JAMAL
POLYMERS PVT. LTD

HDPE PIPES FITTINGS & POLES

For Water, Gas & Industrial Applications

www.**jamalpolymers**.com

CONTENTS

THE GROUP

JAMAL PIPE INDUSTRIES (Private) Limited
JAMAL POLYMERS (Private) Limited
JAMAL SEAMLESS (Private) Limited

PRODUCTS OFFERED UNDER ONE ROOF

High Density Polyethylene (Hdpe) Pipes & Fittings *From* 20mm To 1200mm	Unplasticized Polyvinyl Chloride (U-Pvc) Pipes & Fittings *From* 1" To 16" Diameters	M.S Steel Line Pipes (Machine Made) *From* ½" To 18" Diameters
M.S Steel Line Pipes Hand Made *From* 18" Onwards	High Tension Poles Steel Lighting Poles HDPE Lighting Poles	G.I Steel Pipes *From* ½" To 18" Diameters
Lighting Poles of All Types Like Tubular, Round Conical & Octagonal Poles	Guard Rails PPRC Pipes & Fittings *From* 20mm To 160mm	Ms Seamless Pipes & Ms Seamless Fittings

With the divine's gracious blessing, **Jamal Polymers Private Limited** have achieved yet another milestone in manufacturing of Pipes by enhancing its range of **HDPE Pipes upto 1600 mm PN 16**

INTORDUCTION

It is our great pleasure; we would like to respectfully take the opportunity to introduce ourselves for the purpose of enlistment. The genesis of Jamal Group dates back to the 1970s with a humble shop on Brandreth Road. By the grace of almighty Allah, today, the name 'Jamal' has become synonymous with the word 'quality'. At present, the group constitutes of three principal businesses: (1) M/s. Jamal Pipe Industries (Pvt.) Ltd, (2) M/s. Jamal Polymers (Pvt.) Ltd, (3) M/s. Jamal Seamless (Pvt.) Ltd.

The former has been producing Steel Pipe-lines for over 50 years. Adding to the range of products over the years, our steel division now also produces Steel Tubular Poles, Scaffoldings and Guardrails amongst other things. The latter and the subject of this letter, our plastics division, started with the production of PVC Pipes in the early 2000s. We can proudly say that today we are one of the leading manufacturers of PVC pipes, Polyethylene (PE) pipes and PPRC pipes & fittings in Pakistan. We are not only known for our superior quality PVC, HDPE, PPRC Pipes Fitting & Electric Pole but also for setting industry standards. As a result, we have become the preferred choice of professionals in various fields that utilize PVC, HDPE, PPRC Pipes Fitting & Electric Pole. We would like to bring to your kind attention that our PVC, HDPE, PPRC Pipes Fitting & Electric Pole are duly manufactured as per international standards (ASTM, BS, DIN, ISO OHSAS and PS) with top of the line imported raw materials (PVC.PPRC & HDPE resins). To meet the specifications of our valued clients we regularly import raw materials from but not limited to the Middle East, Europe and the USA.

We like to think of our manufacturing unit as an “organism” that fuses hi-tech machines and human ingenuity, thus rendering the very high standards needed to produce a wide range of modern and hygienically tested products including HDPE Pipes (20mm to 1200mm), PVC pipes (1” to 16”) And PPRC Pipes (20mm to 160mm). Furthermore, we have a proper quality control system in place at our production site along with a state of the art testing laboratory to ensure the ISO standards. All this activity is carried out by our well-trained and experienced technical staff. Our real strength lies in our customer's delight that can only be achieved by providing quality products that meet their requirements. In our quest to lead by example, our efforts have led Jamal to ISO-9001, ISO-14001 and ISO-18001 certification, as well as the Pakistan standards & quality control authority (PSQCA) certification.

It is pertinent to mention here that our products are versatile and can be used for an array of reasons. Currently, our pipes are being used for water supply networks, gas, air and chemical distribution systems, hazardous waste management systems, sewerage, mining, fiber optical cables, various agriculture activities including irrigation, firefighting and in many other applications in various industries, departments and organizations of repute in Pakistan.

It is further submitted that our brand 'Jamal' PVC, HDPE, PPRC Pipes Fitting & Electric Pole is listed and pre-qualified in various NGOs. Government, and semi-government departments such as HUD & PHEDs, DHA, NESPAK, PAEC, MES., C&W, UNICEF, PWD etc. Keeping in view Jamal Polymers' profile, you are requested to consider us as a potential vendor with your prestigious organization for pre-qualification.

Hope to have your positive response in this regard.

OUR VALUED CUSTOMERS


IFAD
CGGC
Parks & Horticulture Authority
PHA
FIEDMC
DHA
LAHORE
NISHAT
Nishat Mills Limited
BAHRIA TOWN
AL JALIL GARDEN
HOUSING SCHEME
中国通信服務
CHINA COMSERVICE
CREC
中国铁建
EIGHTEEN
LAKE CITY
LAHORE
CSCEC
CEEC
THE STRENGTH
KOHAT
CEMENT
DESCON
WORLD BANK
MAPLE LEAF CEMENT
DG
CEMENT
RYK
Sapphire
DAUDHOY
BESTWAY
Fatima
Fertilizer Company Limited
LIBERTY
SADIQ POULTRY
MUGHAL
STEEL
A TRADITION OF QUALITY
NSS
Nestlé
ZAHID
MPCL
ALI AKBAR
GROUP
PAKISTAN
PIONEER
CEMENT LTD.
NESPAK
NATIONAL
ENGINEERING
SERVICES PAKISTAN
HRL
HABIB RAFIQ (PVT.) LTD.
BUKHARI
ASSOCIATES
IZHAR
GROUP OF COMPANIES
MAAKSONS
ITTEFAQ
GROUP
Packages Mall

CERTIFICATIONS

Serial No. 1518

Registration No.
DP&W/E-2/WS/011/2011

ENGINEER-IN-CHIEF's BRANCH
CERTIFICATE OF ENLISTMENT/REGISTRATION

M/s Jamal Pipe PVC Industries, Lahore

HAVE BEEN ENLISTED / REGISTERED IN CATEGORY "WS" FOR SUPPLY OF FOLLOWING PRODUCTS

1. HDPE Pipe ; Dia - 20mm, 25,32,40,50,63,75,90 , 110, 125, 140, 160,180,200 , 225,250, 280,315 ,355,400,500, 560,630 ,710,800,900,1000 & 1200mm
2. xxxxx
3. xxxxx
4. xxxxx
5. xxxxx
6. xxxxx

This Certificate is Valid/Renewed up to : 31 Dec 2023

Brig
For Engineer-in-Chief
(Raza Noor Ali Khan)

Date 17 June 2022

(NON TRANSFERABLE)

Number. 005662

Pakistan Standards

Pakistan Standards and Quality Control Authority

Licence for the use of the Pakistan Standard Mark

Agreement No. 361/L-1973

Licence No. CM/L-361/2013(R)

M/s. Jamal PVC Pipe (Pvt.) Ltd,

Address: 12-KM, G.T Road, Shahdara, Lahore

Licence shall be valid from 1-Jan 18 to 31-Dec-19 and renewable as prescribed under the Rules.

