

FULL CIRCLE STEEL PIPE CULVERT											
PIPE DIAMETER FOR CORRUGATION PATTERN				MIN. COVER TOP OF PIPE TO TOP OF SUBGRADE	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE						
					EQUIV. STANDARD GAGE						
2 2/3" x 1/2"	3" x 1"	5" x 1"	6" x 2"		16	14	12	10	8	7	5
18"					12"	61'	67'	86'	90'	94'	
21"				12"	53'	57'	74'	77'	81'		
24"				12"	46'	50'	65'	68'	71'		
27"				12"	41'	44'	57'	60'	63'		
30"				12"	37'	40'	52'	54'	56'		
36"				12"	30'	33'	43'	45'	47'		
	36"			12"	53'	66'	77'	89'	100'		
42"				12"	34'	44'	46'	47'	49'		
	42"			12"	45'	56'	64'	71'	78'		
48"				12"		41'	44'	45'	46'		
	48"			12"	39'	49'	56'	61'	66'		
		48"		12"	49'	52'	56'	61'	66'		
54"				12"		36'	43'	44'	45'		
	54"			12"	35'	44'	51'	55'	58'		
		54"		12"	47'	48'	52'	55'	58'		
60"				12"			42'	43'	43'		
	60"			12"	31'	39'	49'	51'	53'		
		60"		12"	43'	46'	49'	51'	53'		
			60"	12"			46'	68'	90'	96'	106'
66"				12"				42'	43'		
	66"			12"	29'	36'	47'	48'	50'		
		66"		12"	39'	45'	47'	48'	50'		
			66"	12"			42'	62'	78'	82'	90'
72"				12"				42'	42'		
	72"			12"	26'	33'	45'	47'	48'		
		72"		12"	36'	44'	45'	47'	48'	73'	78'
			72"	12"			38'	57'	69'		
78"				12"					42'		
	78"			12"	24'	30'	44'	45'	46'		
		78"		12"	33'	42'	44'	45'	46'		
			78"	12"			35'	53'	63'	66'	70'
84"				12"					42'		
	84"			12"	22'	28'	42'	44'	45'		
		84"		12"	31'	39'	43'	44'	45'		
			84"	12"			33'	49'	59'	61'	64'
				12"			26'	39'	44'	44'	
		90"		12"	29'	36'	43'	44'	44'		
			90"	12"			31'	45'	55'	57'	60'
				12"			24'	36'	43'	44'	
		96"		12"			29'	43'	53'	54'	57'
			96"	12"			34'	43'	43'	44'	
				12"			29'	43'	53'		
		102"		24"			34'	41'	43'		
			102"	24"		32'	42'	43'	43'		
				24"			32'	39'	43'		
			108"	24"			42'	42'	43'		
				24"			25'	38'	49'	50'	52'
								31'	37'	41'	
		114"		24"			40'	42'	42'		
			114"	24"			29'	35'	39'		
				24"			38'	42'	42'		
			120"	24"			23'	34'	45'	48'	49'

FULL CIRCLE ALUMINUM PIPE CULVERT									
PIPE DIAMETER FOR CORRUGATION PATTERN			MIN. COVER	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE					
				EQUIV. STANDARD GAGE					
2 2/3" X 1/2"	3" X 1"	6" X 1"		TOP OF PIPE TO TOP OF SUBGRADE	16	14	12	10'	8
18"			12"	36'	36'	63'			
24"			12"	27'	27'	47'	50'		
27"			12"	24'	24'	42'	44'		
30"			12"	22'	21'	37'	39'		
	30"		12"	40'	50'	68'			
36"			12"		18'	32'	33'		
	36"		12"	33'	41'	57'	85'		
		36"	12"	20'					
42"			12"			54'	57'		
	42"		12"	27'	35'	48'	73'		
48"			12"			47'	49'	51'	
	48"		12"	24'	30'	42'	63'	82'	
54"			12"			41'	44'	45'	
	54"		12"	21'	27'	37'	56'	73'	
		54"	12"		29'	42'	67'	66'	
60"			12"				39'	41'	
	60"		12"	19'	24'	33'	24'	66'	
		60"	12"		25'	37'	59'	58'	
66"			12"				36'	37'	
	66"		12"	14'	18'	26'	40'	51'	
		66"	12"		23'	33'	53'	52'	
	72"		12"		28'	27'	41'	54'	
		72"	15"		19'	27'	36'	43'	
	78"		15"		18'	25'	38'	50'	
		78"	15"		17'	25'	32'	40'	
	84"		18"		17'	23'	35'	47'	
		84"	18"			23'	30'	37'	
	90"		18"			21'	33'	43'	
		90"	18"			21'	28'	34'	
	96"		18"			20'	31'	40'	
		96"	18"			19'	26'	32'	
	102"		21"			18'	28'	37'	
		102"	21"			18'	25'	29'	
	108"		21"				27'	35'	
		108"	21"			17'	23'	28'	
	114"		24"				25'	34'	
		114"	24"			16'	21'	26'	
	120"		24"				24'	32'	
		120"	24"				20'	25'	

POLY-PROPYLENE PIPE DIAMETER	MAXIMUM FILL HEIGHT OVER CULVERT (FT.)				
	UNDER PAVEMENT		OUTSIDE PAVEMENT		
	95% COMPACT	90% COMPACT	Class C - 85% COMPACT	Class D - 85% COMPACT	
18	25	18	16	13	
24	22	16	14	12	
30	23	17	13	12	
36	22	16	11	11	
42	22	15	11	11	
48	21	15	11	10	
60	23	16	11	10	

● REFER TO ROADWAY DESIGN STANDARD SPB-1 FOR MINIMUM FILL HEIGHT AND OTHER POLYPROPYLENE INSTALLATION DETAILS.

