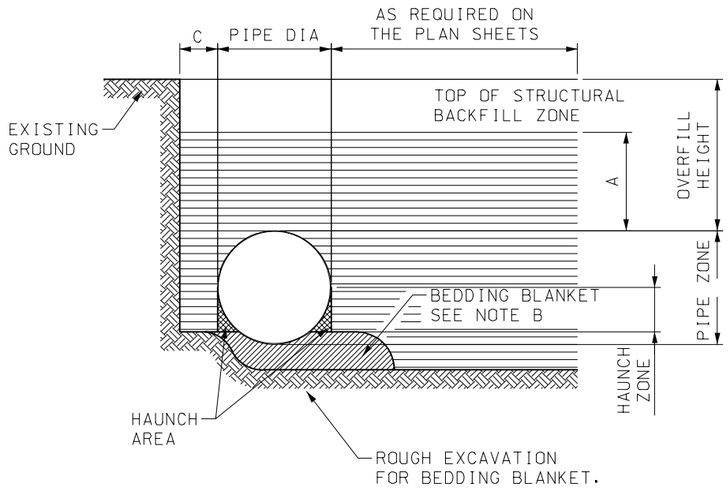



TYPICAL TRENCH DETAIL

## PIPE INSTALLATION AND BEDDING

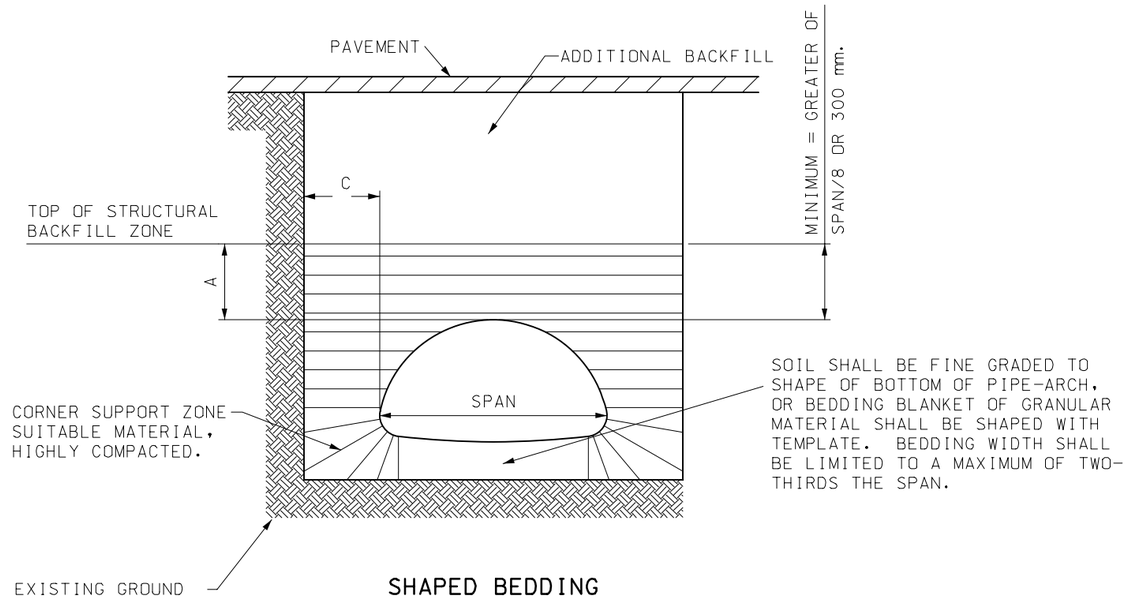
NOTE:

A) MINIMUM STRUCTURAL BACKFILL OVER TOP OF PIPE SHALL BE ONE-EIGHTH DIAMETER OR SPAN OF PIPE OR 300 mm WHICHEVER IS GREATER.

