

Spirolite

**BULLETIN No. 908 –
MARKETING ASTM F-894**

Profile wall high-density polyethylene pipe and fittings



 **PLASSON**[®]
USA

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TABLE OF CONTENTS

WHO WE ARE - **pg. 2**

WHAT IS SPIROLITE? - **pg. 2**

PROFILE WALL CONCEPT - **pg. 2-3**

PROFILE OPTIONS - **pg. 3**

PIPING MATERIALS - **pg. 3**

ADVANTAGES OF PLASTIC PIPES - **pg. 3-4**

- Flexibility
- Hydraulics/Flow
- Chemical, Corrosion & Abrasion Resistance
- Stress Crack Resistance
- Weatherability
- Temperature

FEATURES AND BENEFITS OF SPIROLITE - **pg. 5**

- Lightweight
- Long Lengths
- Tough and Durable

JOINING METHODS - **pg. 5-6**

- Bell & Spigot
- Thermal Welded Ends

MANHOLES AND FITTINGS - **pg. 7**

APPLICATIONS - **pg. 8**

NEW PRODUCTS - **pg. 9**



WHO WE ARE - PLASSON USA

Plasson Group (www.Plasson.com), established in 1964, is an international company comprised of wholly owned subsidiaries in Israel, USA, Mexico, South America, China, Italy, France, Spain, United Kingdom, Germany, Poland, Brazil, India, and Australia. Publicly traded on the Tel Aviv Stock Exchange since 1997, Plasson Group focuses 1,800 highly skilled employees with the goal of providing the highest quality fluid conveyance system products worldwide. Plasson Group markets over 12,000 different products into various business segments primarily serving municipal water distribution, gas collection and distribution, industrial fluid transfer networks, wastewater systems, and mining applications in over 80 countries worldwide. Plasson Group is the leader in Innovation, Technology and Quality in the markets it serves.

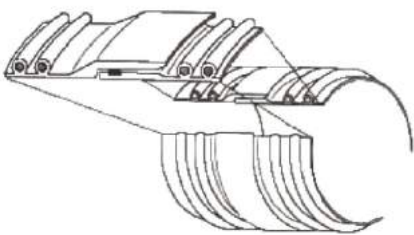
Plasson USA (www.plassonusa.com) is Plasson Group's USA subsidiary. Plasson USA was established in 1993 as Industrial Pipe Fitting, LLC. Throughout the years, we've acquired a number of companies, chief among these was Performance Pipe's Fabrication, a division of Chevron/Phillips Petroleum, in 2005. Plasson USA is a full-line manufacturer of High Density Polyethylene (HDPE) Fluid Network Systems ranging from ½" to 65" nominal pipe sizes with pressure ratings capable of 320 psi at 73 °F and lower pressure systems through 120" in diameter. Plasson USA is recognized by Factory Mutual Global (FM Global) as the leading supplier of HDPE fittings and has over 8,000 products approved for fire suppression systems. Plasson USA along with its sister companies under the Plasson Group holdings are global in reach, serving customers throughout the world.

Spirolite

Spirolite® continues Plasson USA's lineage as a leader in HDPE Pipe and Fittings technology as it has for nearly 40 years. Spirolite® is a specialized HDPE fluid network conveyance system encompassing pipe, fittings, manholes, and structures made from spirally wound HDPE pipe in open, closed, or solid wall profiles up to 120" diameter. Larger sizes available upon request.



PROFILE WALL CONCEPT



Spirolite®'s unique manufacturing processes is the only HDPE system in the United States that truly offers an engineered cost competitive alternative to traditional piping systems in applications of gravity and low pressure sanitary sewer systems, odor control ductwork, as well as industrial waste applications. Connecting Spirolite® systems is easy! Joint configurations include either a bell and spigot gasketed joint or a plain end fields welded joint. Both joining methods reduce installation times and provides end users long term, corrosion resistant, and trouble-free conveyance systems.

Spirolite® pipe is manufactured to constant internal diameters produced to the following standards: ASTM F-894, ISO 21138, DIN 16961, EN 13476 as well as other international standards, pending the application.

Sizes up to 120" diameters are standard. Additional sizes through 144" are available upon request. We can also customize. The beauty of the profile wall concept is that any of the parameters, including wall thickness, tube diameter, rib spacing, and more, can be varied to create a custom designed pipe for any specific application.