Signature

Engr. Waseem Ahmed Mirza
DIRECTOR

Place Lahore

Date: 30-Mar-18

THE FIRST SCHEDULE

PS Mark	Article / Process	Pakistan Standard(s)
1	2	3
	PE Pipe Sizes & Brand as per Annex A	PSS: 3580/1997(R)

THE SECOND SCHEDULE

Article / Process	Unit	Marking Fee Per Unit	Mode of Payment
1	2	3	4
PE Pipe Sizes & Brand as per Annex A	Ex-Factory Price	0.1%	Through Bank Draft Quarterly

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 证书 | 인증서

CERTIFICATE

TÜV AUSTRIA

Management System as per
EN ISO 14001 : 2015

In accordance with TÜV AUSTRIA procedures, it is hereby certified that

JAMAL PVC PIPE (PVT) LIMITED
12 KM G.T. Road, Shahdara
LAHORE, PAKISTAN

Applies an Environmental Management System in line with the above Standard for the following Scope

MANUFACTURING OF U-PVC & HDPE PIPE.

Certificate Registration No.: **20051210005030**

Valid until: 2024-04-29

Rashid Mehr
CEO
Certification Body
at TÜV AUSTRIA

Lahore, 2021-04-30

This certification was conducted in accordance with TÜV AUSTRIA auditing and certification procedures and is subject to regular surveillance audits.

TÜV AUSTRIA HELLAS
429, Mesogeion Ave.
GR-153 43 Athens, Greece
www.tuvaustriahellas.gr

IAF ΕΣΥΔ
MS Certification
No. of Certificate 236

Headquarters in Athens bear the responsibility of the Certification decision

002635 20 8

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 证书 | 인증서

CERTIFICATE

TÜV AUSTRIA

Management System as per
EN ISO 9001 : 2015

In accordance with TÜV AUSTRIA procedures, it is hereby certified that

JAMAL PVC PIPE (PVT) LIMITED
12 KM G.T. Road, Shahdara
LAHORE, PAKISTAN

Applies a Quality Management System in line with the above Standard for the following Scope

MANUFACTURING OF U-PVC & HDPE PIPE.

Certificate Registration No.: **20001210005029**

Valid until: 2024-04-29

Rashid Mehr
CEO
Certification Body
at TÜV AUSTRIA

Lahore, 2021-04-30

This certification was conducted in accordance with TÜV AUSTRIA auditing and certification procedures and is subject to regular surveillance audits.

TÜV AUSTRIA HELLAS
429, Mesogeion Ave.
GR-153 43 Athens, Greece
www.tuvaustriahellas.gr

IAF ESYD MS Certification No. of Certificate 236

CePH428_A1e

Headquarters in Athens bear the responsibility of the Certification Decision

002626-20-8

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 证书 | 인증서

CERTIFICATE

TÜV AUSTRIA

Management System as per
ISO 45001 : 2018

In accordance with TÜV AUSTRIA procedures, it is hereby certified that

JAMAL PVC PIPE (PVT) LIMITED
12 KM G.T. Road, Shahdara
LAHORE, PAKISTAN

Applies an Occupational health and safety management system in line with the above Standard for the following Scope

MANUFACTURING OF U-PVC & HDPE PIPE.

EA Code / Risk Category: 14 / B

Certificate Registration No.: **20152210005031** Valid until: 2024-04-29

Rashid Mehr
CEO
Certification Body
at TÜV AUSTRIA

Lahore, 2021-04-30

This certification was conducted in accordance with TÜV AUSTRIA auditing and certification procedures and is subject to regular surveillance audits.

TÜV AUSTRIA HELLAS
429, Mesogeion Ave.
GR-153 43 Athens, Greece
www.tuvaustriahellas.gr

ESYD
MS Certification
No. of Certificate 236

CePRS21_A5

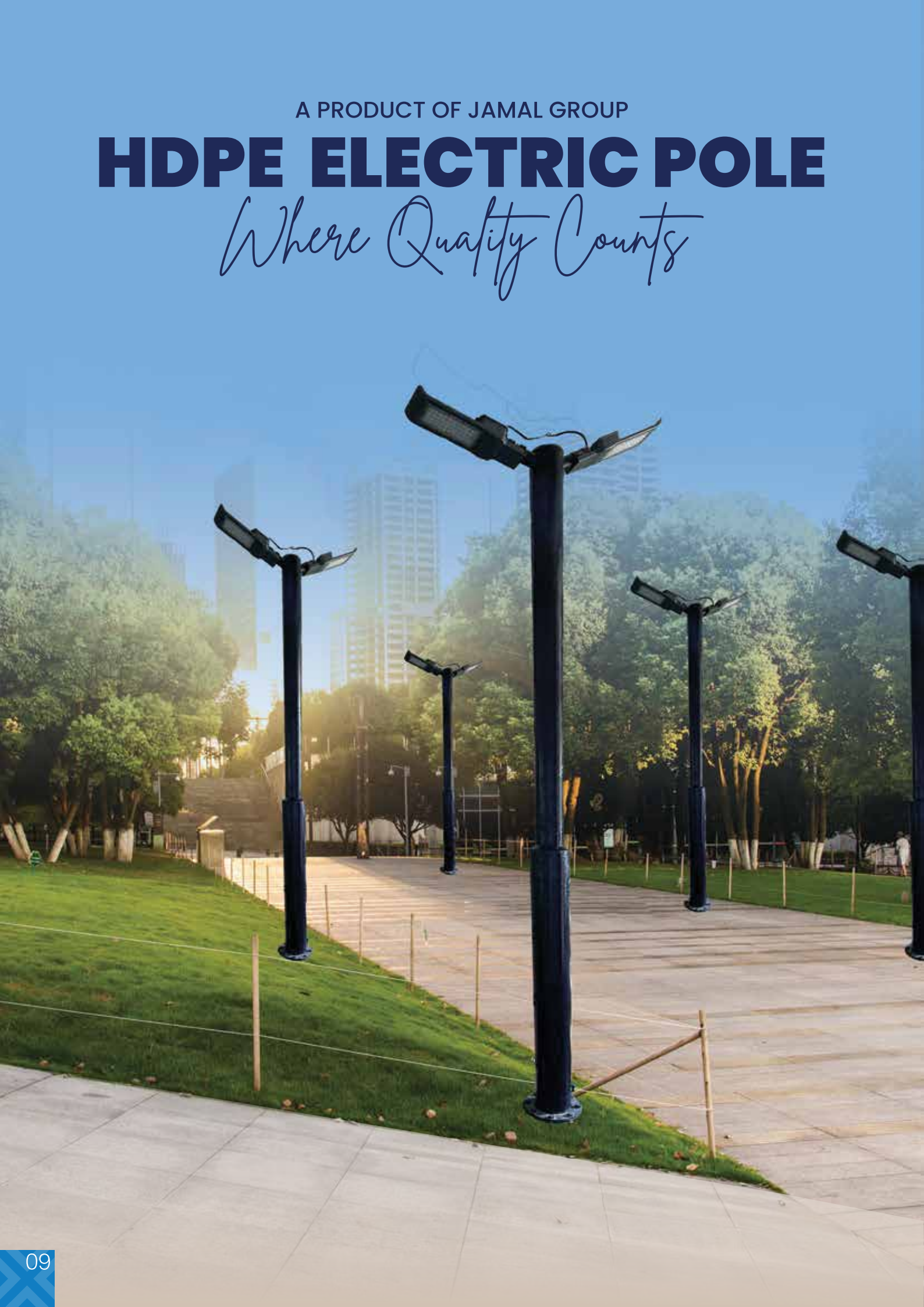
Headquarters in Athens bear the responsibility of the Certification decision

002624-20-8

A PRODUCT OF JAMAL GROUP

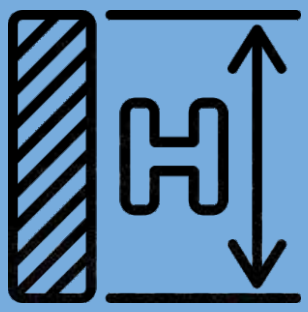
HDPE ELECTRIC POLE

Where Quality Counts



JAMAL POLYMERS (PVT.) LIMITED is a leading manufacturer of high quality HDPE pipes since 2006 and contributing in building and modernizing the country's infrastructure. JAMAL is now proudly introducing HDPE Lighting Poles to cater multiple needs of different sectors of the economy. JAMAL HDPE Poles have multiple features to fulfill customers' needs like:

AVAILABLE IN
CUSTOM COLORS



AVAILABLE IN
2.5 METER HEIGHT

AVAILABLE IN
SINGLE & DOUBLE ARM

JAMAL HDPE POLES

FEATURES AND BENEFITS

COST EFFECTIVE — As compared to conventional other Lighting poles, JAMAL HDPE lighting poles are very cost effective. LIFE SPAN — HDPE material is considered to have a life span of more than 50 Years, so JAMAL HDPE Pole serves for a very long period and even generations.

