

CORRUGATED STEEL PIPE (ROUND) H-20 LOADING

PIPE DIAMETER (mm)	MINIMUM COVER TOP OF PIPE TO TOP OF SUBGRADE (mm)	MAX. FILL HEIGHT ABOVE TOP OF PIPE (meters)							
		METAL THICKNESS IN mm							
		1.63	2.01	2.77	3.51	4.27			
		68mm BY 12mm CORRUGATION RIVETED, WELDED, OR HELICAL							
300	300	25.6	27.7						
375	300	20.4	22.3						
450	300	17.1	18.6						
600	300	12.8	14.0	18.0					
750	300	10.4	11.0	14.3					
900*	300		9.1	11.9	12.5				
1050*	300		13.1	14.0	20.4	21.3	15.2	22.3	
1200*	300		11.3	13.7	17.7	14.0	18.6	14.3	19.5
		75mm BY 25mm OR 125mm BY 25mm CORRUGATION** RIVETED, WELDED, HELICAL, OR BOLTED							
900	300	14.6	18.3	23.9	26.8	27.1	33.8	30.8	39.9
1050	300	12.5	16.5	19.6	21.9	21.6	27.4	24.1	31.1
1200	300	11.0	13.7	17.4	19.6	18.6	23.6	20.1	25.9
1350	300	9.8	12.2	15.8	18.0	16.8	21.6	18.8	24.1
1500	300	8.8	11.0	14.9	16.2	15.5	19.5	16.5	21.6
1650	300	7.9	10.1	14.3		14.9	17.7	15.5	19.5
1800*	300	7.3	9.1	13.4		14.3	16.2	14.9	18.0
1950	300		8.5	12.5		14.06	14.9	14.3	16.5
2100*	300		7.9	11.6		13.7		14.0	15.5
2250*	300		7.3	10.7		13.1		13.7	
2400*	300		6.7	10.1		12.2		13.4	
2550*	600			9.5		11.6		12.8	
2700*	600			9.1		10.7		11.9	
2850*	600			8.5		10.4		11.3	
3000*	600			8.2		9.8		10.7	

* MAX. FILL CAN BE INCREASED IN THESE DIAMETER PIPES BY USING THE NEXT LARGER CORRUGATION. REFER TO "CORRUGATED METAL PIPE", REVISED 1970, PUBLISHED BY U.S. DEPARTMENT OF TRANSPORTATION, F.H.W.A., B.P.R.

** WHERE THE STANDARD 68mm x 13mm CORRUGATION AND GAUGE IS SPECIFIED FOR A GIVEN DIAMETER, A 75mm x 25mm OR 125mm x 25mm CORRUGATION PIPE OF THE SAME DIAMETER MAY BE SUBSTITUTED, PROVIDING IT IS GAUGED FOR A FILL HEIGHT CONDITION EQUAL TO OR GREATER THAN THE MAXIMUM FILL HEIGHT CONDITION FOR THE SPECIFIED GAUGE AND CORRUGATION.

CORRUGATED ALUMINUM PIPE (ROUND) H-20 LOADING

PIPE DIAMETER (mm)	MINIMUM COVER TOP OF PIPE TO TOP OF SUBGRADE (mm)	MAX. FILL HEIGHT ABOVE TOP OF PIPE (meters)				
		METAL THICKNESS IN mm				
		1.52	1.91	2.67	3.43	4.17
		68mm BY 12mm CORRUGATION RIVETED OR HELICAL				
300	300	13.7	13.7			
450	300	9.1	9.1	15.9		
600	300	6.7	6.7	11.9	12.5	10.4
750	300	5.5	5.5	9.5	9.8	8.5
900	300		4.6	7.9	8.7	8.5
1050	300		7.9	13.1	12.5	13.4
1200	300			10.7	11.3	11.6
1350	300			10.7	10.1	10.4
1500	300				9.1	9.5
1650	300					8.8
1800	300					