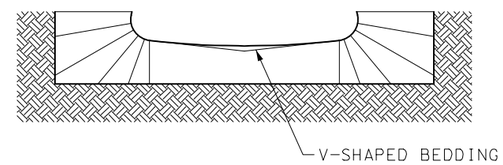
B) BEDDING BLANKET OF LOOSE FILL SHALL BE ROUGHLY SHAPED TO FIT BOTTOM OF PIPE. MINIMUM THICKNESS BEFORE PLACING PIPE SHALL BE AS FOLLOWS:

| | |
|---|---|
| 12 mm | 25 mm |
| 25 mm | 50 mm |
| 50 mm | 75 mm |

C) TRENCH INSTALLATIONS - 0.6 m MINIMUM EACH SIDE OF CULVERT. THIS RECOMMENDED LIMIT SHOULD BE MODIFIED AS NECESSARY TO ACCOUNT FOR VARIABLES SUCH AS POOR IN-SITU SOILS. EMBANKMENT INSTALLATIONS - ONE DIAMETER OR SPAN EACH SIDE OF CULVERT.



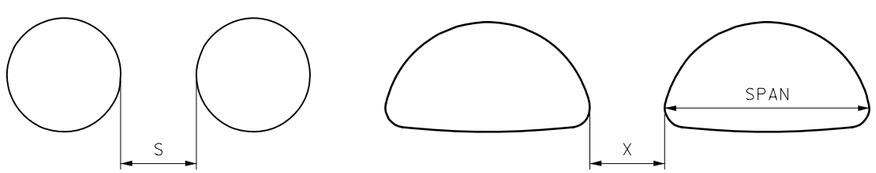

SHAPED BEDDING




ALTERNATIVE-SHAPED BEDDING

PIPE-ARCH TRENCH DETAIL

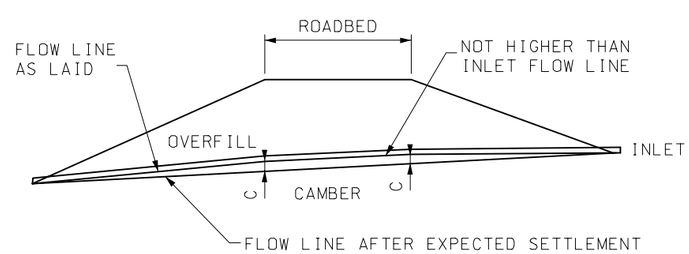
## BEDDING AND CORNER ZONE TREATMENT FOR PIPE ARCH STRUCTURES




| PIPE | |
|---|---|
| DIAMETER | SPACE S |
| UP TO 600 | 300 |
| 600 TO 1800 | ½ PIPE DIA. |
| 1800 AND OVER | 900 |

| PIPE-ARCHES | |
|---|---|
| SPAN | SPACE X |
| UP TO 900 | 300 |
| 900 TO 2700 | 1/3 ARCH SPAN |
| 2700 TO 4725 | 900 |

## MULTIPLE STRUCTURE SPACING




## TYPICAL CAMBERED FLOW LINE

NOTE:

ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITIONS AND WILL BE SPECIFIED ON THE DESIGN PLANS.

