

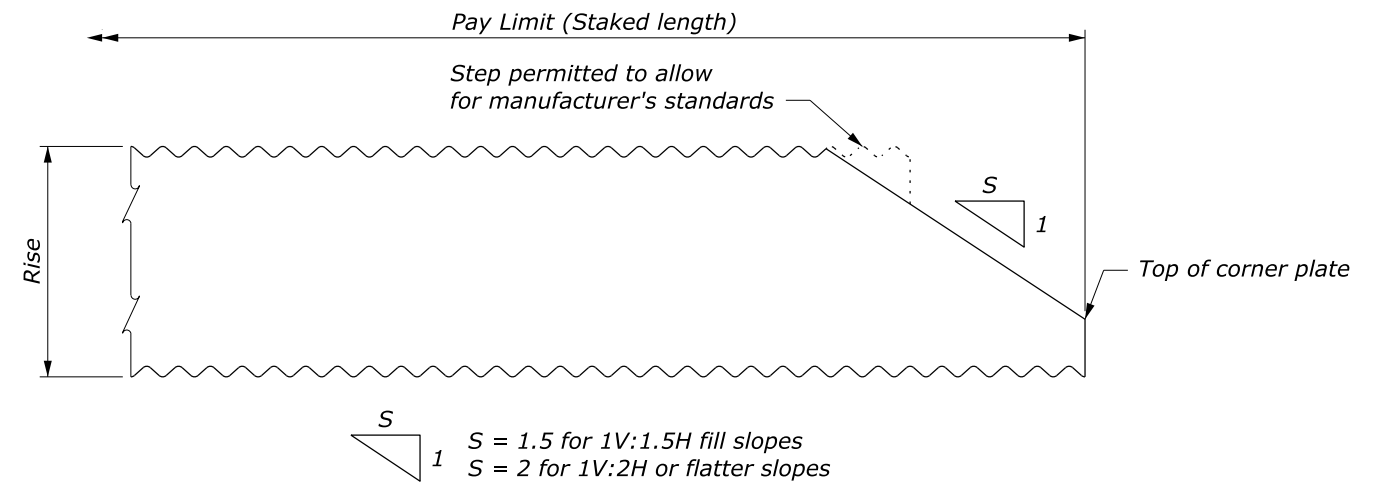
# STRUCTURAL PLATE PIPE ARCH CULVERT

## FILL HEIGHT AND METAL THICKNESS TABLE

STEEL						ALUMINUM					
6" x 2" CORRUGATIONS						9" x 2 1/2" CORRUGATIONS					
2 BOLTS PER CORRUGATION						4 BOLTS PER CORRUGATION					
PIPE ARCH SIZE	CORNER RADIUS	MIN. COVER	METAL THICKNESS		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE FEET	PIPE ARCH SIZE	CORNER RADIUS	MIN. COVER	METAL THICKNESS		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE FEET
SPAN X RISE	INCH	INCH	INCH	GAGE	FEET	SPAN X RISE	INCH	INCH	INCH	GAGE	FEET
6'-1" x 4'-7"	18	12	0.111	12	16	6'-7" x 5'-8"	32	18	0.100	12	23
6'-4" x 4'-9"	18	12	0.111	12	15	6'-11" x 5'-9"	32	18	0.100	12	22
6'-9" x 4'-11"	18	12	0.111	12	14	7'-3" x 5'-11"	32	18	0.100	12	21
7'-0" x 5'-1"	18	12	0.111	12	14	7'-9" x 6'-0"	32	18	0.100	12	20
7'-3" x 5'-3"	18	12	0.111	12	13	8'-1" x 6'-1"	32	21	0.100	12	19
7'-8" x 5'-5"	18	12	0.111	12	13	8'-5" x 6'-3"	32	21	0.100	12	18
7'-11" x 5'-7"	18	12	0.111	12	12	8'-10" x 6'-4"	32	21	0.100	12	17
8'-2" x 5'-9"	18	18	0.111	12	12	9'-3" x 6'-5"	32	24	0.100	12	16
8'-7" x 5'-11"	18	18	0.111	12	11	9'-7" x 6'-6"	32	24	0.100	12	16
8'-10" x 6'-1"	18	18	0.111	12	11	9'-11" x 6'-8"	32	27	0.100	12	15
9'-4" x 6'-3"	18	18	0.111	12	10	10'-3" x 6'-9"	32	27	0.100	12	15
9'-6" x 6'-5"	18	18	0.111	12	10	10'-9" x 6'-10"	32	27	0.100	12	14
9'-9" x 6'-7"	18	18	0.111	12	10	11'-1" x 7'-0"	32	30	0.100	12	14
10'-3" x 6'-9"	18	18	0.111	12	9	11'-5" x 7'-1"	32	30	0.100	12	13
10'-8" x 6'-11"	18	18	0.111	12	9	11'-9" x 7'-2"	32	30	0.100	12	13
10'-11" x 7'-1"	18	18	0.111	12	9	12'-3" x 7'-3"	32	33	0.100	12	12
11'-5" x 7'-3"	18	18	0.111	12	8	12'-7" x 7'-5"	32	33	0.100	12	12
11'-7" x 7'-5"	18	18	0.111	12	8	12'-11" x 7'-6"	32	36	0.100	12	12
11'-10" x 7'-7"	18	18	0.111	12	8	13'-1" x 8'-2"	32	36	0.100	12	11
12'-4" x 7'-9"	18	24	0.111	12	7	13'-1" x 8'-4"	32	36	0.100	12	11
12'-6" x 7'-11"	18	24	0.111	12	7	13'-11" x 8'-5"	32	36	0.100	12	11
12'-8" x 8'-1"	18	24	0.111	12	7	13'-11" x 9'-5"	32	36	0.100	12	11
12'-10" x 8'-4"	18	24	0.111	12	6	14'-0" x 8'-7"	32	36	0.100	12	11
13'-5" x 8'-5"	18	24	0.111	12	6	14'-3" x 9'-7"	32	36	0.100	12	10
13'-11" x 8'-7"	18	24	0.111	12	6	14'-8" x 9'-8"	32	36	0.125	11	12
