

| COUPLING TYPE            | PIPE DIMENSIONS        |                      | BAND - MINIMUMS |   | BAND CONNECTING METHOD   |  |                |                     |               |            |            |     |            |
|--------------------------|------------------------|----------------------|-----------------|---|--|--|----------------|---------------------|---------------|------------|------------|-----|------------|
|                          | PIPE CORRUGATION (IN.) | PIPE SIZE I.D. (IN.) | W OR A (IN.)    | BAND THICKNESS (IN.)<br>(SEE NOTE 4 SHEET 3 OF 3) | BAR & STRAP STRAP THICKNESS (IN.)  | BAND - ANGLE   |                |                     |               |            |            |     |            |
|                          |                        |                      |                 |   |  | ANGLE DIMENSIONS (IN.)                                       | BOLTS          |                     | ANGLE TO BAND |            | SPOT WELDS |     |            |
|                          |                        |                      |                 |   |  |  | NO.            | SIZE (IN.)          | NO.           | SIZE (IN.) |            | NO. | SIZE (IN.) |
| <b>STANDARD JOINTS</b>   |                        |                      |                 |   |  |  |                |                     |               |            |            |     |            |
| UNIVERSAL BAND (DIMPLED) | 2-2/3 X 1/2            | THRU 36              | 12              | 0.052 (18 GA.)                                    | 0.079 (14 GA.)<br>DBL. 0.079 (14 GA.)  | 2 X 2 X 3/16<br>2 X 2 X 3/16                                 | 3              | 1/2                 | 3             | 3/8        | 3          | 1/2 |            |
|                          |                        | 42 THRU 60           | 12              | 0.052 (18 GA.)                                    |  |  | 3              | 1/2                 | 3             | 3/8        | 5          | 1/2 |            |
|                          |                        | THRU 72              | 12              | 0.052 (18 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 78 THRU 84           | 16-1/4          | 0.079 (14 GA.)                                    |  |  |                |                     |               |            |            |     |            |
| ANNULAR OR HELICAL BAND  | 2-2/3 X 1/2            | THRU 36              | 7               | 0.052 (18 GA.)                                    |  | 2 X 2 X 3/16<br>2 X 2 X 3/16<br>2 X 2 X 3/16                 | 2              | 1/2                 | 3             | 3/8        | 3          | 1/2 |            |
|                          |                        | 42 THRU 60           | 12              | 0.052 (18 GA.)                                    |  |  | 3              | 1/2                 | 3             | 3/8        | 5          | 1/2 |            |
|                          |                        | 66 THRU 84           | 12              | 0.052 (18 GA.)                                    |  |  | 4              | 1/2                 | 5             | 3/8        | 5          | 1/2 |            |
|                          |                        | 3 X 1<br>& 5 X 1     | 36 THRU 60      | 14  |  |  | 0.052 (18 GA.) | 3                   | 1/2           | 3          | 3/8        | 5   | 1/2        |
| 60 THRU 120              | 14                     |                      | 0.052 (18 GA.)  | 4   | 1/2  | 5  | 3/8            | 5                   | 1/2           |            |            |     |            |
| WING CHANNEL BAND ①      | 2-2/3 X 1/2            | THRU 60              | 12              | 0.052 (18 GA.)                                    | 0.079 (14 GA.)<br>0.109 (12 GA.)   | 2 X 2 X 3/16   | 3              | 1/2                 | 3             | 3/8        | 5          | 1/2 |            |
|                          |                        | THRU 72              | 12              | 0.052 (18 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 78 THRU 84           | 12              | 0.079 (14 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 3 X 1<br>& 5 X 1     | 36 THRU 84      | 12  |  |  | 0.052 (18 GA.) | 0.079 (14 GA.)      |               |            |            |     |            |
| 90 THRU 120              | 12                     |                      | 0.052 (18 GA.)  | 0.109 (12 GA.)                                    |  |  |                |                     |               |            |            |     |            |
| CHANNEL BAND             | 2-2/3 X 1/2            | THRU 42              | 3/4             | 0.079 (14 GA.)                                    | 0.079 (14 GA.)<br>0.079 (14 GA.)<br>0.079 (14 GA.)<br>0.079 (14 GA.)           | 2 X 2 X 5/16<br>2 X 2 X 5/16                                 | 1              | 1/2                 |               |            | ②          | 1/2 |            |
|                          |                        | 48 THRU 54           | 3/4             | 0.079 (14 GA.)                                    |  |  | 1              | 1/2                 |               |            | ②          | 1/2 |            |
|                          |                        | THRU 54              | 3/4             | 0.079 (14 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 60 THRU 66           | 3/4             | 0.079 (14 GA.)                                    |  |  |                |                     |               |            |            |     |            |
| SEMI-CORRUGATED BAND     | 2-2/3 X 13             | THRU 54              | 10-1/2          | 0.052 (18 GA.)                                    | 0.079 (14 GA.)<br>0.109 (12 GA.)   | 1-1/2 X 2-1/2 X 3/16   | 1              | 1/2                 |               |            | 3          | 1/2 |            |
|                          |                        | THRU 72              | 10-1/2          | 0.052 (18 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 78 THRU 84           | 10-1/2          | 0.079 (14 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 3 X 1<br>& 5 X 1     | 36 THRU 84      | 10-1/2  |  |  | 0.052 (18 GA.) | 0.079 (14 GA.)      |               |            |            |     |            |