EQUIVALENT METAL THICKNESSES AND GAUGES

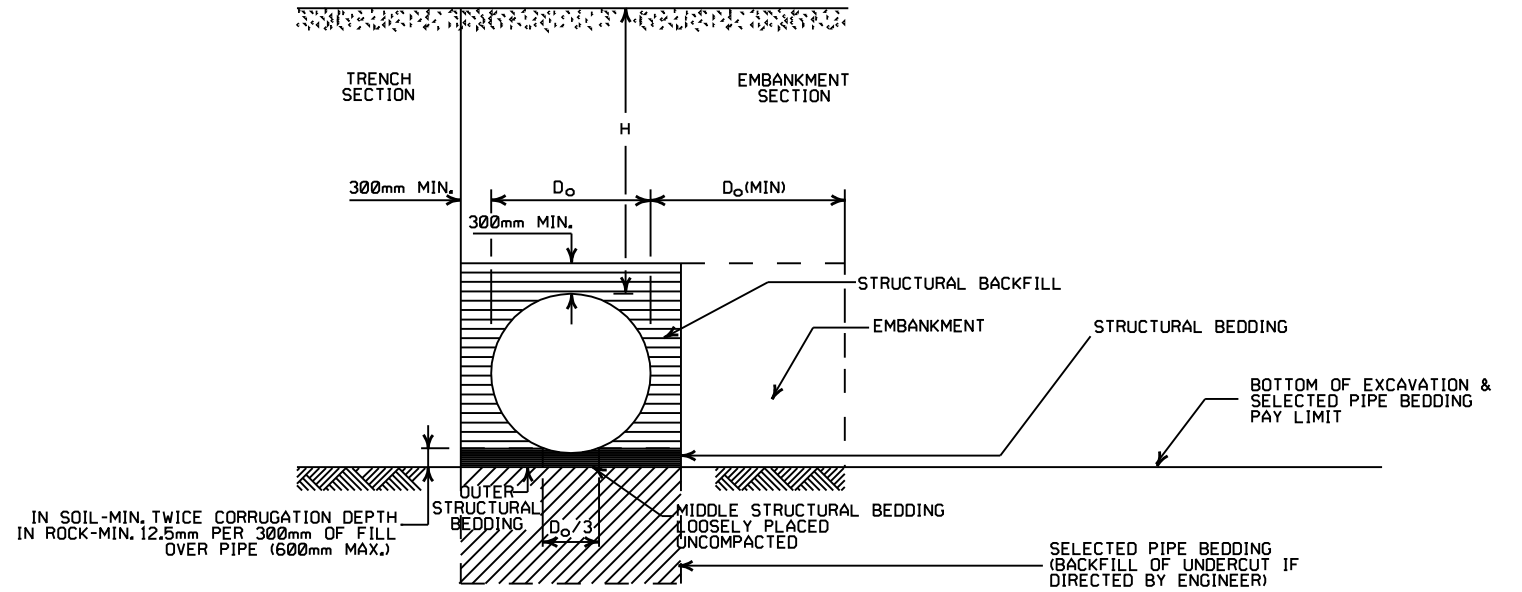
METAL THICKNESS IN mm			GAUGE NUMBER
STEEL			
ZINC COATED	UNCOATED	ALUMINUM	
1.63	1.52	1.52	16
2.01	1.90	1.91	14
2.77	2.66	2.67	12
3.51	3.42	3.43	10
4.27	4.18	4.17	8
4.78	4.67		7
5.54	5.45		5
6.32	6.23		3
7.11	7.01		1

CORRUGATED METAL PIPE ARCHES (H - 20 LOADING)

