



Productive & Industrial Co.
HD PE Pipes & Fittings Manufacturer

P.E.S.

www.pespipe.com
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The major producer of HD PE pipes and fittings in Iran
12 to 1600 mm

The exclusive producer of large diameter (630-1600 mm)

P.E.S.

The high light of History



- The productive and industrial company established in 1977 and started its activity by installation of irrigation and water supply system.
- Started producing HD PE pipes and fittings in 1981 up to size 160 mm.
- Began producing HD PE pipes and fittings up to size 500 mm in 1994.
- Lunched to make HD PE pipes and fittings up to size 1200 mm in 1998.
- Has commenced to manufacture Vacuum Tanks, Cooling Tanks, Haul-offs, Heads, Die Heads, Calibrator and Injection Molds since 1998.
- Started producing 1600 mm PE HD pipes and fittings in 2007.
- Embarked on producing Polyethylene Gas Pipes in 2007 from size 25 to 160 mm.
- Made bargain on Technical Corporation in the field of plastic pipe welding with SKZ (Plastic Technology Centre in Wuerzburg / Germany) in 2007.
- Made haul-off for size 1600 mm in 2007.
- Has drawn out the contract with SKZ in the use of its logo on HD PE pipes since 2008.
- Has expanded its products range from 16 to 1600 mm during its 25 years of endeavor and has increased the annual production capacity from 1000 MT to 55000 MT.



The high light of Quality

- The first holder of ISO 9002-1994 from QMI Canada in HD PE pipe and fitting industry in Iran-1998.
- The first holder of ISO 9001-2000 from QMI Canada in HD PE pipe and fitting industry in Iran-2001.
- The holder of Iranian Standard Organization Logo.
- The winner of Highest Quality Producer Awards by ISIRI election.
- The winner of 5 International Management Awards.

The high light of Ability

- Producing high pressure HD PE pipes and fittings up to 40 bars.
- Manufacturing haul-off, Vacuum and Cooling tanks up to size 2000 mm.
- Carrying out training courses on plastic pipe welding according to German standards and based on know how and industrial procedures acquired from SKZ.
- Testing HD PE pipes and fittings at a fully equipped accredited laboratory under ISO 17025 standard.
- Manufacturing Heads and Die heads up to size 630 mm, pipe markers up to size 2000, Calibrator up to 1200 mm.
- Manufacturing custom made PE products like as Manhole, Handhole, and HD PE Drainage pipe.

Learner's Club





P.E.S

PE Pipe Use it everywhere



The solid-wall polyethylene pipe has:

- Smooth inner wall with everlasting low head loss
- Strong & flexible joining system
- High fatigue strength
- High resilience to shocks
- At least 100 years working life



It has great resistant to:

- Corrosion
- Chemicals
- Abrasion
- Knocks
- Sedimentation
- Earthquakes & tide pressure

The solid wall polyethylene pipe is:

- Flexible with bending radius down to $20 \times OD$
- Light weight
- Leak free
- Non-toxic, potable water approved
- Joinable by butt-fusion and electro fusion welding
- Buoyant in sea water
- Almost unlimited lifetime underwater utility



Programa de Engenharia em
Técnicas de Pipas e Fiação de Manufatura





Polyethylene Pipe Application

P.E.S. has been established in 1977 in Tehran with focus on designing and installation polyethylene pipe system for water supply, sewage and irrigation systems.

In 1981 **P.E.S.** started to produce PE pipe and fittings. Since then, **P.E.S.** has become the leading manufacturer of HD PE pipes and fittings sector in Iran. During the past 30 years, by employing know-how and determined efforts, the company successfully increased its capacity to 55000 tons annually and completed the range of its products up to 1600 mm and became the exclusive manufacturer of solid-wall HD PE large size pipes and fittings in Iran.

Determining quality, technology and customer satisfaction as our first goals to achieve, direct us to supply high quality products to the market and maintain ourselves with the fast renovations in the world of plastic industry.

As an experienced pipe producer, **P.E.S.** applies knowledge, creativity, ability and excellent workshop machinery to manufacture down stream extrusion line. Our manufactured equipments like as Extruder heads, Die heads, Calibrators, Haul-offs, Markers, Vacuum and Cooling tanks are compatible with international standards and compete well-known products worldwide. Our high quality solid wall polyethylene pipes and fittings have been used effectively in many agricultural, industrial and municipal projects.