| 90 THRU 120              | 10-1/2                 |                      | 0.079 (14 GA.)  | 0.109 (12 GA.)                                    |  |  |                |                     |               |            |            |     |            |
| <b>POSITIVE JOINTS</b>   |                        |                      |                 |   |  |  |                |                     |               |            |            |     |            |
| UNIVERSAL BAND (DIMPLED) | 2-2/3 X 1/2            | THRU 36              | 12              | 0.064 (16 GA.)                                    | 0.079 (14 GA.)<br>DBL. 0.079 (14 GA.)  | 2 X 2 X 3/16   | 3              | 1/2                 | 3             | 3/8        | 5          | 1/2 |            |
|                          |                        | THRU 36              | 12              | 0.064 (16 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 42 THRU 60           | 16-1/4          | 0.064 (16 GA.)                                    |  |  |                |                     |               |            |            |     |            |
| ANNULAR OR HELICAL BAND  | 2-2/3 X 1/2            | THRU 36              | 12              | 0.064 (16 GA.)                                    |  | 2 X 2 X 3/16<br>2 X 2 X 3/16<br>2 X 2 X 5/16<br>2 X 2 X 5/16 | 3              | 1/2                 | 3             | 3/8        | 5          | 1/2 |            |
|                          |                        | 42 THRU 60           | 12              | 0.064 (16 GA.)                                    |  |  | 3              | 1/2                 | 3             | 3/8        | 5          | 1/2 |            |
|                          |                        | 42 THRU 60           | 12              | 0.064 (16 GA.)                                    |  |  | 3              | 1/2                 | 5             | 3/8        |            |     |            |
|                          |                        | 66 THRU 84           | 24              | 0.064 (16 GA.)                                    |  |  | 5              | 1/2                 | 7             | 3/8        |            |     |            |
|                          |                        | 3 X 1<br>& 5 X 1     | 36 THRU 60      | 14  |  |  | 0.064 (16 GA.) | 3                   | 1/2           | 3          | 3/8        |     |            |
|                          |                        |                      | 36 THRU 60      | 14  |  |  | 0.064 (16 GA.) | 3                   | 1/2           | 5          | 3/8        |     |            |
| 66 THRU 120              | 25                     |                      | 0.064 (16 GA.)  | 5   | 1/2  | 9  | 3/8            |                     |               |            |            |     |            |
| WING CHANNEL BAND ①      | 2-2/3 X 1/2            | THRU 60              | 12              | 0.064 (16 GA.)                                    | 0.079 (14 GA.)<br>0.109 (12 GA.)<br>DBL. 0.079 (14 GA.)<br>DBL. 0.109 (12 GA.) | 2 X 2 X 5/16   | 3              | 1/2                 | 5             | 3/8        |            |     |            |
|                          |                        | THRU 48              | 12              | 0.064 (16 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 42 THRU 48           | 12              | 0.064 (16 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 54 THRU 60           | 12              | 0.064 (16 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 66 THRU 84           | 12              | 0.109 (12 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 3 X 1<br>& 5 X 1     | 36 THRU 78      | 12  |  |  | 0.064 (16 GA.) | DBL. 0.079 (14 GA.) |               |            |            |     |            |
| 84 THRU 96               | 12                     |                      | 0.079 (14 GA.)  | DBL. 0.079 (14 GA.)                               |  |  |                |                     |               |            |            |     |            |
| 102 THRU 120             | 12                     |                      | 0.109 (12 GA.)  | DBL. 0.109 (12 GA.)                               |  |  |                |                     |               |            |            |     |            |
| CHANNEL BAND             | 2-2/3 X 1/2            | THRU 24              | 3/4             | 0.079 (14 GA.)                                    | 0.079 (14 GA.)<br>0.079 (14 GA.)<br>0.079 (14 GA.)<br>0.079 (14 GA.)           |  |                |                     |               |            |            |     |            |
|                          |                        | 30 THRU 42           | 3/4             | 0.079 (14 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 30 THRU 42           | 1               | 0.109 (12 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 48 THRU 54           | 1               | 0.109 (12 GA.)                                    |  |  |                |                     |               |            |            |     |            |
| SEMI-CORRUGATED BAND     | 2-2/3 X 1/2            | THRU 48              | 10-1/2          | 0.064 (16 GA.)                                    | 0.079 (14 GA.)<br>0.109 (12 GA.)<br>DBL. 0.079 (14 GA.)<br>DBL. 0.109 (12 GA.) |  |                |                     |               |            |            |     |            |
|                          |                        | 42 THRU 48           | 10-1/2          | 0.064 (16 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 54 THRU 60           | 10-1/2          | 0.064 (16 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 66 THRU 84           | 10-1/2          | 0.109 (12 GA.)                                    |  |  |                |                     |               |            |            |     |            |
|                          |                        | 3 X 1<br>& 5 X 1     | 36 THRU 66      | 10-1/2  |  |  | 0.064 (16 GA.) | DBL. 0.079 (14 GA.) |               |            |            |     |            |
|                          |                        |                      | 72 THRU 84      | 10-1/2  |  |  | 0.079 (14 GA.) | DBL. 0.079 (14 GA.) |               |            |            |     |            |
| 90 THRU 120              | 10-1/2                 |                      | 0.109 (12 GA.)  | DBL. 0.109 (12 GA.)                               |  |  |                |                     |               |            |            |     |            |

