow of water, brine, oil, and gas in polyethylene pipe are presented in the *Performance Pipe Engineering Manual, Book 2 System Design*, and in Performance Pipe's Plexcalc® II PC program. When installed on a personal computer, the Plexcalc® II program allows the user to enter values for his application, and calculate a result. For information on Performance Pipe publications, and Plexcalc®, contact your Performance Pipe distributor or sales representative.

Pressure Surge Capacity

System pressures due to frequently occurring surges or water hammer events of up to 1-1/2 times the rated system operating pressure are well within the limits of the DriscoPlex® piping system. System pressures of twice the rated operating pressure can be tolerated occasionally. For moderate flow velocity systems, i.e. 5 ft/sec or less, it is generally unnecessary to include a surge allowance within the pressure rating of the system. For lines operating at higher velocities, the allowance will be reduced. See the *Performance Pipe Engineering Manual*.

Vacuum or Suction Pipelines

Typical cases of vacuum or suction pipelines are gravity flow, downhill siphon lines, pipelines which are cleaned by vacuum and gas gathering lines operating under vacuum. When DriscoPlex® 6400 pipe is used in vacuum applications, a sufficiently heavy wall pipe must be selected to resist the collapsing forces. The amount of vacuum a pipeline can support is a function of its dimension ratio (DR) and other operating conditions. A thicker wall pipe will provide a greater resistance. The *Performance Pipe Engineering Manual* lists critical collapse pressures by DR for high-density polyethylene pipe.

DriscoPlex® 6400 Piping Systems Size and Dimension Data

TABLE 7

P @ 73.4° F		DR 17 (100 psi PC†)		DR 11 (160 psi PC†)		DR 9 (200 psi PC†)		DR 7 (267 psi PC†)		DR5 (400 psi PC†)	
IPS Pipe Size	OD, in.	Min Wall, in.	Weight, lb/ft	Min Wall, in.	Weight, lb/ft	Min Wall, in.	Weight, lb/ft	Min Wall, in.	Weight, lb/ft	Min Wall, in.	Weight, lb/ft
¾	1.050	--	--	0.095	0.12	0.117	0.15	0.150	0.18	0.210	0.24
1	1.315	--	--	0.120	0.20	0.146	0.23	0.188	0.29	0.263	0.38
1-1/4	1.660	--	--	0.151	0.31	0.184	0.37	0.237	0.46	0.332	0.60
1-1/2	1.900	--	--	0.173	0.41	0.211	0.49	0.271	0.60	0.380	0.78
2	2.375	--	--	0.216	0.64	0.264	0.76	0.339	0.94	0.475	1.23
2-7/8	2.875	--	--	0.261	0.93	0.319	1.12	0.411	1.38	0.575	1.80
3	3.500	0.206	0.93	0.318	1.39	0.389	1.66	0.500	2.05	0.700	2.66
4	4.500	0.265	1.54	0.409	2.29	0.500	2.74	0.643	3.39	0.900	4.40
6	6.625	0.390	3.34	0.602	4.97	0.736	5.93	0.946	7.33	1.325	9.54
8	8.625	0.507	5.65	0.784	8.42	0.958	10.05	1.232	12.43	1.725	16.16
10	10.750	0.632	8.78	0.977	13.09	1.194	15.61	1.536	19.32	2.150	25.11
12	12.750	0.750	12.36	1.159	18.41	1.417	21.97	1.821	27.16	2.550	35.32
14	14.000	0.824	14.91	1.273	22.20	1.556	26.50	2.000	32.76	2.800	42.59
16	16.000	0.941	19.46	1.455	29.00	1.778	34.60	2.286	42.79	3.200	55.62
18	18.000	1.059	24.64	1.636	36.69	2.000	43.79	2.571	54.14	--	--
20	20.000	1.176	30.41	1.818	45.30	2.222	54.05	2.857	66.85	--	--
24	24.000	1.412	43.81	2.182	65.24	2.667	77.85	--	--	--	--

Other Dimension Ratio's available upon request. † Pressure class ratings are for water at 80°F (27°C) or less. Pressure class ratings can vary for other fluids and service temperatures. Actual ID will vary For flow calculations, average ID may be estimated using: Avg. ID = OD Size – (2.12 x min. wall). For actual ID (for stiffeners, etc.), consult applicable specifications for tolerances and other factors affecting pipe ID. ‡ Pipe weight calculated per PPI TR-7.