Some popular application of our HD PE pipes includes:

- Pressure and Gravity water supply
- Pressure and Gravity municipal and industrial sewage System
- Gas Distribution System
- Marine Intakes and Outfalls
- Marine and river Crossings
- Potable Water Piping
- Power Plant Applications
- Agricultural Drainage System
- Irrigation System
- Directional Drilling and Relining Applications
- Mining Industry
- Fire Protections Lines
- Perforated Pipes

Mining

Polyethylene pipes are used in mining industry for Acid Mine Drainage, Chemical Mineral Extraction, Slurry and Tailings Lines, Decant Systems, Dewatering, Impoundment Piping, Process Pipe and Fittings and Waste Transportation. They are light weight, flexible, easy to transport and install. They are corrosion and erosion resistant, maintain a smooth bore and when properly installed require very little maintenance. HD PE pipes and fittings in mining industry have major cost advantages over competitive products. They can be installed above and below ground.





Irrigation

The solid-wall HD PE pipes are widely used for conveying water through Drainage and Irrigation systems. HD PE pipes are selected from other conventional piping products as the least expensive option when comparing pipe material and installation costs.



Sewer Systems

In all newly developed area and/or in all existing area where new sanitary and industrial sewers are required, the solid-wall polyethylene pipes and fittings are reliable choices. The smooth interior and low roughness coefficient, with adequate chemical and corrosion resistance, flexibility and practical bending radius make HD PE pipe a cost effective solution for wastewater and sewer systems during their long working lives.

Intake and Outfall Pipeline

Resistance to erosion, corrosion and zebra mussel fouling, good strength against tide and current forces, light weight, buoyant in sea water, easy transport and install, flexibility and sufficient bending radius with very little maintenance make the HD PE the best convenient choice for these applications. Polyethylene Intake pipelines are used to withdraw a large body of naturally cold water at a constant temperature (4-10 C°) or less from deep areas within lakes, oceans and rivers. The withdrawn cold water is pumped through the primary side of a heat exchanger. On the secondary side, clean chilled water is produced with one tenth the average energy required by conventional chiller based systems. Polyethylene outfall pipe lines are used to convey returned cooling water and occasionally treated sewage water into the recipient discharge area that can be river, lake or sea at a certain depth and distance from the shore. Outlet deep will vary in the range of 10-60 m dependent of the recipient's self-purification capacity.

Gas Lines

Polyethylene PE100 and PE80 pipes are used extensively in natural gas distribution systems worldwide. PE pipe can be joined by heat fusion or mechanical fittings. The number of joints in the PE gas piping system is minimized due to pipe flexibility, lightweight and the availability of long coils. PE has good abrasion, weathering and bending resistance. It is flexible enough to cause the pipe deflects rather than cracks under stress. So the pipe is not affected by soil shift and temperature fluctuations.

Perforated Pipe

HD PE perforated pipes are used for Aeration Systems, Landfill Gas Collection, Leach ate Collection, Drainage and Waste Disposal Absorption Field and Odor Control.

Fire protection Lines

HD PE pipes are used extensively in high pressure fire mains and loops. Improved raw material with superior lifetime pressurized performances, leak-free joints, smooth interior and corrosion resistant, are the main reasons to choose HD PE pipes and fittings for fire protection lines.

Products and Services

P.E.S. produces the whole range of solid-wall HD PE pipes and fittings from 12-1600 mm based on ISO standards. Our products range also includes manholes, inspection chambers and other accessories needed for a complete PE piping system. We mainly use PE 100 bi-modal resins which has enhanced performance characteristics.

Product	Raw Material	Product Standards	Size Range	Pressure Class Range
Single-wall pipe	PE 100, PE 80 Black resin	EN 12201 DIN 8074	12-1600 mm	3.2-40 bar (Vary with pipe size)
Gas pipe	PE 100 Black resin with yellow strips	EN 1555	20-250 mm	10-16 bar
But fused joints <ul style="list-style-type: none"> • Elbows • Tees • Sidewall tees • Reducers • Flange Adapters • End Caps • Laterals 	PE 100, PE 80	EN 12201 DIN 16963	160-1600 mm	3.2-40 bar (Vary with size)
Slip-on metal flanges	Cast iron Steel	DIN 2501	DN 160-1600 mm	3.2-40 bar
Injected molding fittings	PE 100 PP copolymer	ASTM D2513	20-160 mm	Up to 10 bar
Manholes	PE 100 Black resin	ASTM F1759	Up to 1600 mm	