|                 |  |
|-----------------|--|
| GAGE SIZE       |  |
| 18 GA = 0.0516" |  |
| 16 GA = 0.0635" |  |
| 14 GA = 0.0785" |  |
| 12 GA = 0.1084" |  |

NOTES:

- ① IF CHANNEL HEIGHT IS GREATER THAN CORRUGATION HEIGHT, ANGLE MAY BE NOTCHED TO FIT AND WELDED OR DOUBLE BAR AND STRAP REQUIRED.
- ② SEE SHEET 2 OF 3.

APPROVED FEBRUARY 22, 2021

  
STATE DESIGN ENGINEER

STATE OF MINNESOTA  
DEPARTMENT OF TRANSPORTATION

**CORRUGATED STEEL PIPE  
COUPLING BAND**

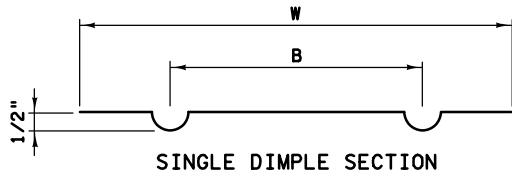
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3226

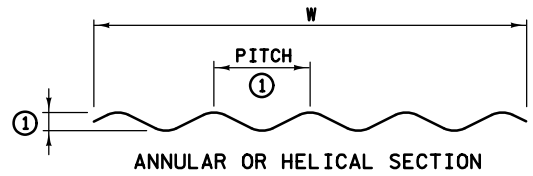
STANDARD  
PLATE  
NO.

