



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"	15"	15"	12"	12"
60"	*15"	15"	12"	12"
66"	N/A	18"	15"	15"
72"	N/A	*18"	15"	15"
78"	N/A	*21"	18"	18"
84"	N/A	N/A	21"	21"
90"	N/A	N/A	*24"	24"
96"	N/A	N/A	*24"	24"
102"	N/A	N/A	*30"	30"
108"-120"	N/A	N/A	N/A	*30"

THESE SIZES AND GAGE COMBINATIONS ARE INSTALLED IN ACCORDANCE WITH ASTM A796 PARAGRAPHS 18.2.3 AND ASTM A798.

- 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 AND TO SUPPORT HORIZONTAL PRESSURE FROM THE PIPE. THE MANUFACTURER'S SUGGESTED MINIMUM VALUE IS: $1.5D + 12"$.
- ①a MINIMUM EMBANKMENT WIDTH (in feet) FOR INITIAL FILL ENVELOPE: $3.0D$ BUT NO LESS THAN $D + 4'0"$.
- ② FOUNDATION SHALL BE WELL CONSOLIDATED & STABLE, CAPABLE OF SUPPORTING FILL MATERIAL LOAD.
- ③ OPEN-GRADED GRANULAR BEDDING MATERIAL SHALL BE A RELATIVELY LOOSE MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 4" TO 6" IN DEPTH. SUGGESTED PARTICLE SIZE OF 1/2 CORRUGATION DEPTH.
- 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.
- ⑤a THE BACKFILL MATERIAL SHALL BE A FREE-DRAINING, ANGULAR, WASHED-STONE WITH A 1/2" - 2" RECOMMENDED PARTICLE SIZE. MATERIAL SHALL BE PLACED IN 12" MAXIMUM LIFTS AND SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR-TAMPER, VIBRATORY PLATE OR OTHER EFFECTIVE METHODS. COMPACTION IS CONSIDERED ADEQUATE WHEN A DENSITY EQUIVALENT TO 90% STANDARD PROCTOR IS ACHIEVED OR WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR OR UNDER FOOT. THE PROJECT ENGINEER OR HIS REPRESENTATIVE MUST BE SATISFIED WITH THE LEVEL OF COMPACTION. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE PIPE DEFLECTIONS AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM .
- ⑥ INITIAL OPEN GRADED GRANULAR 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.
- ⑦ FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.
- ⑧ LIMITS OF DRAIN ROCK MAY BE PLACED BELOW PIPE AS DEFINED BY ENGINEER OF RECORD. FOUNDATION SPEC STILL APPLIES AND BEDDING WILL BE THE FIRST 4" TO 6" BELOW INVERT.

NOTES:
 • GEOTEXTILE SHALL BE USED AS REQUIRED TO PREVENT SOIL MIGRATION.
 • FOR MULTIPLE BARREL INSTALLATIONS THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE PIPE DIA./2 BUT NO LESS THAN 12", OR 36" FOR PIPE DIAMETERS 72" AND LARGER. CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

237-CSP-STANDARD BACKFILL-ULTRA FLO-ROUND-RETENTION



237 - CSP ULTRA FLO ROUND STANDARD BACKFILL DETAIL RETENTION UNDERDRAIN

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