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

## CORRUGATED METAL PIPE INSTALLATION METHODS

DATE:_____ EFFECTIVE: 07-01-2006 M725.00B 1/3

## TABLE I
## CORRUGATED METALLIC-COATED OR POLYMER-COATED STEEL CIRCULAR PIPE
## LOCK OR WELDED SEAM

### MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

| SPECIFIED DIAMETER OF PIPE | MINIMUM COVER (2) | SPECIFIED THICKNESS OF COATED SHEET (mm) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.63 | | | | 2.01 | | | | 2.77 | | | | 3.50 | | | | 4.27 | | | |
| | | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| mm | m | m | m | | | m | m | | | m | m | | | m | m | | | m | m | | |
| 300 | 0.3 | 24 | | | | 27 | | | | | | | | | | | | | | | |
| 375 | 0.3 | 19.5 | | | | 21 | | | | | | | | | | | | | | | |
| 450 | 0.3 | 16.5 | | | | 18 | | | | | | | | | | | | | | | |
| 525 | 0.3 | 12 | | | | 15 | | | | 18 | | | | | | | | | | | |
| 600 | 0.3 | 10.5 | | | | 12 | | | | 13.5 | | | | | | | | | | | |
| 750 | 0.3 | 7.5 | | | | 9 | | | | 10.5 | | | | | | | | | | | |
| 900 | 0.3 | 7.5 | 12 | | | 7.5 | 13.5 | | | 7.5 | 16.5 | | | 9 | 21 | | | | 24 | | |
| 1050 | 0.3 | 6 | 9 | | | 6 | 10.5 | | | 7.5 | 12 | | | 7.5 | 15 | | | 7.5 | 16.5 | | |
| 1200 | 0.3 | 7.5 | 10.5 | | | 10.5 | 13.5 | | | 13.5 | 19.5 | | | 15 | 24 | | | 15 | 25.5 | | |
| 1350 | 0.3 | | 9 | | | 9 | 12 | | | 12 | 16.5 | | | 13.5 | 21 | | | 13.5 | 22.5 | | |
| 1500 | 0.3 | | 7.5 | | | | 10.5 | | | 12 | 15 | | | 12 | 18 | | | 13.5 | 19.5 | | |
| 1650 | 0.3 | | 7.5 | | | | 9 | | | 9 | 13.5 | | | 12 | 16.5 | | | 12 | 18 | | |
| 1800 | 0.3 | | 6 | | | | 9 | | | | 12 | | | 9 | 15 | | | 12 | 16.5 | | |
| 1950 | 0.3 | | 6 | | | | 7.5 | | | | 12 | | | | 13.5 | | | 9 | 15 | | |
| 2100 | 0.3 | | 6 | | | | 7.5 | | | | 10.5 | | | | 13.5 | | | 7.5 | 15 | | |
| 2250 | 0.3 | | 4.5 | | | | 6 | | | | 10.5 | | | | 12 | | | | 13.5 | | |
| 2400 | 0.3 | | 4.5 | | | | 6 | | | | 9 | | | | 12 | | | | 12 | | |
| 2550 | 0.6 | | 4.5 | | | | 6 | | | | 9 | | | | 10.5 | | | | 12 | | |
| 2700 | 0.6 | | | | | | 6 | | | | 7.5 | | | | 10.5 | | | | 10.5 | | |
| 2850 | 0.6 | | | | | | 4.5 | | | | 7.5 | | | | 9 | | | | 10.5 | | |
| 3000 | 0.6 | | | | | | | | | | 6 | | | | 9 | | | | 10.5 | | |
| 2550 | 0.6 | | | | | | | | | | | | | | | | | | | | |
| 2700 | 0.6 | | | | | | | | | | | | | | | | | | | | |
| 2850 | 0.6 | | | | | | | | | | | | | | | | | | | | |
| 3000 | 0.6 | | | | | | | | | | | | | | | | | | | | |