SPIROLITE® PROFILE SIZES			
18	21	24	27
30	33	36	1000mm
42	48	54	57
60	66	72	78
84	90	96	120

PROFILE WALL CONCEPT



SCP



DOP



HS



Solid Wall



SOP



DCP

PIPING MATERIALS

High Density Polyethylene (HDPE) is characterized by low permeation, good UV resistance (carbon black stabilized), and excellent chemical resistance. HDPE is the ideal material for use in a wide variety of underground conveyance applications. It has been used for decades in drinking water systems and for the transport of chemicals and natural gas. For all these applications, stress rated, high-grade PE 4710 is the material of choice. Spirolite® has been using PE 4710 for many years in its components and pipes as

standard. PE 4710 has a stress life that exceeds 100 years. The resin selected for Spirolite® pipe offers the optimum combination of strength, stiffness, toughness, and long-term reliability (see Figure 1). The material is classified by ASTM D-3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials as having a minimum cell classification of 445574C. Other materials and cell classifications are available upon request.

ADVANTAGES OF PLASTIC PIPES

FLEXIBILITY

Because Spirolite® is made from HDPE, it has considerable durability advantages over traditional piping materials like concrete and ductile iron. HDPE offers a high elongation at break which translates into a bend but doesn't break philosophy. Spirolite® can support loads or deformations that were not originally a part of the design such as earthquakes and droughts. Spirolite® conforms to the earth without breaking so infrastructure remains intact.

HYDRAULICS/FLOW

Being made of high-density polyethylene, all Spirolite® pipe products result in excellent hydraulics, superior to those of conventional materials. Spirolite® pipe products minimize flow disturbance due to sedimentation and slime build-up by providing a smooth, non-polar and anti-adhesive inner surface. Thus, Spirolite® pipe offers the potential for use of smaller diameter and/or reduced slopes to accomplish

given flow requirements. Third party testing has confirmed a Manning's "n" value for Spirolite® of .009 for clean water at ambient temperature.

CHEMICAL, CORROSION AND ABRASION RESISTANCE

The outstanding chemical, corrosion, and abrasion resistance of Spirolite® pipe makes it ideal for sanitary sewer and a wide variety of industrial waste disposal applications. It will not rust or decay or support bacteriological growth and is not subject to electrolytic or galvanic corrosion. Neither hydrogen sulfide nor the resulting sulfuric acid commonly found in sanitary sewers has any effect on the physical properties of Spirolite® pipe. Because of its high impact strength, high molecular weight, and corrosion resistance, Spirolite® is used successfully for transporting liquid slurries in power plants, mining, dredging, and similar applications. Polyethylene piping frequently outwears harder piping materials such as concrete when conveying many types of abrasive solids in liquid slurries. A comprehensive chemical resistance brochure is available on request.

STRESS CRACK RESISTANCE

Some grades of polyethylene may crack or craze when under stress and in contact with certain chemical substances or long term stresses. This phenomenon is known as stress cracking. Spirolite® pipe is made from stress-crack resistant materials which, when tested under the most severe test conditions (ASTM F-1473), produces a result that far exceeds the ASTM D-3350 requirements for the highest-rated pipe materials.

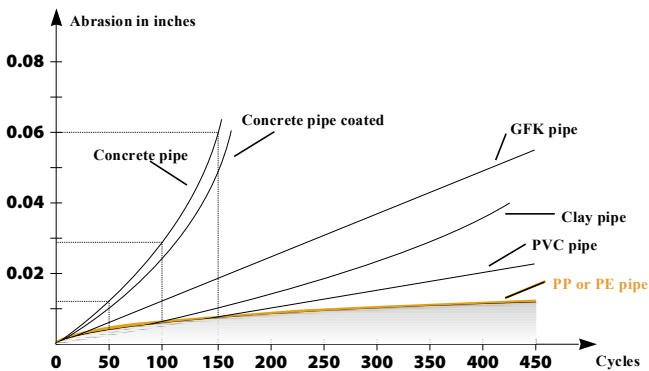
WEATHERABILITY

Although Spirolite® pipe has been primarily designed for buried applications, it is weather resistant and may be stored or used for years in direct exposure to the natural elements. The pipe compound contains a minimum of 2% carbon black, as specified by ASTM D-3350 for weather resistant (Class C) grades. This additive screens out the sun's potentially damaging ultraviolet rays and preserves the pipe's properties.

TEMPERATURE

Spirolite® pipe material has been selected to satisfy the broadest range of commonly encountered operating temperatures. Its working temperature range depends on specific circumstances, but generally extends from about -40°F to 140°F. As with all thermoplastics, an increase in temperature tends to reduce stiffness and strength but improves ductility. With decreasing temperature, the opposite effects occur. When working outside the ambient temperature range, these effects should be taken into consideration by the designer.

A characteristic of polyethylene is its relatively high coefficient of thermal expansion/contraction. However, for buried applications, exposure to variable temperatures is generally not a design concern because of the restraining action of the surrounding soil and the inherent stress absorbing capabilities of the pipe material.



Abrasion curve of various pipe materials according to the Darmstadt procedure.