**3221D**

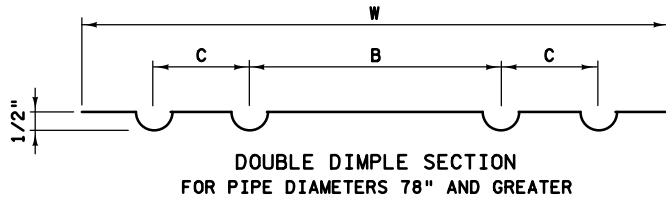
1 OF 3



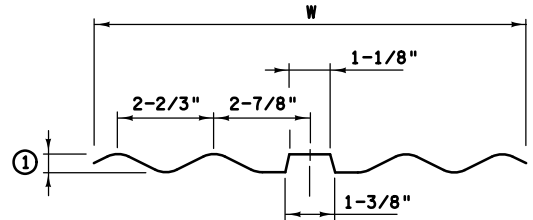
SINGLE DIMPLE SECTION



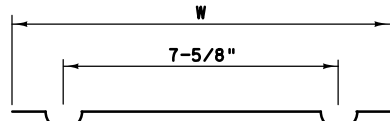
ANNULAR OR HELICAL SECTION



DOUBLE DIMPLE SECTION  
FOR PIPE DIAMETERS 78" AND GREATER



WING CHANNEL SECTION



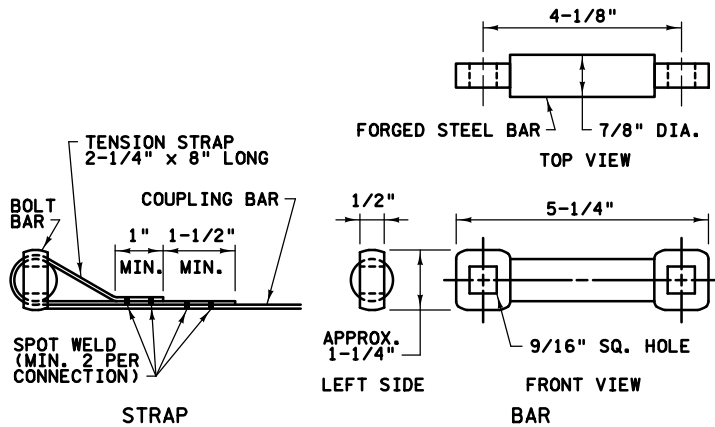
SEMI-CORRUGATED SECTION

W - SEE JOINT TABLE FOR DIMENSIONS.  
B - AS REQUIRED TO FIT HELIX ANGLE 7" MIN.  
C - AS REQUIRED TO FIT HELIX ANGLE 2-2/3" MIN.  
① SEE JOINT TABLE FOR DIMENSIONS.

