

Cast iron vs plastic flow

Standard steel	(in)	(in)	(in)	(sq in)
nominal diameter	outside diameter	wall thick	inside diameter	flow area
1	1.315	0.133	1.049	0.864
1.25	1.660	0.140	1.380	1.496
1.5	1.900	0.145	1.610	2.036
2	2.375	0.154	2.067	3.356
2.5	2.857	0.203	2.451	4.718
3	3.500	0.216	3.068	7.393
3.5	4.000	0.226	3.548	9.887
4	4.500	0.188	4.124	13.358
6	6.625	0.250	6.125	29.465
8	8.626	0.250	8.126	51.861
10	10.750	0.250	10.250	82.516
12	12.750	0.250	12.250	117.859

Source: Republic Steel Catalog API Plain End Pipe

Cast Iron	(in)	(in)	(in)	(sq in)
nominal diameter	outside diameter	wall thick	inside diameter	flow area
2	2.8	0.36	2.080	3.398
3	3.800	0.390	3.020	7.163
4	4.800	0.420	3.960	12.316
6	6.900	0.440	6.020	28.463
8	9.050	0.460	8.130	51.912
10	11.100	0.540	10.020	78.854
12	13.200	0.540	12.120	115.370
14	15.300	0.570	14.160	157.477
16	17.400	0.600	16.200	206.120

assumed  
Source: M Kern email 9/10/2008  
Cast Iron Pipe Handbook (Amer Water Works Assoc)

Plastic		(in)	(in)	(in)	(sq in)
nominal	SDR	outside diameter	wall thick	inside diameter	flow area
2	11	2.375	0.216	1.943	2.965
4	11.5	4.500	0.391	3.718	10.857
6	11.5	6.625	0.576	5.473	23.526
8	13.5	8.625	0.638	7.349	42.418
10		Not Readily Available			
12	13.5	12.750	0.944	10.862	92.664

Source: Drisco Pipe (Performance Pipe) PE2406

Exis/Rep	Flow Area Ratio			Plastic/WI
	Plastic to Plastic	Steel to Plastic	CI to Plastic	
=				
4/4	100.0%	81.3%	88.2%	
6/6	100.0%	79.8%	82.7%	
8/8	100.0%	81.8%	81.7%	
12/12	100.0%	78.6%	80.3%	
2/4	366%	324%	320%	
2/6	793%	701%	692%	
3/4	N/A	147%	152%	
3/6	N/A	318%	328%	
4/6	217%	176%	191%	
4/8	391%	318%	344%	
6/8	180%	144%	149%	
(Roughness Coeff)		Rep/Exist	Exis/Rep	
CI	0.12		1.5% CI to Steel	
Steel	0.0018		0.05% CI to Plastic	
Plastic	0.00006		3.3% Steel to Plastic	

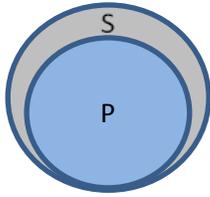
Source: Pipeline Toolbox Ver 10 Houston

Impact Result is minimal to non existant effect because of flow regime (partially turbulent) but cannot be considered negative

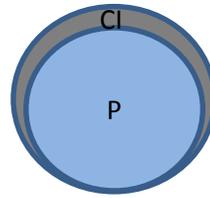
Averages for Attachment 1B

2/4	322%	1.607657383
2/6	697%	3.483578685
3/4	149%	0.746071536
3/8	323%	1.616637307
4/6	184%	0.917834834
4/8	331%	1.654893822
6/8	146%	0.732468306

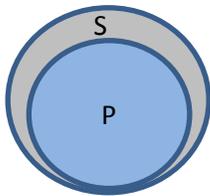
## Attachment 1 A Flow Area Reductions



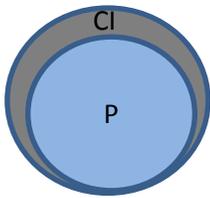
4 in dia. Steel Replaced by 4 in dia. Plastic  
Reduction of 19%



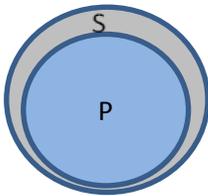
4 in dia. Cast Iron Replaced by 4 in dia. Plastic  
Reduction of 12%



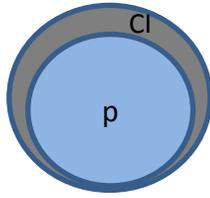
6 in dia. Steel Replaced by 6 in dia. Plastic  
Reduction of 20%