FIGURE 1:

FEATURES AND BENEFITS OF SPIROLITE®

LIGHTWEIGHT

The unit weight of Spirolite® pipe is considerably less than that of traditional pipe products. The savings resulting from the use of a lightweight piping system can be significant. Shipping costs are reduced. Installation equipment may be lighter and thus less expensive to operate. Jobsite handling efficiency is also increased. Many contractors have found it possible to drastically reduce, or in some cases, even eliminate the need for expensive lifting equipment to lower the pipe into the trench. A comparison of various pipe materials and their respective weights are shown in Figure 2.

LONG LENGTHS

Spirolite® pipe is produced in standard 20' laying lengths up to 120" I.D. This allows the contractor to operate at maximum efficiency by reducing the number of joints that have to be assembled. The benefits can be significant. Many contractors have found that they can install 20%-30% more Spirolite® pipe per day than a similar size pipe made from traditional materials. The dramatic difference in the number of joints is also important when you consider the cost of jobsite testing.

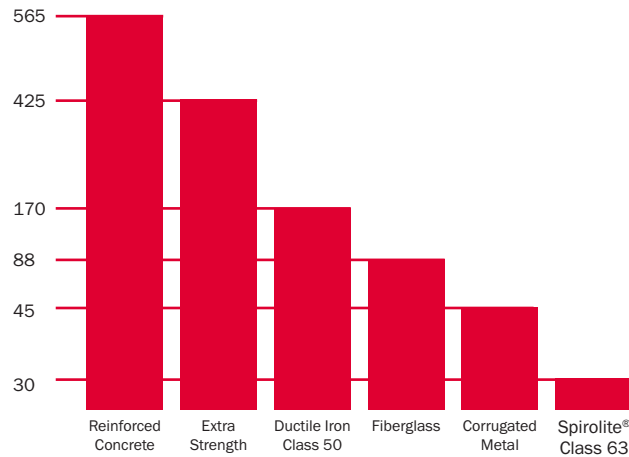


FIGURE 2: TYPICAL WEIGHT OF 36" SEWER PIPE

The number of Spirolite® pipe joints which must be laid and tested, and remain infiltration free for the life of the piping system, is substantially lower than that of other pipes supplied in shorter lengths, as shown in Figure 3. By request, Spirolite® pipe may be produced in shorter lengths for projects where severe ground conditions or existing utilities may limit the amount of trench that can be held open.

TOUGH AND DURABLE

Spirolite® pipe is rugged. It withstands stresses that would normally damage conventional piping products. Its resistance to cracking and breakage through customary jobsite handling eliminates the need to order extra pipe.

JOINING METHODS

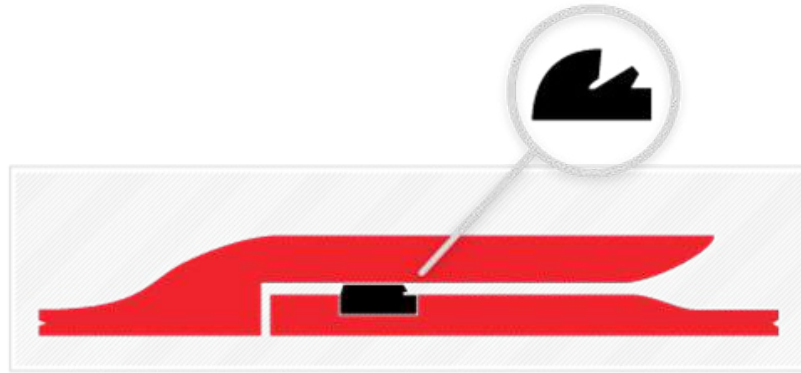
Spirolite® pipe may be joined by two alternative techniques, each employing the ease of bell and spigot assembly. These are rubber gasket and thermal welding. Together, they allow the specifier the option of selecting that method which is best suited for the application.

NUMBER OF JOINTS FOR HS PIPE					
PROJECT LENGTH(FT.)	50' LENGTH	20' LENGTH	13' LENGTH	8' LENGTH	4' LENGTH
5000	100	250	385	625	1250
10000	200	500	769	1250	2500
15000	300	750	1154	1875	3750

FIGURE 3: FEWER JOINTS PER INSTALLED LENGTH

BELL & SPIGOT

The Spirolite® pipe gasket is designed to meet ASTM F-477. This easily assembled joint is perfect for sanitary sewer and most industrial waste applications and is available in 18” through 120” diameter Spirolite® pipe. The gasket will not “fishmouth” or roll out of its groove when homed. Because of its unique profile shape, the gasket provides dual sealing: a compression seal against exfiltration and a combination of compression and hydraulic seal against infiltration. This provides double protection. The hydraulic seal is energized by external pressure, thus it becomes tighter with increasing infiltration pressure. This unique design is superior to an O-ring seal which provides only a compression seal. The Spirolite® pipe joint passes standard air or hydrostatic field testing with ease and is designed in accordance with ASTM D-3212 Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Infiltration rates not to exceed 50 gallons/inch of diameter/mile/day may be specified for the Spirolite® pipe gasket joint. Recommended assembly procedures for the gasket joint are given in the Spirolite Installation Guide.