14'-1" x 8'-9"	18	24	0.111	12	5	14'-11" x 9'-10"	32	36	0.125	11	11
14'-3" x 8'-11"	18	24	0.111	12	5	15'-4" x 10'-0"	32	36	0.125	11	11
14'-11" x 9'-4"	31	30	0.111	12	12	15'-7" x 10'-2"	32	36	0.125	11	11
14'-11" x 9'-4"	31	30	0.111	12	12	16'-1" x 10'-4"	32	36	0.125	11	10
14'-11" x 9'-4"	31	30	0.111	12	12	16'-4" x 10'-6"	32	36	0.150	9	10
14'-11" x 9'-4"	31	30	0.111	12	12	16'-9" x 10'-8"	32	36	0.150	9	10
14'-11" x 9'-4"	31	30	0.111	12	11	17'-0" x 10'-10"	32	36	0.150	9	10
14'-11" x 9'-4"	31	30	0.111	12	11	17'-3" x 11'-0"	32	36	0.150	9	10
14'-11" x 9'-4"	31	30	0.111	12	11	17'-9" x 11'-2"	32	36	0.175	7	9
14'-11" x 9'-4"	31	30	0.111	12	11	18'-0" x 11'-4"	32	36	0.175	7	9
14'-11" x 9'-4"	31	30	0.111	12	10	18'-5" x 11'-6"	32	36	0.175	7	9
14'-11" x 9'-4"	31	30	0.111	12	10	18'-8" x 11'-8"	32	36	0.200	6	9
14'-11" x 9'-4"	31	30	0.111	12	10	19'-2" x 11'-9"	32	36	0.200	6	9
14'-11" x 9'-4"	31	30	0.111	12	10	19'-5" x 11'-11"	32	36	0.200	6	9
14'-11" x 9'-4"	31	30	0.111	12	10	19'-10" x 12'-1"	32	36	0.200	6	8
14'-11" x 9'-4"	31	30	0.111	12	9	20'-1" x 12'-3"	32	36	0.200	6	8
14'-11" x 9'-4"	31	30	0.111	12	9	20'-1" x 12'-6"	32	36	0.200	6	8
14'-11" x 9'-4"	31	30	0.111	12	9	20'-10" x 12'-7"	32	36	0.225	4	7
14'-11" x 9'-4"	31	30	0.111	12	9	21'-1" x 12'-9"	32	36	0.225	4	7
14'-11" x 9'-4"	31	30	0.111	12	9	21'-6" x 12'-11"	32	36	0.225	4	7
14'-11" x 9'-4"	31	30	0.140	10	8						
14'-11" x 9'-4"	31	30	0.140	10	8						
14'-11" x 9'-4"	31	30	0.140	10	8						
14'-11" x 9'-4"	31	30	0.140	10	8						
14'-11" x 9'-4"	31	30	0.140	10	7						
14'-11" x 9'-4"	31	30	0.140	10	7						

**NOTE:**

1. Fabricate the bottom plates one (1) thickness heavier than the side plates but not heavier than 0.170 inch for steel or 0.250 inch for aluminum.
2. Fasten plates with galvanized steel 3/4" bolts and nuts conforming to AASHTO M 167.
3. When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
4. Measure minimum cover from the top of the pipe culvert to the subgrade for flexible pavements, and to the top of the pavement for rigid pavements. Measure maximum fill height from the top of the pipe to the top of the pavement for both flexible and rigid pavement.



