

Transmittal No. 21-01
February 24, 2021

Standard Plates

Distribution: Electronic Distribution Recipients**Subject: Standard Plates 3041 and 3221 (8002 removed)**

The following Standard Plates are updated:

- 3041 - Corrugated Metal Pipe
- 3221 - Corrugated Steel Pipe Coupling Band

The following Standard Plate is removed:

- 8002G - Permanent Barricade

See attached Summary of Changes for details.

Instructions:

- Record this transmittal letter number, date and subject on the transmittal record sheet located in the front of the manual. The last Transmittal Letter was 20-06, dated September 3, 2020.
- Remove from the manual:
 - Standard Plate Index, Sheets 1-4 of 4, Numerical Index of Standard Plates
 - Standard Plate 3041D, Sheet 1 of 1
 - Standard Plate 3221C, Sheets 1-3 of 3
 - Standard Plate 8002G, Sheet 1 of 1
- Insert into the manual:
 - Standard Plate Index, Sheets 1-4 of 4, Numerical Index of Standard Plates (February 22, 2021)
 - Standard Plate 3041E, Sheet 1 of 1 (02-22-2021)
 - Standard Plate 3221D, Sheets 1-3 of 3 (02-22-2021)
- The Standard Plates Manual and associated Transmittal Letters are available online in PDF format at <https://standardplates.dot.state.mn.us/stdplate.aspx>
- Any technical questions regarding this transmittal should be directed to Mike Elle, State Design Standards Engineer, at (651) 252-7644, or by email to DesignStandards.DOT@state.mn.us



Michael Elle, P.E.
State Design Standards Engineer
Office of Project Management and Technical Support

Summary of Changes
Standard Plate 3041E – Corrugated Metal Pipe
Transmittal Letter No. (21-01)

General:

1. Version incremented from D to E.

Sheet 1:

1. Add 5"x1" corrugation option to table.
 - a. Add 5"x1" to title
 - b. Add 5"x1" to column heading for round pipe minimum gage
 - c. Add new 5"x1" minimum gage column for 5"x1" pipe-arch
2. Correct end area on 53"x41" pipe arch from 12.3 to 11.7 Sq. FT.
3. Added 4th note
4. Updated notes to Active Voice

Summary of Changes
Standard Plate 3221D – Corrugated Steel Pipe Coupling Band
Transmittal Letter No. (21-01)

General:

1. Version incremented from C to D.

Sheet 1:

1. Gage table converted to English units
2. In the Pipe Corrugations column added 5"x1" corrugation to the 3"x1" bands
3. Update incorrect width on semi-corrugated band 54" and smaller pipe sizes

Sheet 2:

1. Double Dimple section label converted from Metric to English unit

Sheet 3:

1. Notes updated to Active Voice.

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STANDARD PLATES

BLANK.....	0000 SERIES
PAVEMENT	1000 SERIES
BLANK.....	2000 SERIES
CULVERTS AND APPURTENANCES	3000 SERIES
SEWER APPURTENANCES.....	4000 SERIES
EROSION CONTROL STRUCTURES	5000 SERIES
BLANK.....	6000 SERIES
CURB, CURB AND GUTTER, SIDEWALK	7000 SERIES
BARRICADES, SIGNALS, MARKERS, ETC.....	8000 SERIES
MISCELLANEOUS	9000 SERIES

PLATE NO.