EASE OF INSTALLATION — JAMAL HDPE poles save time, manpower, equipment, and money during installation. JAMAL HDPE Poles can be carried without equipment, making them easy to install most anywhere. JAMAL HDPE poise are particularly valuable for existing sites where the grounds must not be disturbed, and for out-of-the-way and hard-to-reach sites, such as parks and trails.

MULTIPURPOSE USAGE — JAMAL HDPE poles can be used to Parks, Playgrounds, Gardens, Parking Areas and Pathways etc.

DESIGNED TO LAST — JAMAL HDPE Pole will never rust and perform exceptionally well in humidity and salt-air environments along coastlines, in high environments found in bust metropolitan areas, and in dry, harsh environments. Truly, JAMAL HDPE poles are ideal for most any environment.

SAFETY — JAMAL HDPE Poles are Non-Conductive and Resistant to Impact and that is what makes it a favorable choice for large industrial projects and ideal for in heavily populated and opened environment venues such as ballparks and playgrounds, as well as residential, business and shopping areas.

SUPERB SELECTION — Choose our Marathon round tapered or square poles, Legacy ornamental light poles or lamp posts, or CMT's custom-engineered composite structures for your next outdoor lighting project.

KEY FEATURES

SAFE
It is safe for drinking water with no toxic or chemical contamination

FLEXIBILITY
it can be bent as much as 25-40 times of the pipe diameters. Thus reducing unnecessary pipe joint.

LIGHT WEIGHT
with only 0.95 grams/cm2. Weight only 1/5 of steel pipes of the same size.

RUST PROOF
Its rust proof and high resistance to damaged chemicals, making the product last up to 50 years.

SUPER SMOOTH
The internal surface is super smooth, reducing the chance of pipe clog gage.

JAMAL HDPE SIZES
Diameter range 20mm to 1200mm

APPLICATIONS

Polyethylene has become the most popular material of pipe distribution systems as it offer significant benefits compared to alternative material. HDPE pipes when viewed without magnification, the internal and external surfaces of pipes shall be smooth, clean and free from scoring, cavities and other surface defects. The pipe ends shall be cut cleanly and square to the axis of the pipe.

FIELDS OF APPLICATIONS

- Water Supply and Distribution
- Chilled Water Pipine
- Cooling Water
- Cable Conduits
- Drain Lines / Industrial Effluents
- Drip Irrigation / Sprinkle Irrigation
- Fire Water Mains
- Sewage Treatment
- Storage Tank Piping
- Acid / Caustic Lines
- Coal Slurry
- Crude Oil
- De-Watering Pipes
- Dredging
- Drilling
- Mud
- Fly Ash
- Hazardous Waste
- Out Fall Pipelines
- Process Piping
- Sea Water Effluents
- Sludge Piping Slurries
- Underground Services
- Utility Piping
- Compressed Air (Buried)

STANDARD USED FOR JAMAL HDPE PIPES

ISO: 4427 & PREN: 12201

Specification for Plastic Piping System
Polyethylene (PE) Pipes and Fittings for Water Supply

DIN: 8074 & 8075

Specification for Plastic Piping System
Polyethylene (PE) Dimensions

Wall Thickness Chart ISO:4427

HDPE PIEPS PE-100

Wall Thickness Chart

OD	SDR 6	SDR 7,4	SDR 9	SDR 11	SDR 13,6	SDR 17	SDR 21	SDR 26
	----	PN 25	PN 20	PN 16	PN 12,5	PN 10	PN 8	PN 6
	W.T	W.T	W.T	W.T	W.T	W.T	W.T	W.T
	mm	mm	mm	mm	mm	mm	mm	mm
16	3,0	2,3	2,0	----	----	----	----	----
20	3,4	3,0	2,3	2,0	----	----	----	----
25	4,2	3,5	3,0	2,3	2,0	----	----	----
32	5,4	4,4	3,6	3,0	2,4	2,0	----	----
40	6,7	5,5	4,5	3,7	3,0	2,4	2,0	----
50	8,3	6,9	5,6	4,6	3,7	3,0	2,4	2,0
63	10,5	8,6	7,1	5,8	4,7	3,8	3,0	2,5
75	12,5	10,3	8,4	6,8	5,6	4,5	3,6	2,9
90	15,0	12,3	10,1	8,2	6,7	5,4	4,3	3,5
110	18,3	15,1	12,3	10,0	8,1	6,6	5,3	4,2
125	20,8	17,1	14,0	11,4	9,2	7,4	6,0	4,8
140	23,3	19,2	15,7	12,7	10,3	8,3	6,7	5,4
160	26,6	21,9	17,9	14,6	11,8	9,5	7,7	6,2
180	29,9	24,6	20,1	16,4	13,3	10,7	8,6	6,9
200	33,2	27,4	22,4	18,2	14,7	11,9	9,6	7,7
225	37,4	30,8	25,2	20,5	16,6	13,4	10,8	8,6
250	41,5	34,2	27,9	22,7	18,4	14,8	11,9	9,6
280	46,5	38,3	31,3	25,4	20,6	16,6	13,4	10,7
315	52,3	43,1	35,2	28,6	23,2	18,7	15,0	12,1
355	59,0	48,5	39,7	32,2	26,1	21,1	16,9	13,6
400	----	54,7	44,7	36,3	29,4	23,7	19,1	15,3
450	----	61,5	50,3	40,9	33,1	26,7	21,5	17,2
500	----	----	55,8	45,4	36,8	29,7	23,9	19,1
560	----	----	62,5	50,8	41,2	33,2	26,7	21,4
630	----	----	70,3	57,2	46,3	41,3	30,0	24,1
710	----	----	79,3	64,5	52,2	42,1	33,9	27,2
800	----	----	89,3	72,6	58,8	47,4	38,1	30,6
900	----	----	----	81,7	66,2	53,3	42,9	34,4
1000	----	----	----	90,2	72,5	59,3	47,7	38,2
1200	----	----	----	109.1	88.3	7.1	57.2	45.9
1400	----	----	----	128.2	103.7	82.9	67.1	53.9
1600	----	----	----	----	117.6	94.1	76.2	61.5

Note: •Size 16mm to 160mm thickness tolerance ±1.5mm •Size 180mm to 500mm thickness tolerance ±2.5mm

Testing Laboratory View

IN HOUSE TESTING FACILITIES

JAMAL PVC maintains a continuous and strict control over quality of the pipes through every stage of its process. The plant is laid out to permit careful supervision of the blending process as well as close produc- tion control. Trained engineers and a well –equipped testing laboratory help in regular quality checks in accordance with the established procedures to ensure conformity of the products to applicable specifi- cations with respect to thickness, dimensional and other checks through the various stages of production. In this way, a product of high purity and, mechanical strength is ensured. The importance of this rigid control cannot be over emphasized, since the user is rarely in a position to carry out more that the most perfunctory test or make simple visual comparison.