◉ Elbow



◉ Equal Tee



◉ End Cap



◉ Reducing Tee



Polyethylene molded and fabricated fittings are designed to be joined to polyethylene pipe by a simple heat fusion process. The procedures and principles for fusion are essentially the same as that for joining polyethylene pipe, producing a joint that is as strong as the pipe itself. Fittings are produced from the same HD PE resins used to extrude the pipe. Polyethylene fittings 20 to 160 mm shall be injection molded and from 160 to 1600 mm and larger diameter shall be fabricated from HD PE resin. All fittings shall have the same pressure rating as the pipes have.



◉ Manhole



◉ Metal Backing Ring

◉ Reducer



◉ Flange

P.E.S. is one of the middle-east leaders in production and development of polyethylene pipe system. To be able to maintain with the fast growing renovations in the world, **P.E.S.** keeps developing new and needed products with the support of its technical and research division. We also have capabilities to develop technology and manufacture downstream extrusion line equipments like as Die heads, Calibrators, Vacuum tanks, Cooling tanks and Haul-offs. Additionally, our qualified staff assists you to solve problems relating to the design, application, planning and installation of various HD PE pipe system.



The HD PE solid wall pipe is outside diameter controlled pipe which its pressure rating will differ by wall thickness.

The HD PE pipes usually classify by SDR number which is the ratio of outside diameter to minimum wall thickness.

The following table shows dimension and maximum continues operating pressure for HD PE pipes based on PE 100 material and water service temperature at 20°.

Do	SDR51		SDR41		SDR33		SDR26		SDR22		SDR21		SDR17.6	
	PN3.2		PN4.0		PN5.0		PN6.4		PN7.6		PN8.0		PN9.6	
	e _{min}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e
20														
25														
32														
40							1.8	0.4	1.9	0.4	1.9	0.4	1.8	0.4
50					1.8	0.4	2.0	0.5	2.3	0.5	2.4	0.5	2.3	0.5
63	1.5	0.4	1.8	0.4	2.0	0.5	2.5	0.5	2.9	0.5	3.0	0.6	2.9	0.5
75	1.8	0.4	1.9	0.4	2.3	0.5	2.9	0.5	3.5	0.6	3.6	0.6	3.6	0.6
90	2.2	0.5	2.2	0.5	2.8	0.5	3.5	0.6	4.1	0.7	4.3	0.7	4.3	0.7
110	2.2	0.5	2.7	0.5	3.4	0.6	4.2	0.7	5.0	0.8	5.3	0.8	5.1	0.8
125	2.5	0.5	3.1	0.6	3.9	0.7	4.8	0.7	5.7	0.8	6.0	0.9	6.3	0.9
140	2.8	0.5	3.5	0.6	4.3	0.7	5.4	0.8	6.4	0.9	6.7	0.9	7.1	1.0
160	3.2	0.6	4.0	0.7	4.9	0.7	6.2	0.9	7.3	1.0	7.7	1.0	8.0	1.1
180	3.6	0.6	4.4	0.7	5.5	0.8	6.9	0.9	8.2	1.1	8.6	1.1	9.1	1.2
200	3.9	0.6	4.9	0.7	6.2	0.9	7.7	1.0	9.1	1.2	9.6	1.2	10.2	1.3
225	4.4	0.7	5.5	0.8	6.9	0.9	8.6	1.1	10.3	1.3	10.8	1.3	11.4	1.4
250	4.9	0.7	6.2	0.9	7.7	1.0	9.6	1.2	11.4	1.4	11.9	1.4	12.8	1.5
280	5.5	0.8	6.9	0.9	8.6	1.1	10.7	1.3	12.8	1.5	13.4	1.6	14.2	1.7
315	6.2	0.9	7.7	1.0	9.7	1.2	12.1	1.4	14.4	1.7	15.0	1.8	15.9	1.8
355	7.0	1.0	8.7	1.1	10.9	1.3	13.6	1.6	16.2	1.9	16.9	1.9	17.9	2.0
400	7.9	1.0	9.8	1.2	12.3	1.4	15.3	1.8	18.2	2.1	19.1	2.2	20.1	2.3
450	8.8	1.1	11.0	1.4	13.8	1.6	17.2	2.0	20.5	2.3	21.5	2.4	22.7	2.5
500	9.8	1.2	12.3	1.4	15.3	1.8	19.1	2.2	22.8	2.5	23.9	2.6	25.5	2.8
560	11.0	1.4	13.7	1.6	17.2	2.0	21.4	2.4	25.5	2.8	26.7	2.9	28.4	3.1
630	12.3	1.5	15.4	1.8	19.3	2.2	24.1	2.7	28.7	3.1	30.0	3.3	31.7	3.4
710	13.9	1.6	17.4	2.0	21.8	2.4	27.2	3.0	32.3	3.5	33.9	3.6	35.7	3.8
800	15.7	1.8	19.6	2.2	24.5	2.7	30.6	3.3	36.4	3.9	38.1	4.1	40.2	4.3
900	17.6	2.0	22.0	2.5	27.6	3.0	34.4	3.7	41.0	4.4	42.9	4.5	45.3	4.8
1000	19.8	2.2	24.5	2.7	30.6	3.3	38.2	4.1	45.5	4.8	47.7	5.0	51.0	5.4
1200	23.5	2.6	29.4	3.5	36.7	3.9	46.9	4.9	54.6	5.7	57.2	6.0	56.7	5.9
1600	31.4	3.4	39.2	4.1	49.0	5.0	61.2	6.3	72.7	7.5	76.2	7.8	68.0	7.1
													90.6	9.3