Coiling Pipe

DriscoPlex® 6400 pipe, in diameters to 6" IPS, is available in coils. Coils allow the installation of long lengths of pipe while greatly reducing the number of fusion weld joints. The chart below gives common coil sizes, coil weights and footages.

TABLE 6

Common Coil Sizes, Weight and Footage				
Nominal Pipe Size	Nominal Coil OD (in)	Coil Weight DR11 Pipe (lb)	Footage per Coil (ft)	Footage per Truck (ft)
1 ¼" IPS	72	155	500	42,000
	74	310	1000	49,000
1 ½" IPS	75	205	500	28,000
	75	410	1000	35,000
2" IPS	78	320	500	24,500
	73	640	1000	21,000
	76	960	1500	21,000
	77-3/8	1280	2000	28,000
3" IPS	96	695	500	12,000
	96	1390	1000	12,000
4" IPS	93	1150	500	6,000
	93	1380	600	7,200
	116	2300	1000	8,000
6" IPS	120	2485	500	4,000
Drop deck trailers required to ship coils larger than 96". All footages are approximate. Other coil diameters and footages may be available.				

Because of their size and weight, DriscoPlex® 6400 piping coils require appropriate equipment and procedures for safe handling, installation and use. Before and during installation, the owner or installer is responsible for establishing appropriate safety practices, and for complying with all applicable Federal, State, and Local codes and regulations. For additional information, please contact your Performance Pipe Distributor or Performance Pipe.



Fittings

DriscoPlex® 6400 molded fittings are available through 12" IPS. A complete listing of available fittings is available from your Performance Pipe Distributor or at www.performancepipe.com.



Installation

DriscoPlex® 6400 piping materials are stabilized against UV degradation and can be permanently installed on or above the surface. Surface and above grade applications must be properly supported and must take thermal expansion and contraction into account.



Direct Burial

Like all piping materials, HDPE piping must be properly installed. DriscoPlex® 6400 pipe should be installed in accordance with ASTM D 2774 *Standard Practice for Underground Installation of Thermoplastic Pressure Piping*. HDPE is a flexible piping material that works together with its soil embedment to sustain the earth and live loads above it. Suitable embedment is required to provide support around the pipe, and embedment materials must be placed so that the pipe is properly surrounded. In general, coarse, angular sands and gravels are preferred, but other materials may be used under the direction of the design engineer. See ASTM D 2774 *for recommended embedment material size*. Embedment material must be placed in the haunch areas below the pipe springline and above the pipe so that the pipe is fully encapsulated without voids. Compacted embedment is preferred. See the *Performance Pipe Engineering Manual* for information about the design of underground installations.

Leak Testing

Take all necessary precautions to ensure the safety of persons and property while conducting leak tests. Leak tests should always be conducted using hydrostatic leak testing procedures. In general, the maximum allowable test pressure for leak testing is 150% of the pipe pressure class at the lowest elevation in the line. A leak test should be conducted in no more than eight (8) hours including bringing the line up to pressure, maintaining test pressure, and depressurizing. If leaks are found, depressurize the line before repairs are made. If retesting is necessary, allow the line to relax for at least eight (8) hours before repressurizing the line. See Performance Pipe Technical Note PP-802 *Leak Testing for recommended leak testing procedures*.

WARNING - Correctly made fusion joints do not leak. When pressurized, leakage at a faulty fusion joint may immediately precede catastrophic separation and result in violent and dangerous movement of piping or parts and the release of pipeline contents under pressure. Never approach or attempt to repair or stop leaks while the pipeline is pressurized. Always depressurize the pipeline before making corrections. Faulty fusion joints cannot be repaired.