QUALITY CONTROLS

During 24 hours of production, samples are drawn as per required sampling plan and the same are tested for the presence of defects like flakes, chips, holes, irregular shapes, cracks, scratches, roughness etc.

Some of the important test conducted on the HDPE Pipes during and after the production with the use of sophisticated machinery is as follows:

- Hydrostatic Test
- Elongation Test
- Longitudinal Reversion Test
- Melt Mass Flow Test
- Tensile Strength Test

Chemical Resistence Chart

S.No	Chemicals	PE
1	Acetaldehyde	C
2	Acetamide	A
3	Acetic Acid 80%	D
4	Acetone	B
5	Acetylene	A
6	Alcohols : Amyl	B
7	Benzyl	D
8	Butyl	A
9	Ethyl	B
10	Isopropyl	A
11	Methyl	A
12	Aluminum Sulphate	A
13	Ammonia	C
14	Aniline	B
15	Aromatic Hydrocarbons	C
16	Arsenic Acid	B
17	Barium Carbonate	B
18	Barium Sulphate	B
19	Benzaldehyde	A
20	Benzene	C
21	Benzonic Acid	B
22	Benzol	C
23	Borax	A
24	Boric Acid	A
25	Butadiene	D
26	Butane	C
27	Butylene	B
28	Calcium Sulphata	B
29	Carbon Dioxide	C
30	Carbon Dioxide	C
31	Carbonic Acid	B
32	Chlorine, anhydrous	B
33	Chloroform	C
34	Chromic Acid 50%	A
35	Citric Acid	A
36	Copper Sulphate	B
37	Diesel Fuel	C
38	Ethylene Glycol	B

S.No	Chemicals	PE
39	Fatty Acids	A
40	Ferric Chloride	A
41	Ferric Sulphate	A
42	Flourine	C
43	Formaldehyde 100%	B
44	Formic Acid	B
45	Gasoline	C
46	Heptane	B
47	Hydrochloric Acid 20%	A
48	Hydrogen Peroxide 100%	C
49	Iodene	A
50	Magnesium Hydroxide	A
51	Mercury	A
52	Oleum 100%	D
53	Petrolatum	B
54	Phenol	B
55	Phosphoric Acid	B
56	Potassium Carbonate	A
57	Silver Nitrate	B
58	Sodium Bicarbonate	A
59	Stearic Acid	B
60	Sulphuric Acid	B
61	Tannic Acid	B
62	Toluene	C
63	Zinc Sulphate	A

LEGENDS	
A	Very Good
B	Good
C	Modrate
D	Not Recomended

Physical Characteristcs

ISO:4427 HDPE Pipes				
Characteristic	**Requirements**	**Test Parameters**		**Test Method**
		Parameter	**Value**	
Elongation at break	≥ 350 %	Test Piece shape	Type 2	ISO 6259-1
for e ≤ 5 mm		Test Speed	100 mm/min	ISO 6259-3
		Number of test pieces [b]	According to ISO 6259	
Elongation at break	≥ 350 %	Test Piece shape	Type 1 [a]	ISO 6259-1
for 5mm < e ≤ 12mm		Test Speed	50 mm/min	ISO 6259-3
		Number of test pieces [b]	According to ISO 6259	
		Test Piece shape	Type 1 [a]	
		Test Speed	25 mm/min	
Elongation at break	≥ 350 %	Number of test pieces [b]	According to ISO 6259	ISO 6259-1
for e > 12mm		OR		ISO 6259-3
		Test Piece shape	Type 3 [a]	
		Test Speed	10 mm/min	
		Number of test pieces [b]	According to ISO 6259	

Physical Properties

PE Compound (PE100)			
S.No	**Property**	**Typical Value**	**Test Method**
1	Density (Base Resin)	948 kg/m3	ISO 1872-2/ ISO 1183
2	Density (Compound)	959 kg/m3	ISO 1872-2/ ISO 1183
3	Melt Flow Rate (190 °C/5,0 kg)	0.25 g/ 10 min	ISO 1133
4	Tensile Modules (1mm / min)	1.100 Mpa	ISO 527-2
5	Tensile Strain at Break	> 600%	ISO 527-2
6	Tensile Stress at Yield (50 mm/min)	25 Mpa	ISO 527-2
7	Carbon black content	2 - 2.5 %	ISO 6964
8	Oxidation Induction Time (210 °C)	> 20 min	EN 728
9	Resistance to rapid crack propagation (S4 test, Pc at 0 °C Test pipe 250 mm, SDR11)	> 10 bar	ISO 13477
10	Resistance to slow crack growth (9,2 bar, 80 °C)	> 5.000 h	ISO 13479

Mechanical Characteristics

ISO:4427				
Characteristic	**Requirements**	**Test Parameters**		**Test Method**
		Parameter	**Value**	
Hydrostatic	No Failure of any	End Caps	Type a)[a]	
strength at	test piece during	Conditioning period	According to ISO 1167-1	
20 °C	test period	Number of Test Pieces [b]	3	
		Type of test	water-in-water	
		Test Temperature	20 °C	
		Test Period	100 h	ISO 1167-1
		Circumferential (hoop)		ISO 1167-2
		stress for		
		PE 40	7,0 Mpa.	
		PE 63	8,0 Mpa.	
		PE 80	10,0 Mpa.	
		PE 100	12,4 Mpa.	
Elongation at break	≥ 350 %	Test Piece shape	Type 2	ISO 6259-1
for e ≤ 5 mm		Test Speed	100 mm/min	ISO 6259-3
		Number of test pieces [b]	According to ISO 6259	
Elongation at break	≥ 350 %	Test Piece shape	Type 1 [a]	ISO 6259-1
for 5mm < e ≤ 12mm		Test Speed	50 mm/min	ISO 6259-3
		Number of test pieces [b]	According to ISO 6259	
		Test Piece shape	Type 1 [a]	
		Test Speed	25 mm/min	
Elongation at break	≥ 350 %	Number of test pieces [b]	According to ISO 6259	ISO 6259-1
for e > 12mm		OR		ISO 6259-3
		Test Piece shape	Type 3 [a]	
		Test Speed	10 mm/min	
		Number of test pieces [b]	According to ISO 6259	

JAMAL HDPE FITTINGS
(Compression Fittings)

Reducing Tee

Elbow 45º

Reducer

Straight Coupler

Straight Coupler

JAMAL HDPE IMPORTED FITTINGS
(Butt Fusion Fittings)

Reducing Tee

Elbow 45º

Saddle Clump

Reducer

Stub End

HDPE / MDPE - GAS PIPES - ISO:4437

This international standard specifies the physical properties of buried polyethylene (PE) pipes intended to be used for the supply of gaseous fuels. In addition, it specifies some general properties of the material from which these pipes are made, including classification scheme. This international standard also lays down dimensional requirement and maximum allowable operating pressure ratings related to overall service (design) coefficients and operating temperatures.