**END TREATMENT DIAGRAM**

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA  
OFFICE OF FEDERAL LANDS HIGHWAY

**STRUCTURAL PLATE  
PIPE ARCH CULVERT**

FLH STANDARD  
603-2

SPECIFICATION  
FP-24, FP-14

APPROVED FOR USE  
1/2024

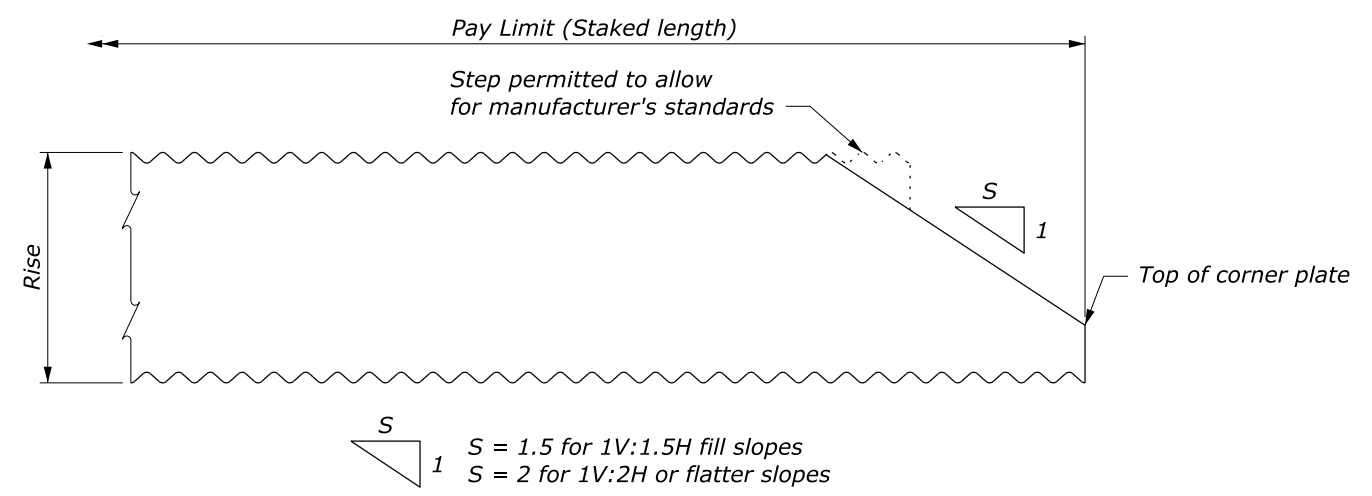
### STRUCTURAL PLATE PIPE ARCH CULVERT

#### FILL HEIGHT AND METAL THICKNESS TABLE

STEEL					ALUMINUM				
152 x 51 CORRUGATIONS					230 x 64 CORRUGATIONS				
2 BOLTS PER CORRUGATION					4 BOLTS PER CORRUGATION				
PIPE ARCH SIZE	CORNER RADIUS	MIN. COVER	METAL THICKNESS	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE METERS	PIPE ARCH SIZE	CORNER RADIUS	MIN. COVER	METAL THICKNESS	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE METERS
SPAN X RISE					SPAN X RISE				
1850 x 1400	460	300	2.82	4.9	2010 x 1730	805	450	2.54	7.0
1930 x 1450	460	300	2.82	4.6	2110 x 1750	805	450	2.54	6.7
2060 x 1500	460	300	2.82	4.3	2210 x 1800	805	450	2.54	6.4
2130 x 1550	460	300	2.82	4.3	2360 x 1830	805	450	2.54	6.1
2210 x 1600	460	300	2.82	4.0	2460 x 1850	805	525	2.54	5.8
2340 x 1650	460	300	2.82	4.0	2570 x 1910	805	525	2.54	5.5
2410 x 1700	460	300	2.82	3.7	2690 x 1930	805	525	2.54	5.2
2490 x 1750	460	450	2.82	3.7	2820 x 1960	805	600	2.54	4.9
2620 x 1800	460	450	2.82	3.4	2920 x 1980	805	600	2.54	4.9
2690 x 1850	460	450	2.82	3.4	3020 x 2030	805	675	2.54	4.6
2840 x 1910	460	450	2.82	3.0	3120 x 2060	805	675	2.54	4.6
2900 x 1960	460	450	2.82	3.0	3280 x 2080	805	675	2.54	4.3
2970 x 2010	460	450	2.82	3.0	3380 x 2130	805	750	2.54	4.3
3120 x 2060	460	450	2.82	2.7	3480 x 2160	805	750	2.54	4.0
3250 x 2110	460	450	2.82	2.7	3580 x 2180	805	750	2.54	4.0
3330 x 2160	460	450	2.82	2.7	3730 x 2210	805	825	2.54	3.7
3480 x 2210	460	450	2.82	2.4	3840 x 2260	805	825	2.54	3.7
3530 x 2260	460	450	2.82	2.4	3940 x 2290	805	900	2.54	3.7
3610 x 2310	460	450	2.82	2.4	3990 x 2490	805	900	2.54	3.4
3760 x 2360	460	600	2.82	2.1	3990 x 2540	805	900	2.54	3.4
3810 x 2410	460	600	2.82	2.1	4240 x 2570	805	900	2.54	3.4
3860 x 2460	460	600	2.82	2.1	4240 x 2870	805	900	2.54	3.4
3910 x 2540	460	600	2.82	1.8	4240 x 2620	805	900	2.54	3.4
4090 x 2570	460	600	2.82	1.8	4340 x 2920	805	900	2.54	3.0
4240 x 2620	460	600	2.82	1.8	4470 x 2950	805	900	3.18	3.7
4290 x 2670	460	600	2.82	1.5	4550 x 3000	805	900	3.18	3.4