EQUIV. DIA. (mm)	PIPE DIMENSION SPAN X RISE (mm)	MINIMUM CORNER RADIUS (mm)	MIN. COVER TOP OF PIPE TO TOP OF SUBGRADE FOR 19.5 m t/sq meter (mm)	STEEL			ALUMINUM		
				MINIMUM THICKNESS REQUIRED (mm)	MAX. FILL HEIGHT ABOVE TOP OF PIPE (IN METERS) FOR THE FOLLOWING CORNER BEARING PRESSURE IN metric ton PER sq meter		MINIMUM THICKNESS REQUIRED (mm)	MAX. FILL HEIGHTS ABOVE TOP OF PIPE (IN METERS) FOR THE FOLLOWING CORNER BEARING PRESSURE IN metric ton PER sq meter	
					1.81m t	2.72m t ¹		1.81m t	2.72m t ¹
				68mm BY 12mm CORRUGATION RIVETED, WELDED, OR HELICAL					
375	430x330	75	300	1.63	3.96	4.57+	1.52	4.57	
450	530x380	75	300	1.63	3.66	4.57+	1.52	4.27	
525	610x460	75	300	1.63	3.05	4.57+	1.52	3.66	4.57+
600	710x510	75	300	1.63	3.05	4.57	1.52	3.05	4.57+
750	885x610	75	300	2.01	2.74	4.27	1.91	2.74	4.27
900	1060x740	88	300	2.01	2.74	3.96	1.91	2.74	3.96
1050	1240x840	100	300	2.01	2.44	3.66	2.67	2.44	3.66
1200	1440x970	125	300	2.77	2.44	3.66	3.43	2.44	3.66
1350	1620x1100	150	300	2.77	2.44	3.66	3.43	2.44	3.66
1500	1800x1200	175	300	3.51	2.44	3.66	4.17	2.44	3.66
1650	1950x1320	200	300	4.27	2.44	3.66	4.17	2.44	3.66
1800	2100x1450	225	300	4.27	2.74	3.96			
				75mm BY 25mm OR 125mm BY 25mm CORRUGATION ** RIVETED, WELDED, OR HELICAL					
900	1010x790	125	300	2.01	4.57	4.57+			
1050	1160x920	150	300	2.01	4.57	4.57+			
1200	1340x1050	175	300	2.01	4.57	4.57+			
1350	1520x1170	200	300	2.01	4.57	4.57+			
1500	1670x1300	225	300	2.01	4.57	4.57+			
1650	1850x1400	300	300	2.01	4.57	4.57+			
1800	2050x1500	350	300	2.01	4.57	4.57+			
1950	2200x1620	350	450	2.01	4.27	4.57+			
2100	2400x1720	400	450	2.77	3.96	4.57+			
2250	2600x1820	400	450	2.77	3.66	4.57+			
2400	2840x1920	450	450	2.77	3.35	4.57+			
2550	2970x2020	450	600	2.77	3.05	4.57			
2700	3240x2120	450	600	3.51	2.74	4.27			

¹ WHERE BEARING PRESSURE EXCEEDING 19.5 metric tons PER sq meter IS REQUIRED FOR GIVEN FILL HEIGHTS, THE FOUNDATION MATERIAL SHALL BE INVESTIGATED TO DETERMINE THE BEARING CAPACITY.

** WHERE THE STANDARD 68mmx13mm CORRUGATION AND GAUGE IS SPECIFIED FOR A GIVEN DIAMETER, A 75mmx25mm OR 125mmx25mm CORRUGATION PIPE OF THE SAME DIAMETER MAY BE SUBSTITUTED, PROVIDING IT IS GAUGED FOR A FILL HEIGHT CONDITION EQUAL TO OR GREATER THAN THE MAXIMUM FILL HEIGHT CONDITION FOR THE SPECIFIED GAUGE AND CORRUGATION.



TYPE 2 EMBANKMENT AND TRENCH INSTALLATIONS

1. STRUCTURAL BACKFILL, EMBANKMENT, AND OUTER STRUCTURAL BEDDING MATERIAL SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY ACCORDING TO THE TYPE OR CLASS OF MATERIAL USED.