(SNGPL Specification)						
ITEM	SIZE (INCHES)	DIAMETER (MM)		THICKNESS		SDR
		MIN	MAX	MIN	MAX	
MP 26.70 2.41 YELLOW PE-80	3/4"	26.57	26.77	2.41	2.91	11
MP 33.40 3.02 YELLOW PE-80	1"	33.27	33.53	3.02	3.68	11
MP 42.00 4.22 YELLOW PE-80	1-1/4"	42.03	42.29	4.22	4.7	10
MP 60.00 5.50 YELLOW PE-80	2"	60.18	60.48	5.49	6.15	11
MP 114.30 10.39 YELLOW PE-80	4"	114.07	114.53	10 .39	11.63	11
HP 168.28 15.29 ORANGE PE-100	6"	168.00	168.56	15.29	17.12	11
SSGC Specification)						
ITEM	SIZE (MM)	DIAMETER (MM)		THICKNESS		SDR
		MIN	MAX	MIN	MAX	
HP 20.00 2.30 ORANGE PE-100	20	20	20.3	2.3	2.7	11
HP 32.00 3.00 ORANGE PE-100	32	32	32.3	3.00	3.4	11
HP 40.00 3.70 ORANGE PE-100	40	40	40.4	3.7	4.2	11
HP 63.00 5.80 ORANGE PE-100	63	63	63.4	5.8	6.5	11
HP 125.00 11.40 ORANGE PE-100	125	125	125.8	11.4	12.7	11
HP 180 .00 16.40 ORANGE PE100	180	180	181.1	16.4	18.2	11
HP 250.00 22.70 ORANGE PE-100	250	250	251.5	22.7	25.1	11

Characteristics Conventional Density Melt mass – flow rate	Units kg/m	Requirements ≥930 (base polymer) Of value nominated by	Test Parameters 23 °c	Test Method ISO 1183 , ISO 1872/1 ISO 1133
Thermal Stability	min	≥20	190 °c	ISO/TR 10837
Volatile content at extrusion	mg/kg	≤350	200 °c	Annex A
Water content		≤300		ASTM D 4019
Carbon black content	% (m/m)	2.0% <...<2.5%		ISO 6964
Carbon black dispersion	grade	<3		ISO 11420
Pigment dispersion	grade	53		ISO 13949
Resistance to rapid crack propagation (RCP)	h	≥20	80 °c 2 Mpa	Annex B
Resistance to slow crack growth e_n>5mm	h	165	80 °c, 0, 8 MPa [6] 80 °c, 0, 92 MPa [7]	ISO 13479

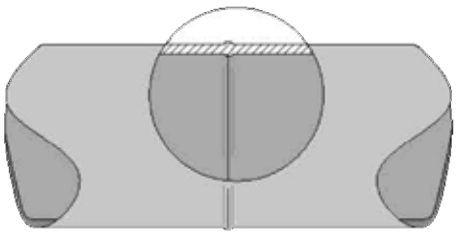
CONDUIT PIPE CHART ASTM - F - 2160

This specification covers material, dimensional workmanship and performance requirements for polyethylene conduit, duct and innerduct manufactured for use in a nonpressure application with communication, CATA, or power wire and cables.

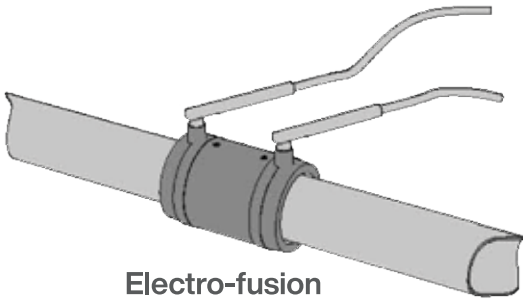
Size	Minimum Outer Diameter (mm)	Maximum Outer Diameter (mm)	Minimum Wall Thickness (mm)	Maximum Wall Thickness (mm)	Standard Weight (Kg/m)	Conversion (M/T)
32	32	32.3	2.4	2.9	0.236	4244
40	40	40.4	3.3	3.7	0.387	2583
40	40	40.4	3	3.6	0.367	2724
40	40	40.4	3.4	3.8	0.397	2518
50	49.75	50.25	5.7	6.3	0.796	1257
57	56.7	57.3	3.25	3.75	0.564	1772
90	90	90.9	5.4	6.2	1.480	676
90	90	90.9	7.35	8.65	1.988	503
90	90	90.9	9	10.3	2.370	422

JOINTING: One of the greatest features of HDPE pipes is the fact that a wide variety of jointing systems is available to suit a whole range of applications. The jointing systems can be divided into permanent jointing and detachable jointing. The schematic below illustrates the available systems.

Permanent Jointing



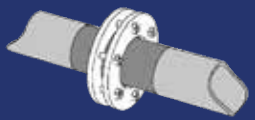
Buttwelding



Electro-fusion

Non Permanent (detachable) Jointing

Compression Fittings



Flanging

Tak System

Magnum saddles and Holderbats

THE CHOICE FOR A GREENER INFRASTRUCTURE

SUSTAINABLE INFRASTRUCTURE

JOINTS: Every pipe line is as strong as its weakest link -the joint. For water and sewer systems, a traditional bell-and-spigot system joins 10 or 20 feet lengths of pipe and creates an opportunity for leaks at every joint. Today's installation standards allow new pipelines to leak thousands of gallons of water each year by design. A survey of 46 jurisdictions, including 43 states, found an average of 16 percent "unaccounted for" water leakage with some leakage exceeding 50 percent.
PE pressure pipe systems have a zero-leak rate due to the heat fusion process that produces a monolithic pipe system. This means precious natural resources are saved and the energy to treat, store and distribute water is reduced while your savings are increased. In municipal storm sewer systems, improvements in joint design have delivered measurable increased benefits. And with pipe lengths of 20 feet, PE storm water pipe systems have only one-third the number of joints as compared to pipe systems using concrete. Therefore a decrease in leak potential is significant.

SUSTAINABLE INFRASTRUCTURE

MANUFACTURING Polyethylene, as its name suggests, is made from the polymerization of ethylene - a component derived from either crude oil or natural gas. The energy needed to extract and deliver the feedstock for PE pipe is far different when compared to the cost of extracting and shipping iron ore. With it's melting point of 275 degrees Fahrenheit, PE resin can be formed into pipe at one-tenth the temperature needed to melt iron. Similarly, conditions of higher energy costs to produce pipe exist for reinforced concrete pipe. In fact, the manufacture of plastic pressure pipe used in the building, construction, and transportation industries required 56,500 trillion fewer BTU than iron in concrete/aggregate alternatives.

SUSTAINABLE INFRASTRUCTURE

TRANSPORTATION With it's lighter weight to accomplish needed performance, PE pipe demonstrates significant cost savings when shipping from the factory to the job site. A nominal 8-inch PE pipe used for a water main weighs 8 lbs. per foot as compared to 8-inch iron pipe weighing 33 lbs per foot. That means for the same amount of feet per truckload, the amount of fuel required and wear on the roadway is significantly less. For storm water pipe, the difference is even more significant. A standard 20-foot length of corrugated PE pipe weighs just over 600 lbs, whereas the same 20 foot of 48-inch reinforced concrete pipe weighs over 22,500 lbs In practical terms a 3-axel, 40 foot long trailer for most sites has a maximum load of 72,000 lbs, or 64 feet of concrete pipe per load. For corrugated PE pipe, the volume, not the weight of the pipe maximizes the load. Yet each load has nearly twice as much footage (120 feet) resulting in half as many loads, and a total load weight of 3700 lbs -requiring far less fuel and destructive weight pounding the roadways. Furthermore, by "telescoping" or "nesting" smaller diameter PE pipe inside larger diameter pipe, even more lengths can be delivered per load without breaching the weight limitations.

