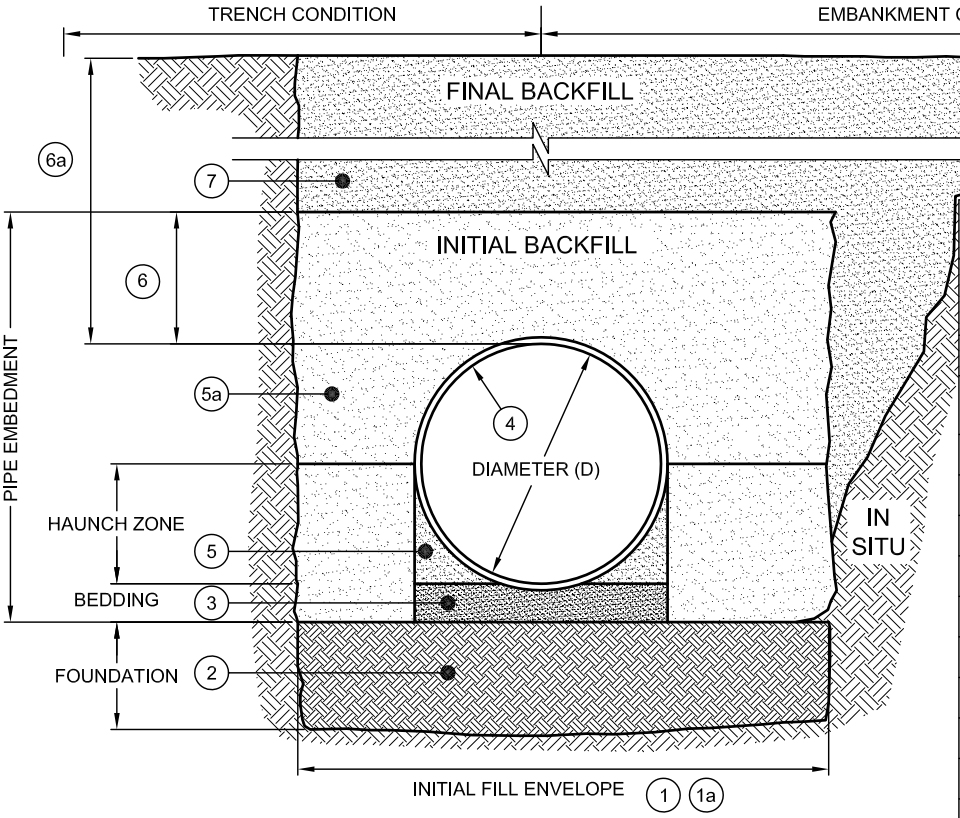

MIN. COVER HEIGHTS FOR DIAMETERS PER GAGE OF MANUFACTURE				
DIA. (in.)	16ga (.064")	14ga (.079")	12ga (.109")	10ga (.138")
18"	12"	12"	N/A	N/A
21"- 42"	12"	12"	12"	N/A
48"	12"	12"	12"	12"
54"	(II) 15"	15"	15"	15"
60"	(III) 15"	15"	15"	15"
66"	N/A	(II) 18"	18"	18"
72"	N/A	(III) 18"	18"	18"
78"	N/A	(III) 21"	21"	21"
84"	N/A	N/A	(II) 21"	21"
90"	N/A	N/A	(III) 24"	24"
96"	N/A	N/A	(III) 24"	(II) 24"
102"	N/A	N/A	(III) 30"	(II) 30"
108"-120"	N/A	N/A	N/A	(III) 30"

ALL INSTALLATIONS ARE TYPE (I) UNLESS OTHERWISE NOTED. SEE NOTE 5a FOR ALL INSTALLATION REQUIREMENTS.