CONSTRUCTION SEQUENCE

1. PLACE STRUCTURAL BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
2. INSTALL PIPE TO GRADE.
3. COMPACT STRUCTURAL BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
4. COMPLETE STRUCTURAL BACKFILL OPERATION BY WORKING FROM SIDE TO SIDE OF THE PIPE. THE SIDE TO SIDE STRUCTURAL BACKFILL DIFFERENTIAL SHALL NOT EXCEED 600mm OR 1/3 THE SIZE OF THE PIPE, WHICHEVER IS LESS.

NOTE: STRUCTURAL BACKFILL AND STRUCTURAL BEDDING MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT COMPENSATION WILL BE CONSIDERED TO BE INCLUDED IN THE PRICE BID PER METER OF METAL PIPE.

INSTALLATION TYPE	MATERIAL REQUIREMENTS FOR STRUCTURAL BACKFILL AND STRUCTURAL BEDDING
TYPE 2	*SELECTED MATERIALS (CLASS SM-1, SM-2 OR SM-3)

* AGGREGATE BASE COURSE (CLASS 4, 5, 6, OR 7) MAY BE USED IN LIEU OF SELECTED MATERIAL.

GENERAL NOTES

1. ALL PIPE SHALL BE PROTECTED DURING CONSTRUCTION BY A COVER SUFFICIENT TO PREVENT DAMAGE FROM PASSAGE OF EQUIPMENT.
2. THE MINIMUM TRENCH WIDTH SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS 600mm.
3. THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE THE MINIMUM WIDTH PRACTICABLE FOR WORKING CONDITIONS.
4. MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 600mm BETWEEN STRINGS OF PIPE.
5. REFER TO STD. DWG. FES-2(M) FOR MINIMUM CLEARANCE WHERE FLARED END SECTIONS ARE USED.
6. IMPERVIOUS MATERIAL SHOULD BE PLACED AS DIRECTED BY THE ENGINEER AT THE ENDS OF THE CULVERT TO PREVENT LOSS OF STRUCTURAL BEDDING WHEN PERVIOUS MATERIAL IS USED FOR STRUCTURAL BEDDING AND/OR BACKFILL.
7. WHEN DIRECTED BY THE ENGINEER, UNSUITABLE MATERIAL THAT IS ENCOUNTERED AT THE BOTTOM OF THE EXCAVATED TRENCH (BELOW THE AREA IDENTIFIED AS "STRUCTURAL BEDDING" ABOVE) WILL BE EXCAVATED AND REPLACED WITH SELECTED PIPE BEDDING. THE QUANTITY OF MATERIAL REQUIRED TO BACKFILL THE UNDERCUT AREA UP TO THE SELECTED PIPE BEDDING PAY LIMIT DESIGNATED ABOVE WILL BE MEASURED AND PAID FOR AS "SELECTED PIPE BEDDING."
8. WHEN THE EXISTING MATERIAL EXCAVATED FOR THE PIPE TRENCH IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING THE PIPE (ABOVE THE AREA IDENTIFIED ABOVE AS STRUCTURAL BACKFILL), BORROW MATERIAL OR MATERIAL FROM THE ROADWAY EXCAVATION WILL BE USED TO BACKFILL THE PIPE. IF SUITABLE MATERIAL IS NOT AVAILABLE, THE ENGINEER MAY AUTHORIZE THE USE OF "SELECTED PIPE BACKFILL."

- LEGEND -

- D_o = OUTSIDE DIAMETER OF PIPE
- MAX. = MAXIMUM
- MIN. = MINIMUM
- [Hatched Pattern] = STRUCTURAL BACKFILL MATERIAL
- [Diagonal Lines] = UNDISTURBED SOIL
- ELONG. = ELONGATED
- EQUIV. DIA. = EQUIVALENT DIAMETER
- H = FILL COVER HEIGHT OVER PIPE (METER)

ARKANSAS STATE HIGHWAY COMMISSION

METAL PIPE CULVERT FILL HEIGHTS & BEDDING

DATE	REVISION	DATE FILMED
3-30-00	REVISED INSTALLATIONS	
1-06-97	ISSUED	

STANDARD DRAWING PCM-1(M)