## TABLE II
## CORRUGATED METALLIC-COATED STEEL CIRCULAR PIPE
## RIVETED, BOLTED OR SPOT WELDED SEAM

### MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)

| SPECIFIED DIAMETER OF PIPE | MINIMUM COVER (2) | SPECIFIED THICKNESS OF COATED SHEET (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.63 | | 2.01 | | 2.77 | | 3.50 | | 4.27 | |
| | | A | B | A | B | A | B | A | B | A | B |
| mm | m | m | m | m | m | m | m | m | m | m | m |
| 300 | 0.3 | 24 | | 27 | | | | | | | |
| 375 | 0.3 | 19.5 | | 21 | | | | | | | |
| 450 | 0.3 | 16.5 | | 18 | | | | | | | |
| 525 | 0.3 | 12 | | 15 | | 18 | | | | | |
| 600 | 0.3 | 10.5 | | 12 | | 13.5 | | | | | |
| 750 | 0.3 | 7.5 | | 9 | | 10.5 | | | | | |
| 900 | 0.3 | 7.5 | 12 | 7.5 | 13.5 | 7.5 | 16.5 | 9 | 21 | | 24 |
| 1050 | 0.3 | 6 | 9 | 6 | 10.5 | 7.5 | 12 | 7.5 | 15 | 7.5 | 16.5 |
| 1200 | 0.3 | 6 | 9 | 6 | 9 | 10.5 | 10.5 | 7.5 | 12 | 7.5 | 13.5 |
| 1350 | 0.3 | | 9 | 9 | 12 | 12 | 16.5 | 13.5 | 21 | 13.5 | 22.5 |
| 1500 | 0.3 | | 7.5 | | 10.5 | 12 | 15 | 12 | 18 | 13.5 | 19.5 |
| 1650 | 0.3 | | 7.5 | | 9 | 9 | 13.5 | 12 | 16.5 | 12 | 18 |
| 1800 | 0.3 | | 6 | | 9 | | 12 | 9 | 15 | 12 | 16.5 |
| 1950 | 0.3 | | 6 | | 7.5 | | 12 | | 13.5 | 9 | 15 |
| 2100 | 0.3 | | 6 | | 7.5 | | 10.5 | | 13.5 | 7.5 | 15 |
| 2250 | 0.3 | | 4.5 | | 6 | | 10.5 | | 12 | | 13.5 |
| 2400 | 0.3 | | 4.5 | | 6 | | 9 | | 12 | | 12 |
| 2550 | 0.6 | | 4.5 | | 6 | | 9 | | 10.5 | | 12 |
| 2700 | 0.6 | | | | 6 | | 7.5 | | 10.5 | | 10.5 |
| 2850 | 0.6 | | | | 4.5 | | 7.5 | | 9 | | 10.5 |
| 3000 | 0.6 | | | | | | 6 | | 9 | | 10.5 |
| 2550 | 0.6 | | 4.5 | | 6 | | 9 | | 10.5 | | 12 |
| 2700 | 0.6 | | | | 6 | | 7.5 | | 10.5 | | 10.5 |
| 2850 | 0.6 | | | | 4.5 | | 7.5 | | 9 | | 10.5 |
| 3000 | 0.6 | | | | | | 6 | | 9 | | 10.5 |

## TABLE III
## CORRUGATED ALUMINUM ALLOY CIRCULAR PIPE

68 mm X 13 mm CORRUGATIONS
ALLOWABLE OVERFILL HEIGHTS

| SPECIFIED DIAMETER OF PIPE | SPECIFIED SHEET THICKNESS (mm) | | | |
|---|---|---|---|---|
| | 1.91 | 2.67 | 3.43 | 4.17 |
| mm | m | m | m | m |
| 300 | 0.3-11.1 | | | |
| 375 | 0.3-9.9 | 10.2-11.4 | | |
| 450 | 0.3-5.7 | 9-10.5 | | |
| 525 | 0.3-7.5 | 7.8-9 | 9.3-10.5 | |
| 600 | | 0.3-8.7 | 9-9.9 | |
| 750 | | 0.3-6.9 | 7.2-8.4 | 8.7-9 |
| 900 | | | 0.3-6.6 | 6.9-8.1 |
| 1050 | | | 0.3-5.1 | 5.4-7.2 |
| 1200 | | | 0.3-3.3 | 3.6-5.1 |

A = 68 mm X 13 mm CORRUGATIONS.
B = 75 mm X 25 mm CORRUGATIONS.
C = 125 mm X 25 mm CORRUGATIONS.
D = 19 mm X 19 mm X 188 mm SPIRAL RIB.

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.