- **BACKFILL REQUIREMENTS FOLLOW THE GUIDELINES OF ASTM A 798.**

(1) MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE TRENCH WIDTH IS THE MINIMUM AMOUNT REQUIRED FOR PROPER INSTALLATION (5.1) AND TO SUPPORT HORIZONTAL PRESSURE FROM THE PIPE (TABLE #1). THE MANUFACTURER'S SUGGESTED MINIMUM VALUE IS: 1.5D + 12".

(1a) MINIMUM EMBANKMENT WIDTH (in feet) FOR INITIAL FILL ENVELOPE SHALL BE: 3.0D BUT NO LESS THAN D + 4'0" (TABLE #1).

(2) THE FOUNDATION UNDER THE PIPE AND SIDE BACKFILL SHALL BE ADEQUATE TO SUPPORT THE LOADS ACTING UPON IT (6.1).

(3) BEDDING MATERIAL SHALL BE A RELATIVELY LOOSE MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, AND A DEPTH OF ½" PER FOOT OF FILL HEIGHT (6a), 24" MAX (FIG. #3). THE MAXIMUM PARTICLE SIZE IS NOT TO EXCEED 3" IN DIAMETER (7.1).

(4) 0.75" X 0.75" X 7.5" SPIRAL RIB STEEL PIPE (ULTRA FLO).

(5) HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION (10.1).

(5a) INITIAL BACKFILL FOR PIPE EMBEDMENT TO MEET GW, GP, GM, GC, SW OR SP UNIFIED SOIL CLASSIFICATION SYSTEM PER ASTM D2487, OR APPROVED EQUAL. ML AND CL MATERIALS ARE TYPICALLY NOT RECOMMENDED (9.2).
BACKFILL COMPACTED TO 90% STANDARD PROCTOR PER ASTM D698. MAXIMUM PARTICLE SIZE NOT TO EXCEED 3" (9.2). ALL LIFTS SHALL BE PLACED IN A CONTROLLED MANNER, 6" TO 12" IN DEPTH AND COMPACTED BEFORE ADDING THE NEXT LIFT, AND NO MORE THAN ONE LIFT SIDE-TO-SIDE DIFFERENCE SHALL BE PERMITTED (10.1 & 10.2).

THE FOLLOWING THREE INSTALLATION TYPES ARE PER INDUSTRY STANDARDS & ASTM A796:
TYPE I INSTALLATION - EMBANKMENT OR FILL CONDITION MEETING THE ABOVE MATERIAL AND COMPACTION REQUIREMENTS (10.6).
TYPE II INSTALLATION - TRENCH CONDITION: SAME BACKFILL REQUIREMENTS AS TYPE I (10.5).
TYPE III INSTALLATION - TRENCH CONDITION: SAME BACKFILL REQUIREMENTS AS TYPE II EXCEPT THAT BACKFILL MATERIALS ARE LIMITED TO CLEAN, NON-PLASTIC MATERIALS MEETING THE REQUIREMENTS OF GROUPS GP & SP PER D2487 OR THE SAME AS TYPE I & II WITH A MAXIMUM PLASTICITY INDEX (PI) OF 10 (10.4).

(6) INITIAL BACKFILL ABOVE PIPE MAY INCLUDE ROAD BASE MATERIAL (AND RIGID PAVEMENT IF APPLICABLE). SEE TABLE ABOVE.

(6a) TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT (A796, 11.1).

(7) FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD (11.1, 11.2).

NOTES:
- GEOTEXTILE SHOULD BE CONSIDERED FOR USE TO PREVENT SOIL MIGRATION INTO VARYING SOIL TYPES (PROJECT ENGINEER).
- FOR MULTIPLE BARREL INSTALLATIONS THE RECOMMENDED MINIMUM STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE NO LESS THAN 24" FOR DIAMETERS UP TO 48". FOR DIAMETERS > 48", THE MINIMUM SPACING IS DIAMETER/2 OR 36", WHICHEVER IS LESS (A796,19.1)
- CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

238-CSP-STANDARD BACKFILL-ULTRA FLO-ROUND-ASTM

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