SUSTAINABLE INFRASTRUCTURE

LOWER INSTALLATION COSTS: Once again, lighter weight, longer lengths and flexibility all add up to lower costs for installing PE pipe systems. In traditional open trench installations, PE pipe's lighter weight means less heavy equipment to lift and install each section of pipe. With lengths twice as long as iron pipe, and nearly three times longer than concrete pipe, more utility pipe footage can be installed per day, with smaller construction crews and with less joints to worry about.

PE pipe's flexibility makes it a natural for trench less installations including the horizontal directional drilling, slip lining and pipe bursting. All three of these processes require significantly less disruption to the ground - and to the citizens of a community. With less land or roadways torn up, that translates into fewer roads shut down, fewer detours and traffic disruption, and less patching and repaving after the work is completed. For slip lining and pipe bursting, since the original pipe provides the pathway for the new pipe, the installation is not only less disruptive but dramatically faster- and typically less expensive. All of this equals a much "greener" approach with significant cost, time and energy savings.

SUSTAINABLE INFRASTRUCTURE

SERVICE LIFE

According to the American Water Works Association (AWWA) industry database, there are approximately 876,000 miles of municipal water piping throughout the United States. Americans consume approximately 145 gallons of drinking water per person per day, for a total annual quantity of over 15 trillion gallons. Due to the inherent nature of cast iron or ductile iron pipe systems, these pipes are subject to internal and external corrosion, resulting in pipe leaks and water main breaks - nearly 700 each day. The total annual direct cost of corrosion for the nation's drinking water and sewer systems is estimated to be $36.0 billion. This amount includes an extensive list of costs in the form of repairing and replacing aging infrastructure, unaccounted-for water through leaks, corrosion inhibitors, internal mortar linings, external coatings and cathodic protection. PE water pipe is not subjected to galvanic corrosion and is resistant to tuberculation of dissolved minerals. That means it doesn't rust, the water won't be discolored and it doesn't lose its long-term hydraulic effect due to internal pipe wall buildup. And with a leak-free joint, water leakage is a thing of the past. Storm water systems are also subjected to harsh chemicals and aggressive flow conditions. Corrugated PE pipe is unaffected by roadway salts, brackish water, roadway pollutants, corrosive flows or "hot" soils. With its ability to handle the widest utility pH range between 1.5 and 14, PE pipe is commonly used in aggressive environments where concrete and metal pipe cannot consistently perform. A superior joint limits infiltration and exfiltration that can prematurely end a system's design life. And lastly, with the best resistance to abrasion when compared to concrete or metal, PE storm water pipe can deliver an exceptional unmatched service life.

PE PIPE - THE CHOICE FOR UNDERGROUND INFRASTRUCTURE

Beginning in the 1960's PE pipe found a natural home in the gas distribution industry. With its flexibility and leak-free joints, PE pipe is now used in 95% of all gas distribution systems throughout North America. Over that time, three billion feet of PE pipe and more than 39 million gas services have been installed, proving a leak free pressure pipe system can be built and effectively serve the community. Today, with our nation having to deal with deteriorating underground assets, specifier need to compare every alternative. As a nation, we are also becoming more aware of environmental stewardship and why it needs to be an important part of our decision making. We need to be" greener." Exceptional resistance to corrosion and abrasion; leak-free or watertight joints; greater durability and flexibility; high energy efficiency; it's no wonder why PE pipe serves every underground utility today and is becoming the choice for a greener infrastructure.

THE PROBLEM

Every day 2.5 billion gallons of water are being lost due to crumbling pipes and over 250,000 water remain breaks per year. The EPA states that the top two problems with America's water and sewer utilities are corrosion and leakage requiring, within the next 20 years, over $540 billion to replace unreliable water and sewer systems. Our nation's streets and roads are deteriorating, often due to poorly performing storm and wastewater systems that allow important soil support to be eroded away. This compromises the roadbed creating depression, sinkholes, and catastrophic collapses. In just the next two years, over $64 billion will be necessary to rehabilitate the country's streets and roadways. Local municipalities have to fund the repair, replacement of, and aging underground infrastructure that has outlived its service life – sometimes prematurity. With the federal government only supporting a fraction of the costs, the financial burden is laid at the feet of the local citizen in higher taxes or higher service fees. Making the right decision on what type of pipe to use will extend utility life and save local citizens future costs.

THE GREEN SOLUTION

Polyethylene (PE) pipe provides a sustainable solution whose performance has been validated for over 50 years. Starting with a leak-free joint for pressure systems or watertight joint in gravity flow applications, PE pipe is the greenest choice for municipal water, sewer and storm water applications. A lower environmental carbon footprint is the hallmark for PE pipe, starting with its low energy requirements for manufacturing. Continuing through transportation and installation, the energy needed to completely install a PE pipe system pales in comparison to the economic and environmental costs of pipe made from various metals or concrete. PE pipe's resistance to corrosion and abrasion will also create a longer utility life for generations to come. This translates into direct consumer savings and strong enhancement of our environment.

SMOOTH-WALL

HIGH-DENSITY POLYETHYLENE

PIPE SYSTEMS

Meeting the challenges of the 21st century

Piping made from polyethylene is a cost effective solution for a broad range of piping problems in municipal, industrial, marine, mining, landfill, duct and agricultural applications. It has been tested and proven effective for above ground, sur face, buried, sliplined, floating, and sub-sur face marine applications.

High-density polyethylene pipe (HDPE) can carry potable water, wastewater, slurries, chemicals, hazardeous wastes, and compressed gases. In fact, polyethylene pipe has a long and distinguished history of service to the gas, oil, mining and other industries. It has the lowest repair frequency per mile of pipe per year compared with all other pressure pipe materials used for urban gas distribution.

Polyethylene is strong, extremely tough and very durable. Whether you're looking for long service, trouble-free installation, flexibility, resistance to chemicals or a myriad of other features, high-density polyethylene pipe will meet all your requirements.

HDPE Coil

HDPE PIPE

SAVES BOTH TIME AND MONEY

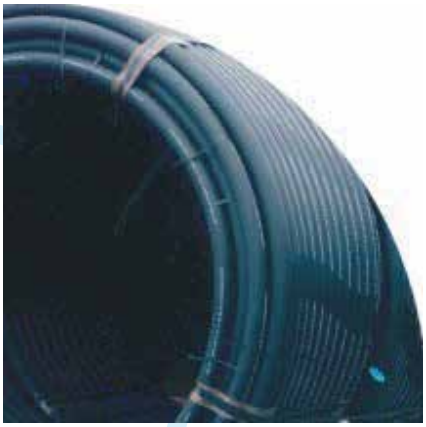
LOWER LIFE CYCLE COSTS

- Corrosion resistance. Does not rust, rot or cor rode.
- Leak tight. Heat-fused joints create a homogenous, monolithic system. The fusion joint is stronger than the pipe.
- Maintains optimum flow rates. Does not tuberculate, has a high resistance to scale or biological build-up. Excellent water hammer characteristics. Designed to withstand surge events.
- High strain allowance. Virtually eliminates breakage due to freezing pipes.
- Additional cost savings are achieved by lower instance of repairs.
- With no infiltration or infiltration, portable water losses and groundwater nuisance treatment costs encountered in traditional piping systems are eliminated.