EQUIVALENT METAL THICKNESS AND GAGE		
GAGE NUMBER	METAL THICKNESS (INCHES)	
	■ STEEL	◆ ALUMINUM
16	0.064	0.060
14	0.079	0.075
12	0.109	0.105
10	0.138	0.135
8	0.168	0.164
7	0.188	----
5	0.218	----

- THE THICKNESS OF THE SHEET INCLUDES BOTH THE BASE STEEL AND THE COATING.
- ◆ THE THICKNESS SHOWN REFERS TO THE CLAD SHEET.

METAL PIPE ARCH - FILLS TO 10 FT. MAX.					
APPROX. EQUIV. ROUND PIPE	SIZE SPAN x RISE	2 2/3" x 1/2" CORRUGATION PATTERN			
		STEEL		ALUMINUM	
		MIN. GAGE	MIN. COVER	MIN. GAGE	MIN. COVER
15"	17" x 13"	16	12"	16	12"
18"	21" x 15"	16	12"	16	12"
21"	24" x 18"	16	12"	16	12"
24"	28" x 20"	16	12"	14	12"
30"	35" x 24"	14	12"	14	12"
36"	42" x 29"	14	12"	12	15"
42"	49" x 33"	14	12"	12	15"
48"	57" x 38"	12	12"	10	15"
54"	64" x 43"	12	12"	10	18"
60"	71" x 47"	10	12"	8	18"
66"	77" x 52"	8	12"	8	18"
72"	83" x 57"	8	12"	8	18"
3" x 1" & 5" x 1" CORRUGATION PATTERN					
36"	40" x 31"	14	12"		
42"	46" x 36"	14	12"		
48"	53" x 41"	14	12"		
54"	60" x 46"	14	12"	14	15"
60"	66" x 51"	14	12"	14	18"
66"	73" x 55"	14	12"	14	18"
72"	81" x 59"	14	12"	12	21"
78"	87" x 63"	14	12"	12	21"
84"	95" x 67"	12	12"	12	24"
90"	103" x 71"	12	18"	10	24"
96"	112" x 75"	12	18"	10	27"
102"	117" x 79"	12	18"		
108"	128" x 83"	10	24"		
114"	137" x 87"	10	24"		
120"	142" x 91"	10	24"		

● WHEN INSTALLED UNDER PAVEMENT INCLUDING ALL P.C. OR A.C. SURFACING UNDER MAINLINE TRAFFIC AND MAJOR STREET RETURNS. A MINIMUM PIPE GAGE OF 16 MAY BE USED FOR INSTALLATION REQUIRING 30 INCH EQUIVALENT ROUND CONDUITS (MAX.) AND LIMITED TO LOW VOLUME COUNTY OR OFF-SYSTEM ROADS, MINOR STREET RETURNS, DRIVEWAYS OR TEMPORARY DETOURS, AS APPROVED BY THE ENGINEER.

GENERAL NOTES

1. METAL PIPE FILL HEIGHT DESIGNS ARE BASED ON A CLASS B BEDDING, NEGATIVE PROJECTION, HS-20 LIVE LOADING AND 120 LBS/C.F. SOIL WEIGHT. POLYPROPYLENE PIPE FILL HEIGHTS ARE BASED ON AASHTO M330 FOR POLYPROPYLENE, TYPE S, PIPE WITH OUTER CORRUGATED WALL AND SMOOTH INNER WALL.
2. IN THE EVENT LOADS IN EXCESS OF HS-20 ARE TO BE OPERATED OVER OR ADJACENT TO THE PIPE INSTALLATION DURING THE CONSTRUCTION PHASE, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A MINIMUM OF FOUR FEET OF COVER OVER THE PIPE AT WHEEL OR TRACK PATHS.
3. PROPER INSTALLATION PRACTICES MUST BE ADHERED TO AS SHOWN ON ROADWAY STANDARDS SPI-4, FPI-3 AND SPB-1. POLYPROPYLENE PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
4. ANY PIPE DEFORMED PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED BY THE CONTRACTOR AT HIS EXPENSE. SURFACE DISTRESS MUST BE REPAIRED TO THE SATISFACTION OF THE ENGINEER OR REPLACED AT THE CONTRACTOR'S EXPENSE.
5. MAXIMUM FILL HEIGHTS ARE MEASURED TO TOP OF SUBGRADE (OR BOTTOM OF ASPHALT OR PC PAVEMENT) FOR METAL AND POLYPROPYLENE PIPES.