Pigging

Some piping systems may require pigging, either during construction or normal operations. Performance Pipe recommends the use of commercially available pigs specifically designed for use in polyethylene piping systems. The pig must be correctly sized based on the inside diameter of the line to be cleaned. The internal bead that forms when polyethylene pipe is butt fused should be considered when selecting and sizing a pig.

DriscoPlex® 6400 piping has excellent corrosion resistance and limits the build up of internal scale. The use of an abrasive or brush pig is not recommended. A crisscross pig can be used in crude lines that have paraffin buildup.

Training and Technical Service

Performance Pipe offers complete technical support for DriscoPlex® 6400 pipe and fittings. Joining procedures, training materials, and on-location fusion training is available. In addition, Performance Pipe's technical staff assists our customers with product applications and capabilities, installation recommendations, and testing and operating procedures. Contact your Performance Pipe Territory Manager or Performance Pipe Distributor for information



Cautions

Observe all local, state and federal codes and regulations, and general handling, installation, construction and operating safety precautions. The following are some additional precautions that should be observed when using Performance Pipe polyethylene piping products.

Fusion and Joining

During heat fusion, equipment and products can exceed 400°F (204°C). Take care to prevent burns.

Do not bend pipes into alignment against open butt fusion machine clamps. The pipe may spring out and cause injury or damage.

Performance Pipe polyethylene piping products cannot be joined with adhesive or solvent cement. Pipe-thread joining and joining by hot air (gas) welding or extrusion welding techniques are not recommended for pressure service.

Liquid hydrocarbon permeation may occur when liquid hydrocarbons are present in the pipe, or where soil surrounding the pipe is contaminated with liquid hydrocarbons. Permeated polyethylene pipe should be joined using suitable mechanical connections because fusion joining to liquid hydrocarbon permeated pipes may result in a low strength joint. Mechanical fittings must be installed in accordance with the fitting manufacturer's instructions. Obtain these instructions from the fitting manufacturer. See Performance Pipe Bulletin PP 750 and the *Performance Pipe Engineering Manual*.

Weight, Unloading and Handling

Although polyethylene piping is lightweight compared to some other piping products, significant weight may be involved. Move polyethylene piping with proper handling and lifting equipment. Use fabric slings. Do not use chains or wire ropes. Do not roll or drop pipe off the truck, or drag piping over sharp rocks or other abrasive objects. Improper handling or abuse can damage piping and compromise system performance or cause injury or property damage. **Obtain and observe the handling instructions provided by the delivery driver.**

Striking the pipe with an instrument such as a hammer may result in uncontrolled rebound. Store DriscoPlex® products so that the potential for damage or injury is minimized. See the *Performance Pipe Engineering Manual*.

Testing

When testing is required, observe all safety measures, restrain pipe against movement in the event of catastrophic failure, and observe limitations of temperature, test pressure, test duration and making repairs. See Performance Pipe Technical Note PP-802 *Leak Testing PE Piping Systems*.

Protection Against shear and Bending Loads

Where a polyethylene branch or service pipe is joined to a branch fitting and where pipes enter or exit casings or walls, structural support such as properly placed, compacted backfill and a protective sleeve should be used. Whether or not a protective sleeve is installed, the area surrounding the connection must be structurally supported by embedment in properly placed compacted backfill or other means to protect the polyethylene pipe against shear and bending loads. See the Performance Pipe Engineering Manual and ASTM D 2774.



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PERFORMANCE PIPE
Product Literature



Technical Notes & Bulletins*:

Bulletin: PP 106-DS

Oil and Gas Gathering Data Sheet

Bulletin: PP 155

Oil and Gas Gathering Size & Dimension Sheet

Additional product literature will be available upon completion.
Visit www.performancepipe.com for the latest completed literature.