REDUCED INSTALLATION COSTS

- Material of choice for trench less technology. Used in directional boring, plowing, river crossings, pipe bursting and sliplining
- Fewer fittings due to pipe flexibility Allowable bending radius of 20 to 25 times outside diameter of pipe. Lighter equipment required for handling and installation than with metallic materials
- Eliminates the need for thrust blocking. Heat fused joints are fully restrained.
- Light weight and longer lengths allow for significant savings in labor and equipment.

CONSIDER THE FOLLOWING FEATURES OF HDPE PIPE



LEAK FREE

Polyethylene pipe is normally joined by heat fusion. Butt, socket, sidewall fusion and electrofusion create a joint that is as strong as the pipe itself, and is virtually leak free. This unique joining method produces significant cost reductions compared to other materials.

CORROSION, ABRASION, AND CHEMICAL RESISTANT

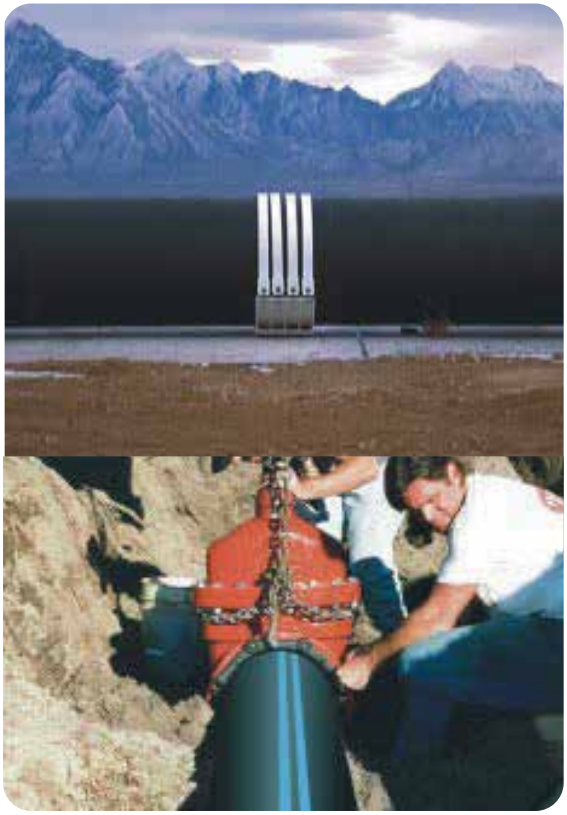
Polyethylene piping's performance in mining, dredging and similar applications proves it will outwear many more costly piping materials when conveying a variety of abrasive slurries. HDPE has excellent corrosion resistance and is virtually inert. It does not need expensive maintenance or cathodic protection. It offers better overall resistance to corrosive acids, bases and salts than most piping materials. In addition, polyethylene is unaffected by bacteria, fungi and the most "aggressive" naturally occurring soils. It has good resistance to many organic substances, such as solvents and fuels.

EXCELLENT FLOW CHARACTERISTICS.

Because polyethylene is smoother than steel, cast iron, ductile iron, or concrete, a smaller PE pipe can carry an equivalent volumetric flow rate at the same pressure. It has less drag and a lower tendency for turbulence at high flow. Its superior chemical resistance and "non-stick" surface combine to almost eliminate scaling and pitting and preserve the excellent hydraulic characteristics throughout the pipe service life.

LIGHTWEIGHT AND FLEXIBLE.

Polyethylene pipe is produced in straight length or in coil. Made from materials about one-eighth the density of steel, it is lightweight and does not require the use of heavy lifting equipment for installation. It reduces the need for fittings, is excellent in shifting soils and performs well in earthquake-prone areas. HDPE resists the effects of freezing and allows bending without the need for an excessive number of fittings. Since HDPE is not a brittle material, it can be installed with bends over uneven terrain easily in continuous lengths without additional welds or couplings.



MANUFACTURED UNDER AWWA,

NSF, ASTM, AGA, EPA, DNR, DOT, API, FM, CSA AND OTHER NATIONALLY RECOGNIZED STANDARDS

Polyethylene pipe is listed and approved by the standards or committees of the agencies listed above.

AVAILABLE IN DIAMETERS FROM ½ INCH TO 48 INCH

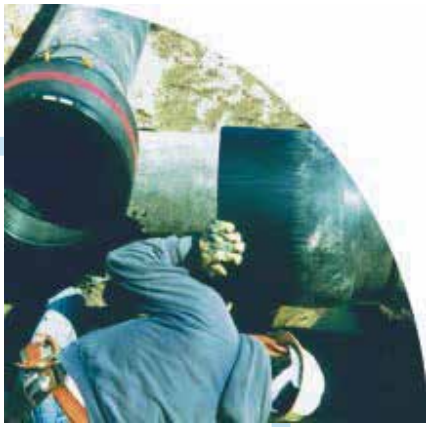
Polyethylene pipe is available in a wide range of diameters and wall thickness, with flanges, elbows, tees, wyes, and valves, providing a total system solution. HDPE pipe is also available in Iron Pipe Size (IPS), Ductile Pipe Size (DIPS) as well as metric sizes. Plastic Pipe Institute members can provide pipe, fittings and other appurtenances.

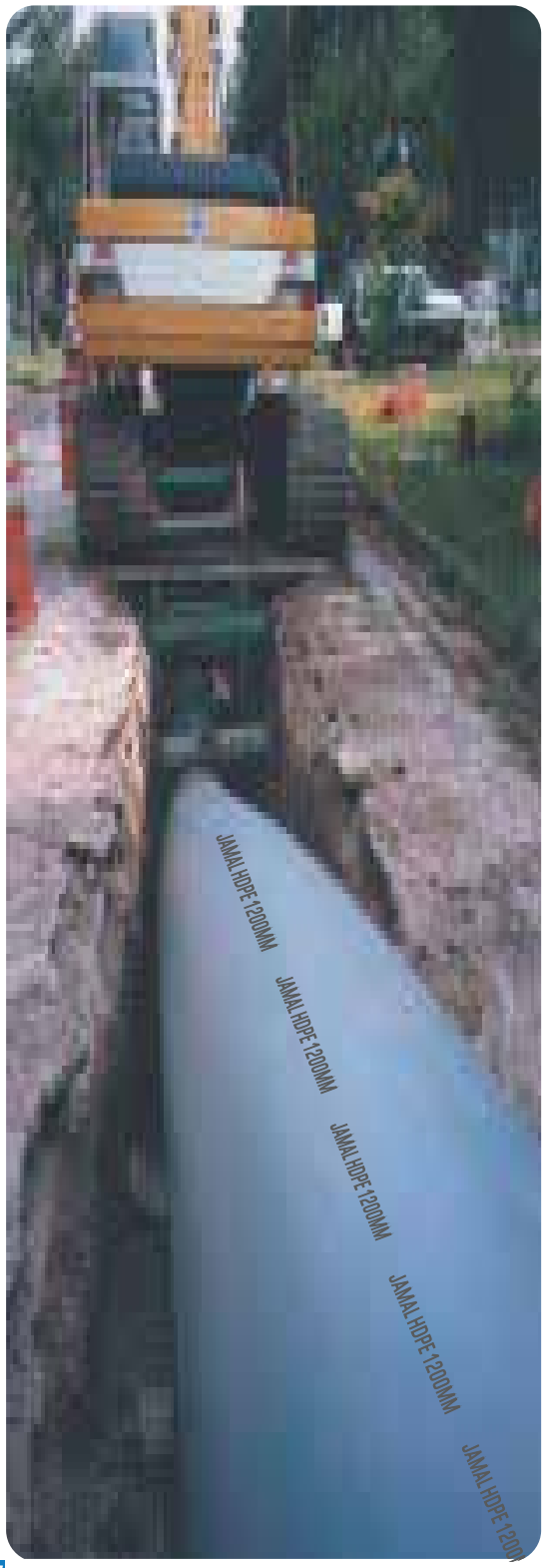
APWA COLOR CODING BY APPLICATION

Polyethylene pipe is available with color coding by application as developed by the utility location and coordination council of the American Public Works Association (APWA).

