

# Spirolite

HIGH-DENSITY POLYETHYLENE  
PIPE AND FITTINGS



[www.isco-pipe.com](http://www.isco-pipe.com)

# 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. 10](#)



# WHO WE ARE - ISCO INDUSTRIES, INC.

---

ISCO has a long history of recognizing and building on opportunity. In 1962, founder Jim Kirchdorfer, Sr. was running his family's hardware store on the corner of a neighborhood in the heart of Louisville, KY when he recognized a need and developed a solution. A long-time devotee to the game of golf, he was able to parlay his love of the game into a business specializing in underground golf course irrigation. He named the venture the Irrigation Supply Co. (ISCO). By 1975, he learned of a new product that would revolutionize the piping industry. High-density polyethylene (HDPE) was relatively new on the market, but already proving to be a more reliable, longer-lasting material compared to other options.

Since then, Mr. Kirchdorfer's sons, Jimmy and Mark, have taken over the reins. ISCO has grown into a global piping solutions provider with more than 30 facilities across the United States and Canada. What do we mean by solutions? Well, we've developed and honed our custom fabrication and spooling ability. Our mechanics, fabricators, and technicians have decades of experience making HDPE structures such as manholes, tanks, fittings, geothermal vaults, and more. ISCO also makes sure every project has the right equipment by selling and renting tools and fusion equipment. We're proud to serve a long and growing list of markets including municipal, waterworks, landfill, marine, golf, geothermal, industrial, energy, EPC, and more.

## Spirolite

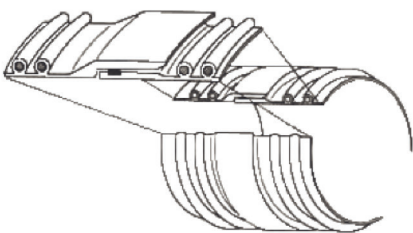
---

**Spirolite**<sup>®</sup> continues ISCO's lineage as a leader in HDPE pipe and fittings technology as it has for 60 years. Spirolite<sup>®</sup> 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

---



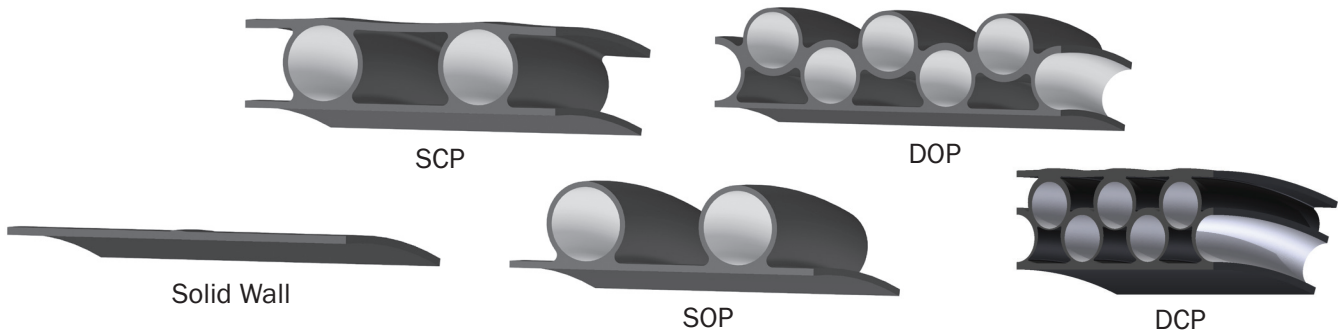
**Spirolite**<sup>®</sup>'s unique manufacturing processes is the only HDPE system in the United States that truly offers an engineered cost competitive alternative to traditional piping systems in applications of gravity and low pressure sanitary sewer systems, odor control ductwork, as well as industrial waste applications. Connecting Spirolite<sup>®</sup> 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                       | 96 | 108 | 120    |

## PROFILE WALL CONCEPT



## 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.

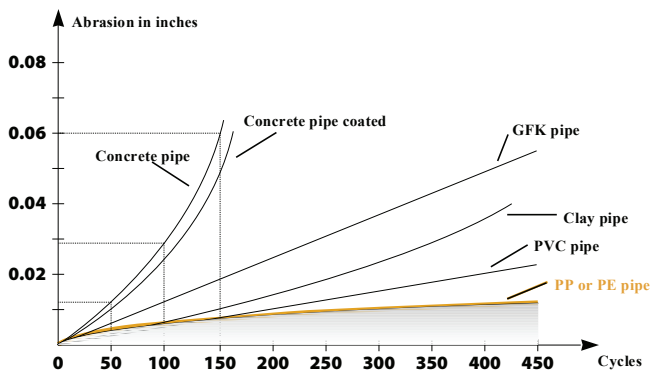
### WEATHERABILITY

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.



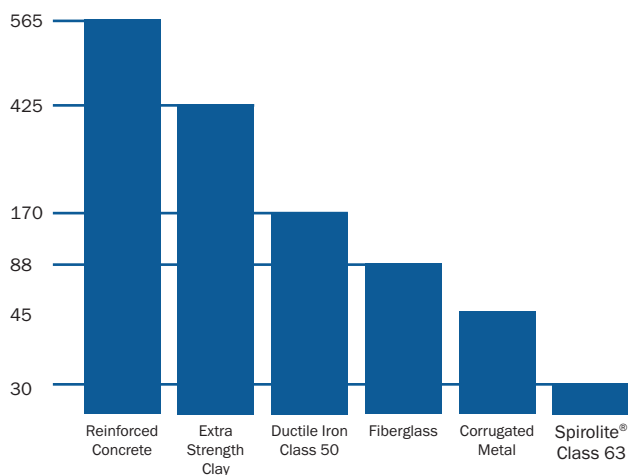
Abrasion curve of various pipe materials according to the Darmstadt procedure.

FIGURE 1:

# FEATURES AND BENEFITS

## 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.



**FIGURE 2: TYPICAL WEIGHT OF 36" SEWER PIPE**

## 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.

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**

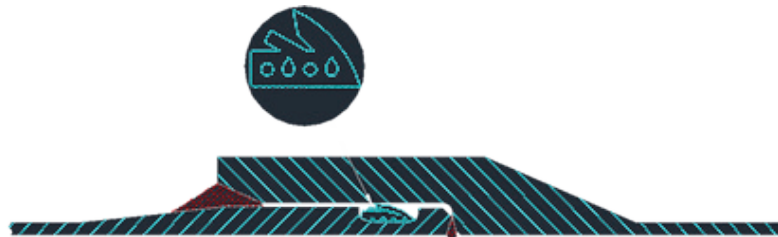
## BELL & SPIGOT

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 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



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 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 |





**ISCO Industries**  
**305 N 7th St | Corsicana, TX 75110**  
**800-345-4726**  
**[www.isco-pipe.com](http://www.isco-pipe.com)**

Our fittings meet the strictest specifications.



AMERICAN PETROLEUM INSTITUTE