- All dimensions are in millimeters
- Pipe dimensions are in accordance with EN12201 and DIN8074
- Pipes are designed according to equation ISO 161 and considering the safety coefficient C=1.25 and MRS=10.0 Mpa
- The non-listed diameters and PR classes may be available upon special request

Do	SDR17		SDR13.6		SDR11		SDR9		SDR7.4		SDR6		SDR5	
	PN10.0		PN12.7		PN16.0		PN20.0		PN25.0		PN32.0		PN40.0	
	e _{max}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e	e _{min}	Δ _e
20			1.8	0.4	1.9	0.4	2.3	0.5	2.8	0.5	3.4	0.6	4.1	0.6
25	1.8	0.4	1.9	0.4	2.3	0.5	2.8	0.5	3.5	0.6	4.2	0.7	5.1	0.7
32	1.9	0.4	2.4	0.5	2.9	0.5	3.6	0.6	4.4	0.7	5.4	0.8	6.5	0.8
40	2.4	0.5	3.0	0.6	3.7	0.6	4.5	0.7	5.5	0.8	6.7	0.9	8.1	0.9
50	3.0	0.6	3.7	0.6	4.6	0.7	5.6	0.8	6.9	0.9	8.3	1.1	10.1	1.1
63	3.8	0.6	4.7	0.7	5.8	0.8	7.1	1.0	8.6	1.1	10.5	1.3	12.7	1.5
75	4.5	0.7	5.6	0.8	6.8	0.9	8.4	1.1	10.3	1.3	12.5	1.5	15.1	1.8
90	5.4	0.8	6.7	0.9	8.2	1.1	10.1	1.3	12.3	1.5	15.0	1.8	18.1	2.0
110	6.6	0.9	8.1	1.1	10.0	1.3	12.3	1.5	15.1	1.8	18.3	2.1	22.1	2.4
125	7.4	1.0	9.2	1.2	11.4	1.4	14.0	1.7	17.1	2.0	20.8	2.3	25.1	2.7
140	8.3	1.1	10.3	1.3	12.7	1.5	15.7	1.8	19.2	2.2	23.3	2.6	28.1	3.0
160	9.5	1.2	11.8	1.4	14.6	1.7	17.9	2.0	21.9	2.4	26.6	2.9	32.1	3.3
180	10.7	1.3	13.3	1.6	16.4	1.9	20.1	2.3	24.5	2.7	29.9	3.2	36.1	3.7
200	11.9	1.4	14.7	1.7	18.2	2.1	22.4	2.5	27.4	3.0	33.2	3.6	40.1	4.1
225	13.4	1.6	16.6	1.9	20.5	2.3	25.2	2.8	30.8	3.3	37.4	4.0	45.1	4.6
250	14.8	1.7	18.4	2.1	22.7	2.5	27.9	3.0	34.2	3.7	41.6	4.4	50.1	5.1
280	16.6	1.9	20.6	2.3	25.4	2.8	31.3	3.4	38.3	4.1	46.5	4.9	56.2	5.7
315	18.7	2.1	23.2	2.6	28.6	3.1	35.2	3.8	43.1	4.6	52.3	5.5	63.2	6.4
355	21.1	2.4	26.1	2.9	32.2	3.5	39.7	4.2	48.5	5.1	59.0	6.2		
400	23.7	2.6	29.4	3.2	36.3	3.9	44.7	4.7	54.7	5.7	66.5	6.9		
450	26.7	2.9	33.1	3.6	40.9	4.3	50.3	5.3	61.5	6.4				
500	29.7	3.2	36.8	3.9	45.4	4.8	55.8	5.8	68.3	7.1				
560	33.2	3.6	41.2	4.4	50.8	5.3	62.5	6.5						
630	37.4	4.0	46.3	4.9	57.2	6.0								
710	42.1	4.5	52.2	5.5	64.5	6.7								
800	47.4	5.0	58.8	6.1	72.7	7.5								
900	53.3	5.6	66.2	7.1	81.8	8.4								
1000	59.3	6.2	72.7	7.4	90.9	9.3								
1200	70.6	7.3	88.2	9.0										
1600	94.1	9.6	117.6	12										



