HDPE Dual Containment Piping

In today's world, we must do all that is possible to prevent environmental contamination. HDPE dual containment piping from ISCO Industries reduces the chance of environmental problems.

Dual containment piping decreases the chance of pollution by having one pipe inside of another. The carrier pipe is the inside pipe. The containment pipe is the outside pipe. Having this system made of high-density polyethylene (HDPE) pipe improves reliability.

The space between the containment pipe and the carrier pipe is called the annular space. When there is an end-termination to seal the annular space, leaks in the carrier pipe can be quickly detected and contained before there is a pollution problem.

Federal and State regulations will influence your choice of piping systems. Federal regulations require the ability to detect leaks when transporting hazardous chemicals in a buried piping system.

Why Dual Containment?

The Environmental Protection Agency (EPA) lists four major causes of piping failure:

- Corrosion
- Poor workmanship and installation
- Accidents
- Natural events

By using high-density polyethylene pipe, corrosion is not a problem. Use our chemical resistance charts to make sure that the chemicals in the pipeline are compatible with HDPE pipe. For chemical resistance information go to www.isco-pipe.com to find the latest information provided by the Plastic Pipe Institute.

Bell and spigot pipes will leak if not properly assembled. If the pipe is properly assembled and the soil around the pipe settles, this may cause a leak. This would be a failure by natural event.

In HDPE pipe systems, pipe is joined by butt fusion. The butt fusion joint is as strong as the pipe. If there is differential soil settlement, the joints will not separate. Dual containment pipe is joined by simultaneous butt fusion or stagger welded individual pipes. These joints are as strong as single wall butt fused joints.

When a contractor digs in the wrong place, he may accidentally cause a leak in a single wall pipe. When dual contained pipe is used, often only the outside containment pipe is punctured. This can be quickly repaired. If both the containment and carrier pipes are damaged, both can be repaired.

Systems Design

Leak monitoring is critical in locating of leaks and quick response to leaks. Leak monitoring can also minimize the impact of a release event and the corresponding clean-up costs. The containment pipe is the means of minimizing a leak's impact.

As indicated, the outer pipe is the containment pipe; the inner pipe is the carrier pipe. Centralizers support the carrier pipe. See Figure 1 below. The annular space between the carrier pipe and the containment pipe is sealed at the ends with end terminations

The space between the centralizers determines the deflection or "bow" in the carrier pipe. Systems with more than 1/4" of deflection between centralizers may increase the resistance to flow. When flow is critical, use centralizer spacing that provides 1/4" of deflection. In gravity systems, this is important. In pressurized systems, this is of less importance.

The design of the centralizer is important. If a leak detection cable is used, there must be a cut-out in the bottom of the centralizer to allow flow from a leak and the leak detection cable to be pulled.

Hydrostatic testing is used to test the carrier pipe. The standard test of 1.5 times the design operating pressure is used to ensure the reliability of the welds. The containment piping is usually tested with 5-psi air pressure. Use extreme care when testing with air.

Underground Installation

Underground Installation of HDPE dual-containment piping is the same as most plastic pipe. Figure 2 below shows a typical trench with backfill. To prevent dual-containment piping from floating during installation, hold it in place with crushed stone or soil with good bridging properties. Good compaction will provide the soil-pipe interaction desired with plastic piping systems.

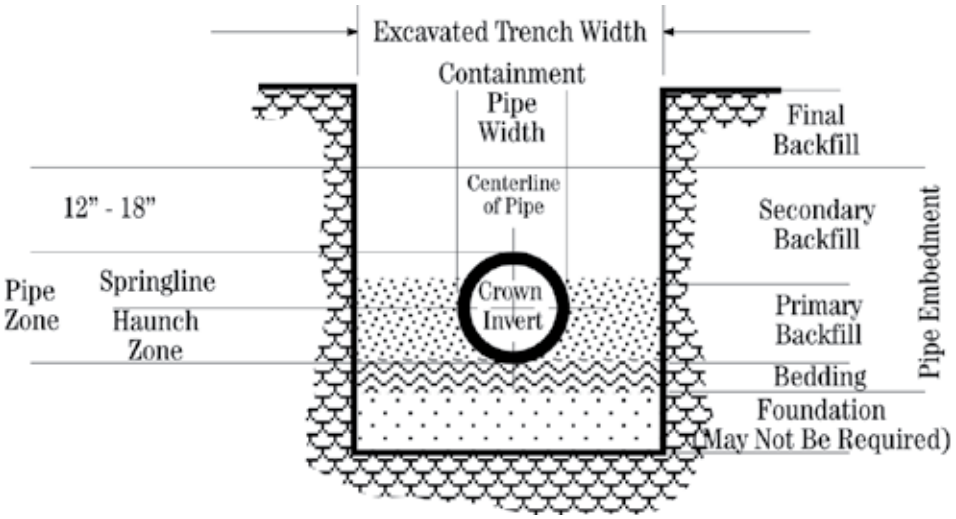
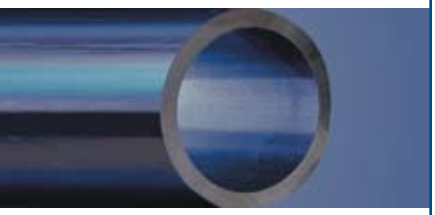


Figure 2 Typical Trench Detail with Backfill



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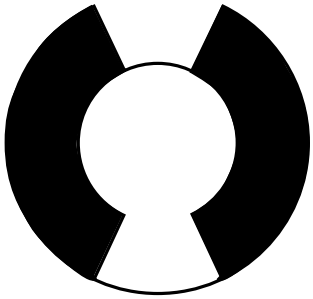


Figure 1 Centralizer

Leak Monitoring for Dual Containment Piping

Leak monitoring can be any method of determining that a leak has occurred. Low point drains are frequently the easiest method of leak monitoring. When a leak occurs, liquid flows to the low point in the pipeline. Liquid in the low point will cause a sensor to set off an alarm or can be manually detected.

