

# aquapipe

High Density Polyethylene Pipe



**High Quality**

HDPE PIPE

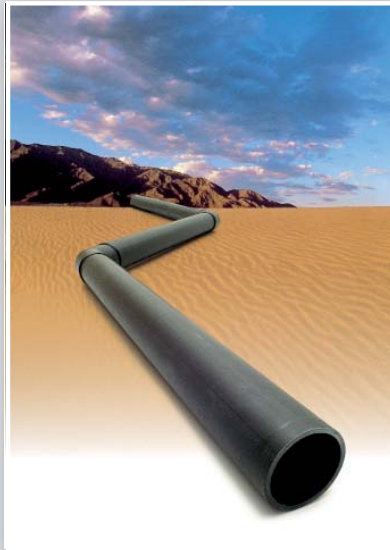


*Pioneer In Plastic Piping Network Since 1984*

## INTRODUCTION

World plastics is a leading company in the development and manufacture of advanced plastic piping systems. Our uniquely extensive range of large and small bore piping systems are capable of handling a wide variety of materials in industrial and domestic applications including water, fluid waste, gas and chemicals. World plastics also produces piping systems for electrical installations. Pipes are made from high quality raw materials and are manufactured on some of the most advanced machinery in the world to the most exacting standards. Our commitment to quality also extends to customer service. You will find us more than willing to help with the design of installations and can advise on the development of piping systems to meet particular needs.

Pipes made from Polyethylene (PE) is a cost effective answer for a number of piping problems in Metropolitan, Municipal, Industrial, Underwater, Mining, Land-fill Gas extraction, Cable duct and agricultural applications. It has been tested and proven effective for underground, above ground, surface, under water as well as floating pipe applications. High Density Polyethylene (HDPE) Solid Wall Pipe has been used in Potable Water applications since the '60's, and has been gaining approval and



growth in municipalities ever since. HDPE - Aquapipe is specified and/or approved in International Standards ISO/DP 4427, German Standards DIN 8074, DIN 8075, British Standards 6920,

Some distinctive advantages of HDPE - Aquapipe that provide important benefits for water applications are listed below:

aquapipes

## 1. Heat Fused Joints -- Benefits

- HDPE - Aquapipes can be heat fused together to form a joint that is as strong as or stronger than the pipe itself and is leak free.
- The Life Cycle Cost of HDPE - Aquapipes differs from other pipe materials because the “allowable water leakage” is zero rather than typical leakage rates of 10 to 20% for PVC and Ductile Iron.
- HDPE - Aquapipes fused joints are self restraining and costly thrust restraints or thrust blocks are not required.
- HDPE - Aquapipes’s fused joints simply do not leak, eliminating infiltration and exfiltration problems experienced with alternate pipe joints

## 2. Flexible and Fatigue Resistant -- Benefits

- HDPE - Aquapipes can be bent to a radius 20 times the nominal pipe diameter. This can eliminate many fittings required for directional changes in a piping system where fittings and thrust blocks or restraints are required with alternate materials.
- The flexibility of HDPE pressure pipe makes it well suited for dynamic soils including areas prone to earthquake.
- HDPE pressure pipe can accept repetitive pressure surges that significantly exceed the static pressure rating of the pipe

## 3. Construction Advantages -- Benefits

- The combination of flexibility and leak free joints allow for unique and cost effective types of installation methods that the rigid PVC and Ductile Iron pipes can’t use with bell and spigot connections. These alternate installation methods (Horizontal Directional Drilling, Pipe Bursting, Slip lining, Plow and Plant, Submerged or Floating Pipe, etc.) can save considerable time and money in most potable water applications.
- Polyethylene pipe is produced in straight lengths up to 12 meter long and coiled of 50 meters and 100 meters in

diameters up through 90 mm. upon request 300 m coil could be produced for small diameters.

- Polyethylene is about one-eighth the density of steel; it does not require the use of heavy lifting equipment for installation.



#### 4. Cost Effective, Long Term and Permanent -- Benefits

- Polyethylene pipe installations are cost effective and have long term cost advantages due to its physical properties, leak free joints and reduced maintenance costs.

- The polyethylene pipe industry estimates a service life for HDPE - Aquapipes to conservatively be 50-100 years. This relates to savings in replacement costs for generations to come.



