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SIMULTANEOUS FUSED – DOUBLE CONTAINMENT HDPE PIPING SYSTEMS  
CRITICAL SDR / WALL THICKNESS DESIGN CRITERIA AND ANNULAR SPACE

Carrier Pipe (inner pipe) and Containment Pipe (outer pipe) should have wall thicknesses that are within 20% of each other to be able to be fused simultaneously with the highest acceptable level of confidence that the proper fusion can be made. (Prime acceptance range) (See examples below)

EXAMPLES OF WALL THICKNESS DIFFERENCE

CONTAINMENT PIPE		CARRIER PIPE (Inner Pipe)		
PIPE SIZE (OD)	10.75	6.625	WALL DIFFERENCE	0.104
SDR	17	9	% THE SAME	86%
WALL	0.632	0.736	Annular Difference per Side	1.430
AVG ID OF PIPE	9.43	5.09		

In the example left, the 10" IPS DR 17 and the 6" IPS DR 9 are within 14% of each other in wall thickness. This application would be acceptable for a simultaneous fusion system.

CONTAINMENT PIPE		CARRIER PIPE (Inner Pipe)		
PIPE SIZE (OD)	10.75	6.625	WALL DIFFERENCE	0.323
SDR	26	9	% THE SAME	56%
WALL	0.413	0.736	Annular Difference per Side	1.649
AVG ID OF PIPE	9.89	5.09		

In the example left, the 10" IPS DR 26 and the 6" IPS DR 9 are 44% different of each other in wall thickness. This application is outside the prime acceptance range for a simultaneous fusion system

CONTAINMENT PIPE		CARRIER PIPE (Inner Pipe)		
PIPE SIZE (OD)	12.75	8.625	WALL DIFFERENCE	0.034
SDR	17	11	% THE SAME	96%
WALL	0.750	0.784	Annular Difference per Side	1.313
AVG ID OF PIPE	11.19	6.99		

In the example left, the 12" IPS DR 17 and the 8" IPS DR 11 are within 4% of each other in wall thickness. This application would be very good for a simultaneous fusion system.

CONTAINMENT PIPE		CARRIER PIPE (Inner Pipe)		
PIPE SIZE (OD)	3.5	1.315	WALL DIFFERENCE	-0.086
SDR	17	11	% THE SAME	172%
WALL	0.206	0.120	Annular Difference per Side	0.887
AVG ID OF PIPE	3.07	1.07		

In the example left, the 3" IPS DR 17 and the 1" IPS DR 11 are 72% different of each other in wall thickness. This application is outside the prime acceptance range for a simultaneous fusion system.

An easy formula for determining if the pipe you want to use is within the pipe acceptance range:

$$\text{Average Wall Thickness} = (\text{OD} \div \text{SDR}) \times 1.04$$

Take one wall thickness and divide it by the other, if the range is within 20% of each other (+20% or -20% from 100%) then these are acceptable pipes and SDR's. i.e.:

$$12.75 \div 17 = .75 \text{ (12" IPS SDR 17)}$$

$$.75 \times 1.04 = .78 \text{ (average wall)}$$

$$8.625 \div 11 = .784 \text{ (8" IPS SDR 11)}$$

$$.784 \times 1.04 = .815 \text{ (average wall)}$$

$$.784 \div .815 = .957$$

$$1 - .957 = .043 \text{ or } 4.3\%$$

It is possible to manufacture Simal-Fuse Dual containment piping systems that fall outside of the 20% range recommended. These systems simply increase the chances of fusion problems during installation.

Annular Space:

It is important that there is enough annular space between the OD of the inner pipe and the ID of the outer pipe to be able to fuse both pipes without the melt beads running into each other and creating sealed sections of pipe. Here is a chart with size to size recommendations. Note wall thickness difference must still be calculated to confirm pipe can be simultaneously fused.

Containment Pipe	X	Carrier Pipe	IPS Size
3.500	X	1.315	3 x 1
3.500	X	1.660	3 x 1 1/4
3.500	X	1.900	3 x 1 1/2
4.500	X	2.375	4 x 2
6.625	X	3.500	6 x 3
6.625	X	4.500	6 x 4
8.625	X	4.500	8 x 4
10.750	X	6.625	10 x 6
12.750	X	8.625	12 x 8
14.000	X	10.750	14 x 10
16.000	X	10.750	16 x 10
18.000	X	12.750	18 x 12
18.000	X	14.000	18 x 14
20.000	X	16.000	20 x 16