DUCTILITY AND TOUGHNESS

Polyethylene pipe and fittings are inherently tough, resilient and resistant to damage caused by external loads, vibrations, and from pressure surges such as water hammer. Even in cold weather polyethylene pipe is tolerant to handling and bending.





CASE HISTORIES

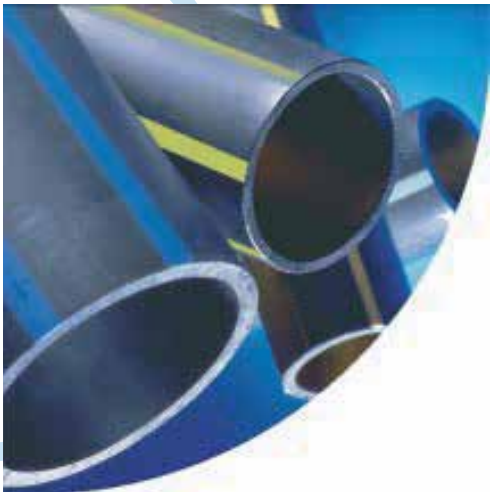
Pipe bursting project saves time and money

As part of its sewer rehab project, the city of Baytown, Texas, elected to use 36-inch HDPE pipe to replace 36-inch Reinforced Concrete Pipe (RCP) sewer lines. To burst more than 3700 feet of pipe in residential areas, the contractor used both static and pneumatic bursting systems. The pipe bursting method was recommended over three other procedures to avoid the major impact of bypass pumping and reduced flow capacity involved.

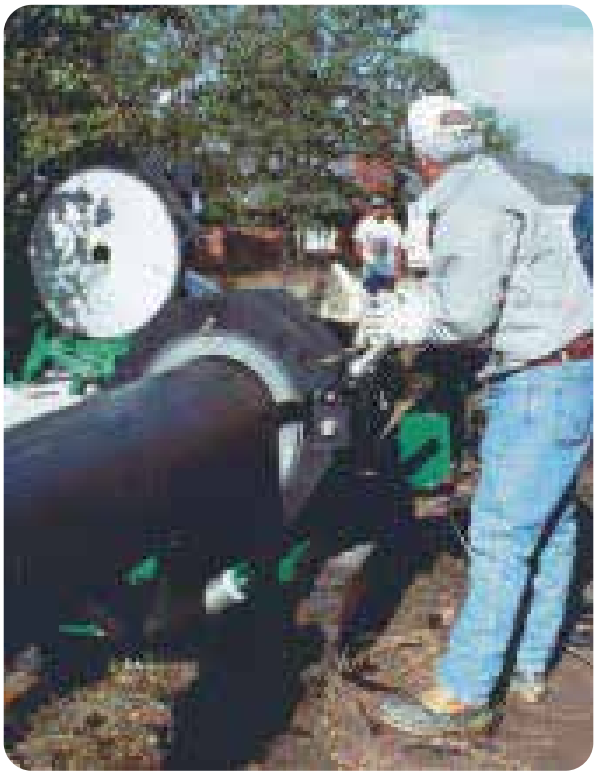
Sliplining polyethylene pipe rescues Colorado highway

When a section of cor rugated metal pipe culvert rusted and washed out, a busy Colorado highway was partially closed down to traffic. The Colorado Department of Transportation acted quickly to line the culvert with polyethylene pipe. It's light weight and durability were perfect for the project's high elevation and isolated location. The line pipe was inserted from the uphill side of the culvert and pulled into position, then the joints were assembled. Filling the annular void space between the existing Corrugated Metal Pipe(CMP) and the liner pipe with grout was challenging, but successful. The liner and direct bury portions are in place, with flow restored and traffic running normally on the highway above it.

HDPE RESTORES CITY DRINKING WATER



A deteriorating cast iron water main in Henrietta, Oklahoma was leaking 300,000 gallons of water per day and threatening to shut off the city 's water supply. Complicating factors included water temperature that changed 30 degrees in short time periods and steep slopes in the location of the leak. Reducing the number of pipe joints along the slope and accommodating the temperature differential, along with elevation problems, convinced city officials to select HDPE pipe. Fourteen-inch Iron Pipe Size (IPS) DR -11 water pipe was installed along the 1,400-foot section of line extending over the steep slope to the flatland below. The HDPE pipe solved the elevation and water temperature problems, and allowed for rapid installation that avoided shutting off the city 's main water supply for an extended period of time.



TAKING SAFE WATER TO A RURAL COMMUNITY

The cost of constructing long lengths of distribution piping deprives many rural residents of safe drinking water. Carlsbad Springs in Ontario, Canada studied a steady -flow water supply technology and chain trencher installations method, discovering they could save 66% over conventional water supply installations. Although high-density polyethylene pipe was not in the standardsfor watermain materials, an assessment of the material and appropriate jointing methods determined HDPE pipe was flexible, resistant to corrosion and smooth-walled. Carlsbad Springs installed approximately 33.5km (20.8mi.) of HDPE watermain ranging from 75mm to 200mm (3 inch to 8 inch) diameter. Using HDPE and chain trenching e xcavation, watermain installation costs were as low as$15 per foot for 6-inch diameter pipe.

THE PLASTICS PIPE INSTITUTE (PPI)

For additional information, visit the PPI web site at www.plasticpipe.org or contact our headquarters in Irving, TX at469/499-1044, fax 469/499-1063.

Since its founding in 1950, PPI has been the voice for its members who are involved in manufacturing and distributing polyethylene pipe systems. Members share an interest in educating industry about the benefits of HDPE pipe, and broadening market opportunities to use polyethylene piping systems for water and gas distribution, sewer and wastewater, oil and gas production, industrial and mining uses, power and communication duct, and ir rigation.

MEMBERS INCLUDE

- Manufacturers of polyethylene pipe, fittings and valves.
- Manufacturers of polyethylene piping materials.
- Manufacturers of equipment and machinery used for fabricating, joining or installing polyethylene piping systems.

HORIZONTAL DIRECTIONAL DRILLING SOLVES OVERFLOW PROBLEMS AT **SAN RAFAEL CANAL**

A nightmare situation faced the San Rafael, California Sanitation District. Few challenging environmental demands can compare with preventing tons of raw sewage from dumping into San Francisco Bay. A pipeline constructed in the 40s to transfer sewage and groundwater was rusting and corroding, and had inside sedimentary buildup that decreased its capacity significantly. Without replacing the entire sewage system, the best solution was to install two new parallel polyethylene pipelines 15 feet below the bottom of the canal. Laying the pipe involved complicated directional drilling at a vertical curve with a series of tight maneuvers, with a compound curve around private property, and without disturbing the nearby wetlands. The project utilized 16-inch SDR - 11 and 26-inch SDR-11 HDPE pipe that met the criteria for pullback, ability to bend and to withstand the stress of horizontal directional drilling. Excavation and environmental impact were kept to a minimum, and the project was completed in four weeks, one-third the time required for the average trench-digging operation, at a total cost of $2.4 million.

Where Quality Counts

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American Petroleum Institute

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Pakistan Standards

Design By: Fadis