#### 5. Corrosion and Chemical Resistant -- Benefits

- HDPE - Aquapipes will not corrode, tuberculate or support biological growth. HDPE - Aquapipes has superb chemical resistance and is the material of choice in harsh chemical environments .

The advantages of corrosion and chemical resistance over traditional metal pipes are shared by many plastic pipes, but hdpe - aquapipes uniquely combines these



attributes with the aforementioned advantages of heat fused joints, flexibility and fatigue resistance .

## 6. Handling -- Benefits

- It is much easier to handle and install HDPE pipe vs. the heavier, rigid metallic or concrete pipe segments, allowing for huge cost advantages in the construction process.
- Polyethylene pipe is better able to structurally withstand an impact than PVC pipe, especially in cold weather installations when other pipes are more prone to cracks and breaks.

## 7. Hazen Williams C Factor is 150 and doesn't change over time - Benefit

- HDPE - Aquapipes has a smooth ID that does not corrode or tuberculate and maintains its flow capability over time.
- The C Factor of Ductile Iron pipe is dramatically reduced over time due to corrosion and/or tuberculation

## Typical Applications

- Drinking water supply systems in national, urban and rural networks.
- Sewage systems and water treatment plants.
- Agricultural and irrigation systems.
- Systems for marine use.
- Swimmingpool systems.
- Piping systems for communication and electrical cable protection.
- Systems for conveying suspension and semi-solid materials
- Gas supply systems.
- Systems for conveying chemical materials

## Materials

Materials used for pressure pipes are classified according to international standards. Classification is based on the minimum required strength (MRS) given as the minimum tensile circumferential stress in the pipe wall, for which

the pipe can be subjected during 50 years when transporting clean water at 20 °C. HDPE - Aquapipe compound (PE80 and PE100) contains only those stabilizers (anti-Oxidant) and pigments (2-2.5% Carbon black) which protect the pipe from aging, light and heat damage.

## PE 100 for Gas and Drinking Water Systems

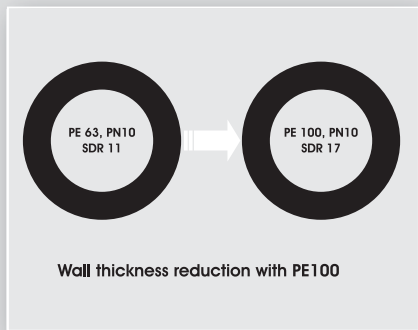
• A unique product from the bimodal process, PE100 remains the highest MRS classified PE today for pressure piping applications.

Its high strength has been appreciated for wall thickness reduction or higher pressure rating compared to its PE80 and PE63 counterparts Market and applications

- Gas pipe for natural gas distribution networks, for pressure rating up to 10 bars
- Drinking water pipe, for pressure rating up to 25 bars.
- Sewers, outfall pipes, industrial pipes

Main Characteristics:

- PE100, MRS 10.0
- Ready-made black compound other colors are available w/wo strips (under request) , High Density PE (HDPE)
- Slow Crack Resistance, Pipe notch @ 80°C/9.2 bars, SCG value over 500 hours
- Low Sag properties, no sagging during extrusion of large and thick wall PE pipe



Pipe made out of PE 100 are now widely used around the world for transporting and distribution water, gas, and chemicals.

## PE80 for Gas and Drinking Water Systems

Market and applications:

- Gas pipe for natural gas distribution network, for pressure rate up to 4 bars
- Drinking water pipe, for pressure rate up to 16 bars, pipe range up to 500 mm
- Sewers, outfall pipes, industrial pipes

Typical Characteristics, PE80 grades:

- PE80, MRS 8.0
- Ready-made black compound
- Slow Crack Resistance, Pipe notch @ 80°C/8.0 bars, SCG value over 500 hours
- Low Sag properties, no sagging during extrusion of large and thick PE pipe

Pipe made out of PE 100 are now widely used around the world for transporting and distribution water, gas, and chemicals.