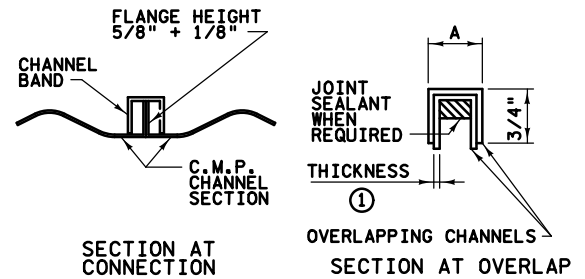


CHANNEL SECTION

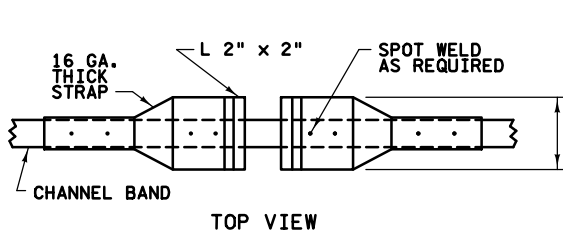
COUPLING BAND TYPES



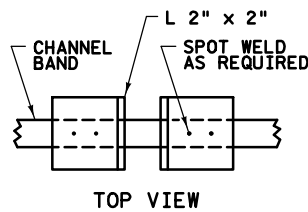
BAR AND STRAP



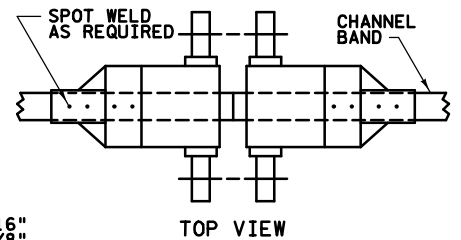
CHANNEL BAND



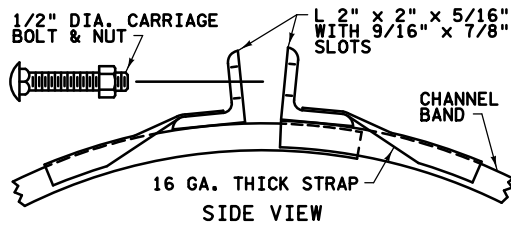
TOP VIEW



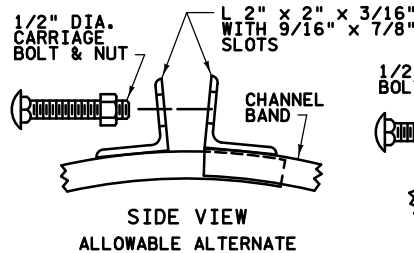
TOP VIEW



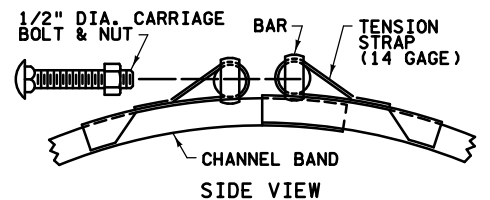
TOP VIEW



SIDE VIEW



SIDE VIEW  
ALLOWABLE ALTERNATE



SIDE VIEW

ANGLE CONNECTION  
CHANNEL

BAR & STRAP CONNECTION  
CHANNEL

APPROVED FEBRUARY 22, 2021

*Rom S. Smith*  
STATE DESIGN ENGINEER

STATE OF MINNESOTA  
DEPARTMENT OF TRANSPORTATION

CORRUGATED STEEL PIPE  
COUPLING BAND

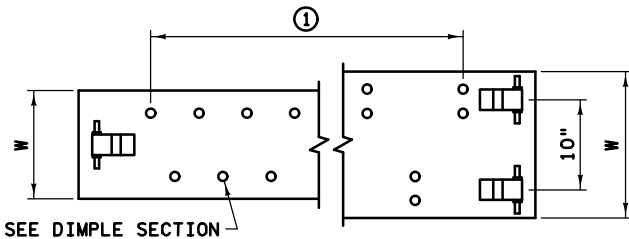
SPECIFICATION  
REFERENCE

3226

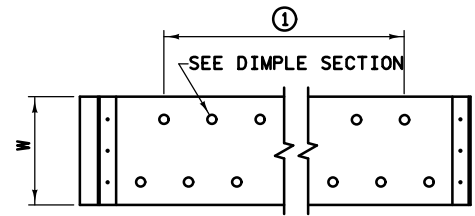
STANDARD  
PLATE  
NO.

3221D

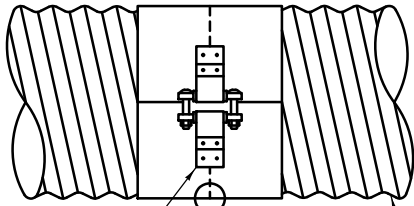
2 OF 3



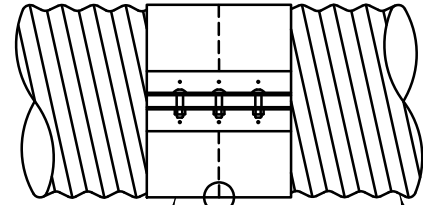
SEE DIMPLE SECTION  
**BAR & STRAP DIMPLE BAND**



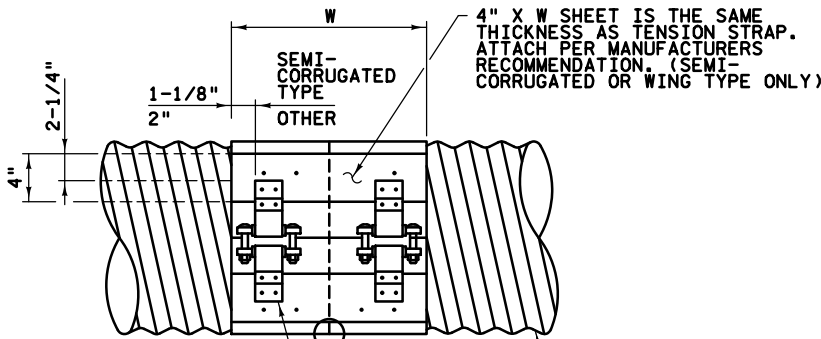
SEE DIMPLE SECTION  
**ANGLE DIMPLE BAND**