(2) MINIMUM COVER MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

**CORRUGATED METAL PIPE INSTALLATION METHODS**

DATE:_____ EFFECTIVE: 07-01-2006 **M725.00B** 2/3

## TABLE IV
## MINIMUM COVER FOR CONSTRUCTION LOADS (ROUND AND PIPE-ARCH)

| DIAMETER OR PIPE SPAN | MINIMUM COVER (m) FOR INDICATED AXLE LOADS (2) | | | |
|---|---|---|---|---|
| | 5.4 kg-15 kg | 15 kg-22.5 kg | 22.5 kg-33 kg | 33 kg-45 kg |
| mm | m | m | m | m |
| 300-1050 | 900 | 1100 | 1300 | 1300 |
| 1200-1800 | 1300 | 1300 | 1500 | 1800 |
| 1950-3000 | 1300 | 1500 | 1800 | 1800 |
| 3150-3600 | 1500 | 1800 | 2000 | 2000 |

THE CONTRACTOR SHALL PROVIDE MINIMUM COVER PLUS ANY ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. IN UNPAVED SITUATIONS, THE SURFACE MUST BE MAINTAINED TO A LEVEL AND NON-RUTTED CONDITION.

## TABLE V
## PIPE-ARCH REQUIREMENTS
## 68 mm X 13 mm CORRUGATIONS

| TYPE | SPAN (3) | RISE (3) | GALVANIZED SHEET THICKNESS |
|---|---|---|---|
| | (mm) | (mm) | (mm) |
| B1 | 430 | 330 | 1.63 |
| B2 | 530 | 380 | 1.63 |
| B3 | 610 | 460 | 1.63 |
| B4 | 710 | 510 | 1.63 |
| B5 | 885 | 610 | 1.63 |
| B6 | 1060 | 740 | 201 |
| B7 | 1240 | 840 | 2.77 |
| B8 | 1440 | 970 | 2.77 |
| B9 | 1620 | 1100 | 2.77 |
| B10 | 1800 | 1200 | 3.51 |
| B11 | 1950 | 1320 | 4.27 |
| B12 | 2100 | 1450 | 4.27 |

## TABLE VI
## PIPE-ARCH REQUIREMENTS
## 75 mm X 25 mm AND 125 mm X 25 mm CORRUGATIONS

| TYPE | SPAN (4) | RISE (4) | GALVANIZED SHEET THICKNESS | GALVANIZED SHEET THICKNESS | MINIMUM COVER (2) |
|---|---|---|---|---|---|
| | (mm) | (mm) | (mm) | (mm) | (mm) |
| B8A | 1340 (-60) | 1050 (+60) | 2.0 | 2.8 | 300 |
| B9A | 1320 (-70) | 1170 (+70) | 2.0 | 2.8 | 375 |
| B10A | 1670 (-75) | 1300 (+70) | 2.0 | 2.8 | 375 |
| B11A | 1850 (-85) | 1400 (+85) | 2.0 | 2.8 | 450 |
| B12A | 2050 (-95) | 1500 (+95) | 2.0 | 2.8 | 450 |
| B13A | 2200 (-110) | 1620 (+110) | 2.0 | 2.8 | 450 |
| B14A | 2400 (-120) | 1720 (+120) | 2.0 | 2.8 | 450 |
| B15A | 2600 (-130) | 1820 (+130) | 2.0 | 2.8 | 450 |
| B16A | 2840 (-145) | 1920 (+145) | 2.8 | 2.8 | 525 |
| B17A | 2970 (-150) | 2020 (+150) | 2.8 | 2.8 | 525 |
| B18A | 3240 (-165) | 2120 (+165) | 2.8 | 2.8 | 600 |
| B19A | 3470 (-175) | 2220 (+175) | 2.8 | 2.8 | 600 |
| B20A | 3600 (-180) | 2320 (+180) | 3.5 | 3.5 | 600 |

(2) MINIMUM COVER MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.

(3) A TOLERANCE OF PLUS OR MINUS 24 mm OR 2 PERCENT OF EQUIVALENT CIRCULAR DIAMETER, WHICHEVER IS GREATER, WILL BE PERMISSIBLE IN SPAN AND RISE.

(4) TOLERANCES IN PARENTHESES. NO TOLERANCE IN OPPOSITE DIRECTION.

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

**CORRUGATED METAL PIPE INSTALLATION METHODS**

DATE:_____ EFFECTIVE: 07-01-2006 **M725.00B** 3/3