### Standard Dimensional Ratio

Solid wall PE pipes are classified against outside diameter and the pipes are designated by a number of SDR-ratings (Standard Dimensional Ratio = outside diameter/pipe wall thickness).

$$SDR = \frac{d_n}{s_n}$$
$$s_n = \frac{PN \cdot d_n}{2\sigma + PN}$$

$$\sigma = \frac{PN \cdot (d_n - s_n)}{2s_n}$$

$s_n$  : Pipe wall thickness (mm)

$PN$ : Operating pressure (MPa)

$d_n$  : Pipe outside diameter (mm)

$\sigma$  : Design stress (MPa)



Designation	MRS (MPa)	Design stress (MPa)
PE 100	10,0	8.0
PE 80	8,0	6.3

- In accordance to ISO 4427 with overall service coefficient 1.25 at 50 years and 20°C

Typical data for PE		PE 80	PE 100
Design stress	MPa	6.3	8.0
Density (black compound)	kg / m <sup>3</sup>	945 - 956	957 - 961
Melt flow rate (190 °C/5 kg)	g / 10 min	0.4 - 0.7	0.2 - 0.4
Tensile strength at yield	MPa	18 - 23	23 - 25
Elongation at break	%	> 600	> 600
Brittleness temperature	°C	< - 70	< - 70
Flexural Modules E	MPa	650 - 1000	1000 - 1200
Charpy impact strength	kJ / m <sup>2</sup>	no break	no break
Linear expansion coefficient	mm / m • °C	0.17	0.17

## AQUAPIPE TECHNICAL DATA

World Plastic manufactures ISO-DIN and BS standards aquapipe with an outer diameter ranges from 16 mm to 450 mm in various pressure classes.

PE 80								
Nominal Outside Diameter (mm)	PN 6.3 Bar		PN 10 Bar		PN 16 Bar		PN 20 Bar	
	Wall Thick (mm)	Weight (kg/m)	Wall Thick (mm)	Weight (kg/m)	Wall Thick (mm)	Weight (kg/m)	Wall Thick (mm)	Weight (kg/m)
20			1.8	0.107	2.30	0.132	2.80	0.154
25			1.9	0.144	2.80	0.200	3.50	0.240
32			2.4	0.232	3.60	0.327	4.40	0.386
40	1.9	0.239	3.0	0.358	4.50	0.509	5.50	0.60
50	2.4	0.374	3.7	0.549	5.60	0.788	6.90	0.938
63	3.0	0.580	4.7	0.873	7.10	1.26	8.60	1.47
75	3.6	0.828	5.6	1.24	8.40	1.76	10.30	2.09
90	4.3	1.18	6.7	1.77	10.10	2.54	12.30	3.00
110	5.3	1.77	8.1	2.62	12.30	3.78	15.10	4.49
125	6.0	2.27	9.2	3.37	14.00	4.87	17.10	5.77
140	6.7	2.83	10.3	4.22	15.70	6.11	19.20	7.25
160	7.7	3.72	11.8	5.50	17.90	7.96	21.90	9.44

PE 100								
Nominal Outside Diameter (mm)	PN 6.3 Bar		PN 10 Bar		PN 16 Bar		PN 20 Bar	
	Wall Thick (mm)	Weight (kg/m)	Wall Thick (mm)	Weight (kg/m)	Wall Thick (mm)	Weight (kg/m)	Wall Thick (mm)	Weight (kg/m)
20					1.90	0.112	2.30	0.133
25			1.80	0.137	2.30	0.171	2.80	0.200
32			1.90	0.187	2.90	0.272	3.60	0.327
40	1.8	0.227	2.40	0.295	3.70	0.430	4.50	0.509
50	2.0	0.314	3.00	0.453	4.60	0.666	5.60	0.788
63	2.5	0.494	3.80	0.720	5.80	1.050	7.10	1.260
75	2.9	0.675	4.50	1.020	6.80	1.470	8.40	1.760
90	3.5	0.978	5.40	1.460	8.20	2.120	10.10	2.540
110	4.2	1.430	6.60	2.170	10.00	3.140	12.30	3.780
125	4.8	1.840	7.40	2.760	11.40	4.080	14.00	4.870
140	5.4	2.320	8.30	3.460	12.70	5.080	15.70	6.110
160	6.2	3.040	9.50	4.520	14.60	6.670	17.90	7.960
180	6.9	3.79	10.7	5.71	16.4	8.42	20.1	10.1
200	7.7	4.69	11.9	7.05	18.2	10.4	22.4	12.4
225	8.6	5.89	13.4	8.93	20.5	13.00	25.2	15.8
250	9.6	7.3	14.8	11	22.7	16.20	27.9	19.4

## Joining methods

### 1) Electro fusion jointing

Electrofusion jointing is used for both the jointing of pipes and pipes to fittings.