Figure 3, below shows a typical end termination with a low point drain. The purpose of the low point drain is for the removal of liquid in case of a leak and for the installation of leak detection point sensors, float switches or leak detection cables.

If leak detection cables are used, care must be taken during installation of the cable or false alarms will occur. The following is a partial list of items to check or avoid:

- Prevent water from getting in the annular space
- Check centralizer spacing to prevent carrier pipe contact with cable
- Centralizer openings must be carefully machined to prevent the cable from getting caught on the centralizer during installation.

Visual leak monitoring systems are used with above ground dual containment piping systems. A clear tube is installed at the low point to show liquid if a leak occurs. Visual leak monitoring systems are not practical for underground pipelines in most cases.

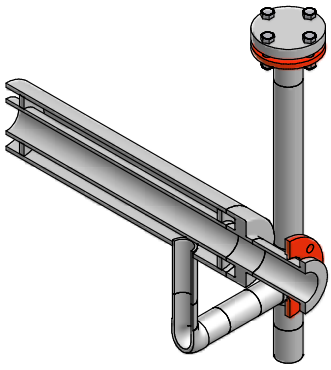


Figure 3. End Termination with Low Point Drain.

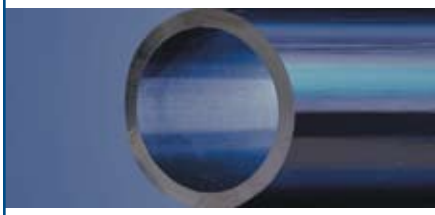


Table 1: Common Size Combinations of Dual Containment Piping

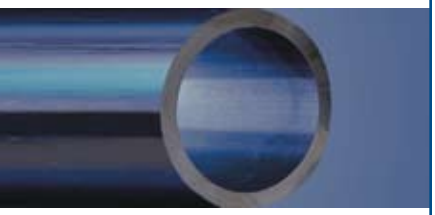
Nominal Size	Carrier DR	Containment DR	Carrier Pipe OD (in)	Carrier Pipe I.D (in)	Containment Pipe OD (in)	Containment Pipe I.D (in)	Weight lbs/ft
1"x 3"	11	11	1.315	1.047	3.5	2.826	1.6
1" x 4"	11	11	1.315	1.047	4.5	3.633	2.5
		17	"	"	"	3.938	1.8
1-1/2" x 4"	11	11	1.9	1.533	4.5	3.633	2.7
		17	"	"	"	3.938	2.0
2" x 4"	11	11	2.375	1.917	4.5	3.633	2.9
		17	"	"	"	3.938	2.2
2" x 6"	11	11	2.375	1.917	6.625	5.349	5.6
		17	"	"	"	5.798	4.0
3" x 6"	11	11	3.5	2.826	6.625	5.349	6.4
		17	"	"	"	5.798	4.7
4" x 8"	11	11	4.5	3.633	8.625	6.963	10.7
		17	"	"	"	7.55	7.9
		26	"	"	"	7.921	6.1
	17	17	"	3.938	"	7.55	7.2
		26	"	"	"	7.921	5.3
6" x 10"	11	11	6.625	5.349	10.75	8.679	18.1
		17	"	"	"	9.41	13.8
		26	"	"	"	9.875	10.8
	17	17	"	5.798	"	9.41	12.1
		26	"	"	"	9.874	9.2
8" x 12"	11	11	8.625	6.963	12.75	10.293	26.8
		17	"	"	"	11.16	20.8
		26	"	"	"	11.711	16.7
	17	17	"	7.55	"	11.16	18.0
		26	"	"	"	11.711	14.0
		32.5	"	"	"	11.919	12.3
	26	26	"	7.921	"	11.711	12.1
		32.5	"	"	"	11.919	10.5

Pressure ranges from gravity flow to more than 200 psi
Carrier pipe sizes from 3/4" - 54" OD.
Containment pipe sizes from 3" - 63" OD.

Additional combinations available as:

Nominal Size	Carrier DR	Containment DR	Carrier Pipe OD (in)	Carrier Pipe I.D (in)	Containment Pipe OD (in)	Containment Pipe I.D (in)	Weight lbs/ft
10" x 14"	11,17,26	26,32.5	10.75	varies	14.0	varies	varies
10" x 16"	11,17,26	17,32.5	10.75	varies	16.0	varies	varies
12" x 16"	11,17,26	26,32.5	12.75	varies	16.0	varies	varies
12" x 18"	11,17,26	17,32.5	12.75	varies	18.0	varies	varies
14" x 20"	11,17,26	17,32.5	14.0	varies	20.0	varies	varies
16" x 22"	11,17,26	17,32.5	16.0	varies	22.0	varies	varies
18" x 24"	11,17,26	17,32.5	18.0	varies	24.0	varies	varies
24" x 30"	17,32.5	32.5	24.0	varies	30.0	varies	varies
30" x 36"	17,32.5	32.5	30.0	varies	36.0	varies	varies
36" x 42"	17,32.5	32.5	36.0	varies	42.0	varies	varies
42" x 48"	26,32.5	32.5	42.0	varies	48.0	varies	varies
48" x 54"	26,32.5	32.5	48.0	varies	54.0	varies	varies
54" x 63"	26,32.5	32.5	54.0	varies	63.0	varies	varies

Non-standard sizes range from 3/4" - 54" (Carrier) and 3" - 63" (Containment).Pressure ranges from Gravity flow to more than 250 psi (<18")



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