Spirolite Bell and Spigot Joint



Spirolite HS Thermal Welded Profile Ends



Spirolite Thermal Welded Bell and Spigot Joint

THERMAL WELDED ENDS

The Spirolite® pipe thermal welded joint is used primarily for applications where contact with exotic effluents are anticipated or a higher pressure rating than 25 feet of head is required. Using a portable field extruder, a bead of polyethylene is extruded and fused to the juncture of the bell and spigot to form a homogeneous joint which is absolutely leak proof. The weld bead may be placed on the inside or outside of the pipe or both.

MANHOLES AND FITTINGS



For complete corrosion-resistant systems, Spirolite® manholes are available. These manholes can be fabricated to permit connection to Spirolite® pipe, as well as traditional piping materials. Spirolite® pipe can also be connected to traditional types of manholes.

A full range of fittings is available for use with Spirolite® pipe. All standard fittings are designed with bell and spigot end configurations for easy assembly to Spirolite® pipe in the field. In addition to standard fittings such as elbows, wyes, tees, flanges, and lateral taps, Spirolite® pipe also has the capability to custom fabricate those one-of-a-kind pieces that may be required for special job conditions.



APPLICATIONS

- Sanitary Sewer
- Culvert Rehabilitation
- Odor Control and Ventilation
- Storm Water Detention and Retention Systems
- Pipeline and Flume Rehab
- Industrial Pipelines
- Marine Installations
- Low Pressure Pipelines
- Special Applications
- Above Grade Tanks
- Below Grade Storage Tanks
- Lift Stations and Manholes



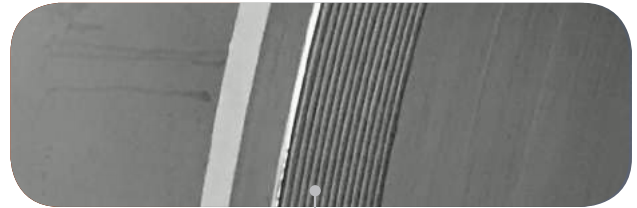


The all-new Spirolite EF pipe welds easily together to form a stronger, more reliable seal that will not break or leak like other pressure pipe joining systems available today. As a result, the two joining Spirolite EF joints form a corrosion-resistant, leak-free, durable pipe that can withstand up to 50 PSI! A leak-free system is not the only advantage our new Spirolite EF offers. When compared

to traditionally designed piping systems, it is evident that Spirolite EF outperforms the alternatives in all parameters.



The perfectly electrofused joint forms one continuous pipe and eliminates leaks.



Electrofusion wires are embedded at the manufacturing stage of the pipe allowing for perfect fusion every time.

Spirolite is cost-efficient, lightweight, durable, weather and corrosion-resistant and can function under a wide temperature range. Spirolite EF can withstand pressure up to 50 PSI!

- Cost-efficient HDPE system for municipal and industrial waste applications
- Pressure grade pipe resin
- Leak-free joints
- No corrosion for lifetime of the pipe
- Less maintenance
- Easier to use and faster to install
- Up to 120" ID or larger custom diameter

Spirolite EF has undergone extensive testing, both locally at our plant and internationally, to ensure a reliable and standardized product.





Spirolite™ pipe also meets the requirements of ASTM F-894 that can function under a wide temperature range and is designed for easy assembly.

Spirolite Electrofusion vs. Other Pipe Materials					
	Spirolite	Corrugated Metal	Concrete	Fiberglass	Clay
Lightweight Typical Weight per foot of 36" pipe (lbs)	30	45	565	88	425
Abrasion Resistant (Darmstadt Procedure 400,000 Cycles)	0.01"	0.05"	0.06" @ 150,000 cycles (max)	0.05"	0.03"
Allowed Deflection Before Failure	20%+	Less than 2%	~0	Long term is 5% or less.	¼"/FT
Minimum Design Life Span (years)	100	35	70-100	50	50
Min No. of Joints Per 100 Feet of Pipe	5	2	13	5	10
Friction/Smoothness (N factor)	0.009	0.022	0.013	0.010	0.014
Withstands PH level	1.5 to 14	5 to 8	4.5 - 6.5	7 to 11 (optimally) down to 2 is possible	1 to 14





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Our fittings meet the strictest specifications.



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