The Electrofusion fitting is supplied with a “heating-coil” pre-installed during the manufacturing process. By applying an electrical charge to the fitting, the wires of the coil heat up to a pre-determined temperature, which causes the PE to melt and form a high-tensile, leaktight joint. Modern Electrofusion control boxes are designed to set time and power requirements automatically for each different fitting .



### 2) Flange joints

Flange joints are made by welding a “stub-end” to a piece of pipe and by using “loose-flanges”, nuts and bolts. They are connected to similar fittings on another pipe or fitting. “loose-flanges” can be supplied in different materials (i.e. steel, aluminum etc), with different surface coatings. The finished joint offers a high tensile strength and ease of assembly .



### 3) Compression fitting

Compression fittings are normally only available in relatively small diameters. They are fairly simple and easy to use and can be supplied either in plastic or metal.



#### 4)Butt welding

Butt welding (or butt fusion) is the most common jointing method for PE-pipes.

The butt-fusion joint is made by inserting a heater-plate



between the ends of two pipes, which are then brought together under pressure - this softens the ends of the pipe. The heater-plate is then removed and the pipes brought together again and allowed to cool under pressure. This results in a high-tensile, leaktight homogeneous joint.

Modern butt-fusion welding machines are normally fitted with an automatic recording unit, which not only can set the actual welding parameters, but also provide data-retrieval facilities for each butt-fusion operation.

#### Our Services:

- Technical consulting and project design.
- Complete range of pipes, fittings, welding machines and accessories.
- Execution of welding works.

#### Quality Control

Aquapipes maintains complete quality control from raw material to finished pipe product by establishing strict manufacturing specifications and by verifying compliance daily, using precise dimensional controls and accelerated long term hydrostatic testing on samples taken from the production run.

This, combined with our proven performance in actual end-use applications, has resulted in Aquapipes being generally recognized as the best piping systems. That is Approved and certified by JISM.



Jordan Institution for Standards and Metrology  
(JISM)

Conformity Certificates Department  
A Product Certification Body operating according to  
EN 45011 & ISO/IEC-Guide 65:1996

has granted this



## Jordan Quality Mark Certificate

No.: JQM/03/04/02

for the product  
"Plastic pipes: High Density Polyethylene (Aquapipe)"  
which is produced by

**World Plastic For Construction Industries**

P.O Box: 53- Amman-11512 - Jordan

After the company has fulfilled all the requirements of granting Jordanian Quality Mark for Industry for its product according to Jordanian Quality Mark instructions no.: 3:2003 including product conformity to the Technical Requirements for Granting JQM no.: 35:2004

"High Density Polyethylene (HDPE) Pipes for Water Supply"

Hence, this company is entitled to label its a/m product with the logo of Jordanian Quality Mark for Industry



Date of Issue : July 25, 2003

Date of Expiry : July 24, 2006 Provided that the preconditions for the certification still exist

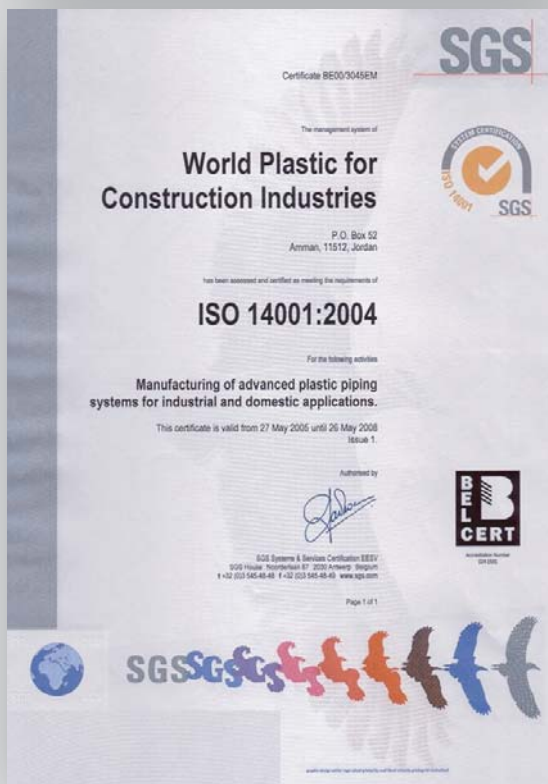
Conformity Certificates Dept. Director

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