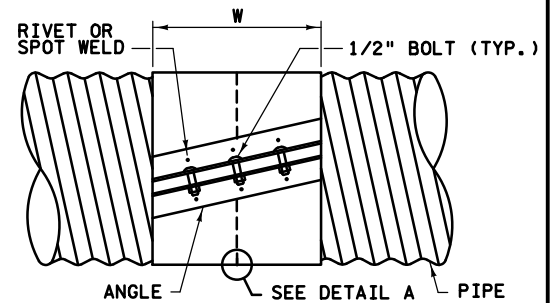
SEE BAR & STRAP DETAILS  
 SEE DETAIL A PIPE  
**TYPICAL SINGLE STRAP**



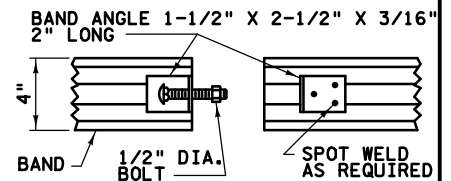
SEE ANGLE CONNECTION DETAIL  
 SEE DETAIL A PIPE  
**TYPICAL ANGLE CONNECTION**



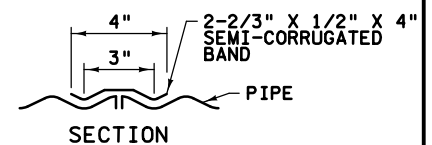
SEE BAR & STRAP DETAILS  
 SEE DETAIL A PIPE  
**TYPICAL DOUBLE STRAP BAND**



ANGLE  
 SEE DETAIL A PIPE  
**SKewed ANGLE CONNECTION**

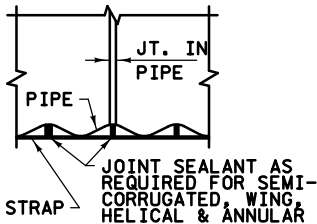


**TOP VIEW**

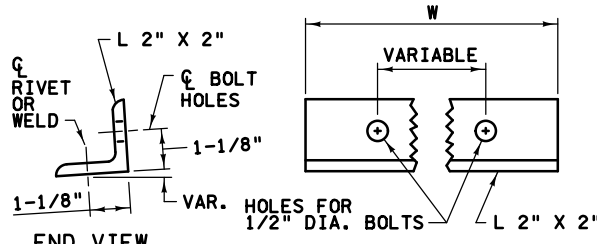


**SECTION**

**SEMI-CORRUGATED BAND WITH ANGLE**



**DETAIL A**



**END VIEW**

**SIDE VIEW**

**BAND COUPLER ANGLE**

**NOTES:**

USE THE SAME BASE METAL FOR CONNECTING BANDS AS REQUIRED FOR CULVERT PIPE.

USE CONNECTING BANDS AND HARDWARE THAT ARE GALVANIZED OR ALUMINIZED IN ACCORDANCE WITH STANDARD SPECIFICATIONS.

FOR PIPE ARCHES, USE THE SAME WIDTH BAND AS FOR ROUND PIPE OF EQUAL PERIPHERY.

COUPLING BANDS MAY BE THREE NUMERICAL THICKNESSES LIGHTER THAN THAT USED FOR THE PIPE, BUT NOT LESS THAN 18 GAGE (0.052") THICK.

FOR ALL BAR & STRAP CONNECTING BANDS, USE A 7/8" BAR DIA. WITH A YIELD STRENGTH OF 32,000 P.S.I. FOR USE WITH STRAP THICKNESS OF 0.079" & 45,000 P.S.I. FOR USE WITH STRAP THICKNESS OF 0.109". USE 1/2" DIA. CONNECTING BOLTS.

LAP BANDS ON AN EQUAL PORTION OF EACH OF THE CULVERT SECTIONS TO BE CONNECTED.

FOR HELICALLY CORRUGATED COUPLING BANDS, ORIENT THE CONNECTION ANGLES PARALLEL TO PIPE AXIS WHEN SLOTTED BOLT HOLES ARE USED TO ALLOW ADJUSTMENT TO HELIX ANGLE.

TWO PIECE BAND REQUIRED FOR PIPE GREATER THAN 42" DIA. ALTERNATE ANGLE CONSTRUCTION, SUCH AS DIE-FORMED ANGLE VS. HOT ROLLED ANGLE AND SLIGHT ANGLE CONFIGURATION MODIFICATIONS, MAY BE USED WHEN APPROVED BY THE OFFICE OF MATERIALS AND ROAD RESEARCH.

① EIGHT SPACES AS REQUIRED TO FIT HELIX ANGLE.

APPROVED FEBRUARY 22, 2021

*Rom Slin*  
 STATE DESIGN ENGINEER

STATE OF MINNESOTA  
 DEPARTMENT OF TRANSPORTATION

**CORRUGATED STEEL PIPE  
 COUPLING BAND**

SPECIFICATION  
 REFERENCE

3226

STANDARD  
 PLATE  
 NO.

**3221D**

3 OF 3