4340 x 2720	460	600	2.82	1.5	4670 x 3050	805	900	3.18	3.4
4040 x 2840	790	750	2.82	3.7	4750 x 3100	805	900	3.18	3.4
4110 x 2900	790	750	2.82	3.7	4900 x 3150	805	900	3.18	3.0
4270 x 2950	790	750	2.82	3.7	4980 x 3200	805	900	3.81	3.0
4320 x 3000	790	750	2.82	3.7	5110 x 3250	805	900	3.81	3.0
4390 x 3050	790	750	2.82	3.4	5180 x 3300	805	900	3.81	3.0
4550 x 3100	790	750	2.82	3.4	5260 x 3350	805	900	3.81	3.0
4670 x 3150	790	750	2.82	3.4	5410 x 3400	805	900	4.44	2.7
4750 x 3200	790	750	2.82	3.4	5490 x 3450	805	900	4.44	2.7
4830 x 3250	790	750	2.82	3.0	5610 x 3510	805	900	4.44	2.7
4950 x 3300	790	750	2.82	3.0	5690 x 3560	805	900	5.08	2.7
5030 x 3350	790	750	2.82	3.0	5840 x 3580	805	900	5.08	2.7
5180 x 3400	790	750	2.82	3.0	5920 x 3630	805	900	5.08	2.7
5230 x 3450	790	750	2.82	3.0	6050 x 3680	805	900	5.08	2.4
5310 x 3510	790	750	2.82	2.7	6120 x 3730	805	900	5.08	2.4
5460 x 3560	790	750	2.82	2.7	6120 x 3810	805	900	5.08	2.4
5510 x 3610	790	750	2.82	2.7	6350 x 3840	805	900	5.72	2.1
5660 x 3660	790	750	2.82	2.7	6430 x 3890	805	900	5.72	2.1
5720 x 3710	790	750	2.82	2.7	6550 x 3940	805	750	5.72	2.1
5870 x 3760	790	750	3.56	2.4					
5940 x 3810	790	750	3.56	2.4					
5990 x 3860	790	750	3.56	2.4					
6070 x 3910	790	750	3.56	2.4					
6220 x 3960	790	750	3.56	2.1					
6270 x 4010	790	750	3.56	2.1					

**NOTE:**

1. Fabricate the bottom plates one (1) thickness heavier than the side plates but not heavier than 4.32 mm for steel or 6.35 mm for aluminum.
2. Fasten plates with galvanized steel M20 bolts and nuts conforming to AASHTO M 167M.
3. When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
4. Measure minimum cover from the top of the pipe culvert to the subgrade for flexible pavements, and to the top of the pavement for rigid pavements. Measure maximum fill height from the top of the pipe to the top of the pavement for both flexible and rigid pavement.
5. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are unavailable.



**END TREATMENT DIAGRAM**

This drawing contains **Metric** units of measure. Dimensions without units are millimeters.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA OFFICE OF FEDERAL LANDS HIGHWAY	FLH STANDARD <b>M603-2</b>
<b>STRUCTURAL PLATE PIPE ARCH CULVERT</b>	SPECIFICATION FP-24, FP-14
	APPROVED FOR USE 1/2024