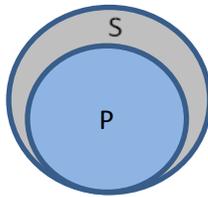
6 in dia. Cast Iron Replaced by 6 in dia. Plastic  
Reduction of 17%



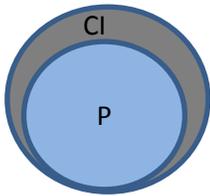
8 in dia. Steel Replaced by 8 in dia. Plastic  
Reduction of 18%



8 in dia. Cast Iron Replaced by 8 in dia. Plastic  
Reduction of 18%

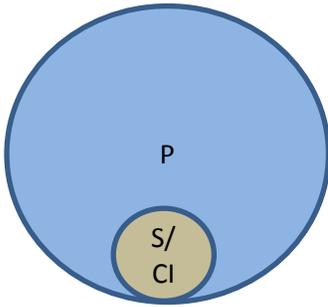


12 in dia. Steel Replaced by 12 in dia. Plastic  
Reduction of 21%

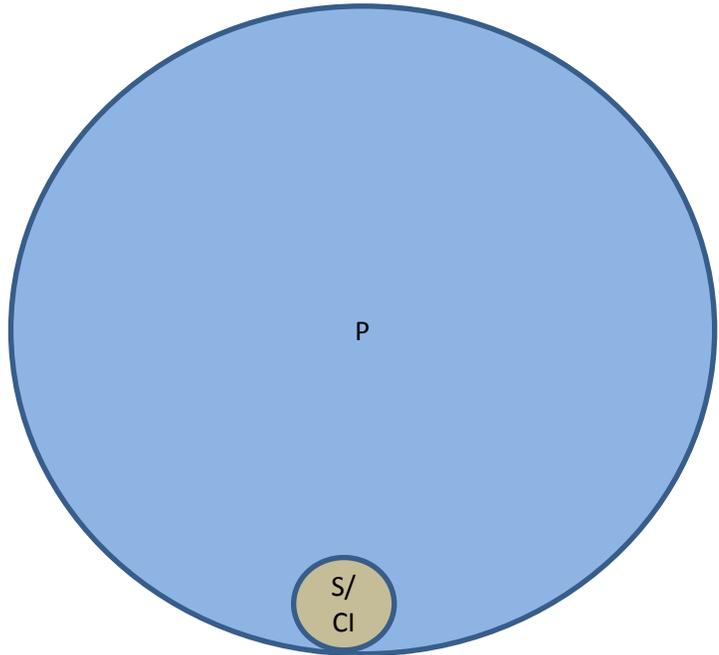


12 in dia. Cast Iron Replaced by 12 in dia. Plastic  
Reduction of 20%

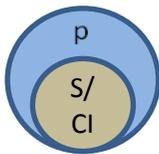
### Attachment 1 B Flow Area Increases



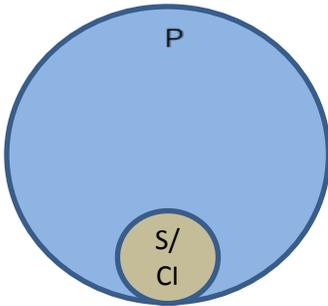
2 in dia. Steel/Cast Iron rpl by 4 in dia. Plastic Increase of 200%



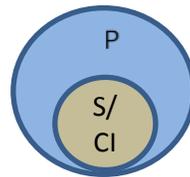
2 in dia. Steel/Cast Iron rpl by 6 in dia. Plastic Increase of 597%



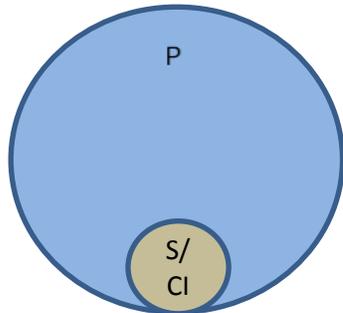
3 in dia. Steel/Cast Iron rpl by 4 in dia. Plastic Increase of 50%



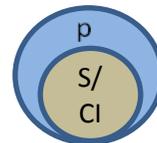
3 in dia. Steel/Cast Iron rpl by 6 in dia. Plastic Increase of 223%



4 in dia. Steel/Cast Iron rpl by 6 in dia. Plastic Increase of 83%



4 in dia. Steel/Cast Iron rpl by 8 in dia. Plastic Increase of 231%



6 in dia. Steel/Cast Iron rpl by 8 in dia. Plastic Increase of 46%