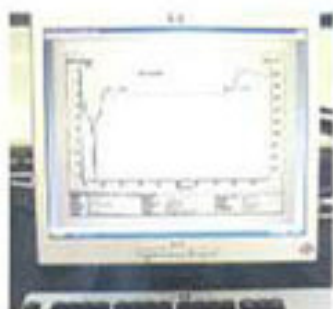


Quality Means a lot in P.E.S

An important goal of production at **P.E.S** is to support the development of great products that can be readily assessed in terms of quality and completeness.

Our QC system is designed to:

- I. Provide routine and consistent checks to ensure data integrity, correctness and completeness.
- II. Identify and address errors and omission.
- III. Document and archive products and raw material specifications and record all QC activities.



It is a good practice to implement quality assurance and quality control (QA/QC) procedure in the development of pipe and fitting production to accomplish this goal. The QA/QC practice guidance outlined at **P.E.S** reflects practically, reflects practically, acceptability, cost-effectiveness, existing experience and the potential for application on a whole products basis.



P.E.S was the first polyethylene pipe and fitting manufacturer in Iran who acquired its quality management system based on ISO 9001-2000 and promoted its laboratory activity by ISO 17025 basis. Our laboratory is equipped with the last innovative and certified high quality apparatus for testing Our laboratory is equipped with the last PE products from raw material to finished pipe and fitting in accordance with international standards and national standards of Iran.



P.E.S laboratory is honored to be the accredited unit collaborating with ISIRI (Institute of Standard and Industrial Research of Iran) for testing polyethylene pipe, fittings and PE raw materials. We use the best HD PE resin for manufacturing pipe and fittings. Our raw materials are classified as PE 100 bimodal resin with high strength and long service life. By using the best raw material and the finest extrusion machinery, doing the whole mandatory and optional quality control and inspection tests on raw material and finished products, plus years of experience on HD PE industry, we proudly can certify that our products have the highest quality of the same goods worldwide.

Joining Techniques

Polyethylene pipe and fittings are joined using these methods:

- **Heat Fusion**
 - ▶ Butt fusion to connect components end to end
 - ▶ Saddle fusion to attach branch outlet to a main pipe
 - ▶ Socket fusion to join smaller pipes to socket fittings
- **Flanged joined**
- **Electrofusion, mainly for gas lines**
- **Mechanical connection that are designed for PE pipe**



Heat Fusion

Heat fusion joints are reliable, leak-free, fully controlled and as strong as the pipe itself when properly made. Butt fusion is fast, cost-effective, very practical and the most popular ones that allows to make long lengths of pipes and set them ready for fast assembling at installation site. Butt welding is the only option for connecting large pipes with diameter bigger than 500 mm. In butt welding the joint faces are heated to welding temperature with hot tool. After removing the hot tool the plasticized pipe ends are pressed together.

Flanged Joined

PE pipe and fittings may also be joined together or connected to other pipe materials or components with flange adaptors. In this case the polyethylene flange adapter is butt fused to PE pipe; then the adapter is connected to the mating component by slip-on metal flange. The flange adapter must have the same pressure rating as the pipe.



Electrofusion

Electrofusion is a heat fusion process where a coupling or saddle fitting contains an integral resistance coils. After surface preparation, the fitting is installed on the pipe and the resistance coils are energized. During heating, the fitting and pipe materials melt, expand and fuse together.



Mechanical Joining

Mechanical compression fittings have a body that is a pressure containing component and fits over the outside diameter of pipe. Some connections may require a stiffener in the pipe bore. The reliability of butt fusion joined is depending on welding machinery, welding technician skills and welding guidelines.





P.E.S is a head for improving polyethylene welding techniques in Iran. In 2006, **P.E.S** made a technical corporation in the field of plastic pipe welding with SKZ institute in Germany. As a result **P.E.S** carries out training courses at its training center on plastic pipe welding according to guideline DVS 2207 part 1, German Standards and industrial producers acquired from SKZ. Innovations, improvements and updated developments are also developments are also provided by SKZ to **P.E.S** training centre normally issues an accreditation certificate to successful candidates completing the training course and maintain a register of accredited welders.

Our valued customers can obtain every assist in the efficient PE pipe system installation from our certified and experienced welding technicians.



Handling and Storage of Polyethylene Pipes and Fittings

Polyethylene Pipes and fittings are light in weight and easy to handle. Although they have flexibility and resistance to impact, they can scratch by sharp objects and deform under load, mostly at high temperature. Scores to a depth of 10% or more of the wall thickness are sufficient to cause rejection for any pressure application, so they should not be dropped, crushed or impacted.

Lifting and Handling

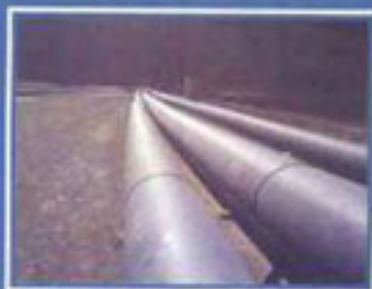
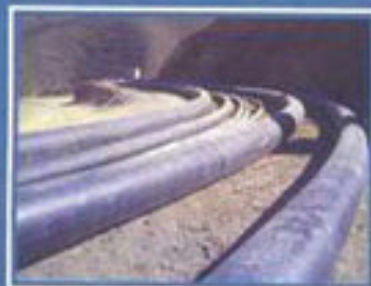
PE pipes and fittings should not be subjected to rough handling during loading and unloading operations. For lifting the pipes by crane, apply webbing strings. Chains, wire ropes and hooks should not be used on PE pipe and fittings under any conditions. To avoid flopping of long pipes and consequent scuffing of pipe ends, two lifting points or spreader bars should be used for lifting the pipes exceeding 6 meters in length.

Storage and Transport

Store HD PE pipes and fittings where there are no drilling slugs and mud, lubricating or hydraulic oil, solvents or other aggressive materials and flammable chemicals. Pipes stack for storage or transport should be continuously and evenly supported to minimize deformation. Horizontal supports, spaced not further apart than 2 meters center-to-center, should be placed beneath the pipes. Pipes of other color than black should be protected from high temperatures and direct sunlight during storage and transport, particularly if they are to be stored for more than 6 months. Pipes with end flanging or preassembled fittings should be stacked so that the end are free from loading and be protected from damage. In storage and employing of pipe and fitting the principle of "first in, first out" should be observed.



Plastic pipe will exhibit the fastest growth due to performance and cost advantages over other materials, as well as improved resins and inroads into larger diameters. High density polyethylene will rise at the fastest pace due to its flexibility, strength, joint integrity, chemical resistant and trench-laying capabilities. Growth areas include gas and potable water distribution and transmission pipes, fire protection underground systems and submarine intakes, outfalls and crossing lines. Our goals in this fast global renovation are to supply all components of HD PE pipe system with highest quality and provide excellent technical back-up and advice for our valued customers. We offer technical information and organized workshops for HD PE raw materials, pipe designing, installation, inspection, test, production process and control of HD PE systems. Our basic policy is to bring together the best raw material, the best operational cycle, the best technical support and the best technical group to keeping the distance with the national and international competitors.



P.E.S
Productive & Industrial Co. HD PE Pipes & Fittings Manufacturer



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