0000 SERIES—BLANK

1000 SERIES—PAVEMENT

- 1070M Supplemental Pavement Reinforcement
- 1103L Typical Dowel Bar Assembly (2 Sheets)
- 1210G Concrete Pavement Adjacent to Railway Crossing

2000 SERIES—BLANK

3000 SERIES—CULVERTS AND APPURTENANCES

- 3000M Reinforced Concrete Pipe (6 Sheets)
- 3001B Reinforced Concrete Reducer Pipe
- 3002B Reinforced Concrete Increaser Pipe
- 3006H Gasket Joint for R.C. Pipe (2 Sheets)
- 3007F Shear Reinforcement for Precast Drainage Structures
- 3014K Reinforced Concrete Pipe Arch (3 Sheets)
- 3020H Reinforced Precast Concrete Cattle Pass (60" & 72")
- 3022C Precast Concrete Safety Apron (3 Sheets)
- 3040F Corrugated Metal Pipe Culvert (Standard 2-2/3" x 1/2" Corrugation)
- 3041E Corrugated Metal Pipe (3" x 1" Corrugation)
- 3050B Design Data Structural Plate Structures (18" Corner Radius)
- 3051B Design Data Structural Plate Structures (31" Corner Radius)
- 3065C Connection between Existing Culv. & New "C" Culv. Barrel (2 Sheets)
- 3066A C.M. Extension for Box Culvert
- 3100G Concrete Apron for Reinforced Concrete Pipe
- 3110G Concrete Apron for Reinforced Concrete Pipe-Arch
- 3114H Sectional Concrete Apron for Reinforced Concrete Pipe-Arch
- 3122K Metal Apron for C.M. Pipe-Arch Culvert
- 3123J Metal Apron for C.S. Pipe
- 3124B Metal Apron Connection
- 3125A Inlet Protection for Metal Culverts (90" dia. to 96" dia.)
- 3126B Inlet Protection for Structural Plate Pipe (60" thru 96" dia. or span)
- 3127A Inlet Protection for Structural Plate Pipe (102" thru 180" dia. or span)

PLATE NO.

3128H	Metal Safety Apron & Grate (2 Sheets)
3129A	Metal Apron for Corrugated Polyethylene Pipe (Use at Entrances and Driveways)
3131C	Precast Concrete Headwall for Subsurface Drains
3132A	Grate for 1:4 Precast Concrete Aprons
3133D	Riprap at RCP Outlets
3134D	Riprap at CSP Outlets
3135A	Hand-Placed Riprap at Precast Concrete Cattle Pass
3136B	Slotted Vane Drain for P.V.C. Pipe
3137B	Slotted Drain for 12" thru 30" Dia. C.M. Pipe (Stackable)
3138B	Slotted Drain for 12" thru 30" Dia. C.M. Pipe (Not Stackable)
3139B	Riprap at Precast Concrete End Sections
3142A	Outlet Screen for C.M. & S.C. Pipes
3143C	Inspection Tees
3145G	Concrete Pipe or Precast Culvert Ties
3146C	Anti-Seepage Diaphragm (For CMP and CMP-A)
3148A	Safety Slope Metal End Section for Circular & Arched Pipes (2 Sheets)
3221D	Corrugated Steel Pipe Coupling Band (3 Sheets)

4000 SERIES—SEWER APPURTENANCES

Drainage Structure and Castings (4 Sheets)

- Structure and Casting Combinations
- Standard Casting Assemblies
- List of Castings
- List of Drainage Structures

4000J	Manhole or Catch Basin (Masonry, Field Constructed) - Design A
4002F	Manhole or Catch Basin (Masonry, Field Construction) - Design C
4003B	30" Precast Catch Basin – Design N
4005M	Manhole or Catch Basin Type A & B Cone Sections Precast - Design F
4006L	Manhole or Catch Basin Precast - Designs G and H
4007C	Precast Mechanical Joint Sewer Manhole
4008E	Catch Basin (Sectional Concrete Pipe) - Design I
4009H	Manhole or Catch Basin (Sectional Concrete Pipe) - Design J
4010H	Concrete Short Cone & Adjusting Ring (Sectional Concrete)
4011E	Precast Concrete Base
4017C	Catch Basin (Concrete Pipe and Metal Pipe) - Designs PC and PM
4018B	Manhole or Catch Basin (Reducer Cone Section Precast) Design D
4020J	Manhole or Catch Basin (For Use With or Without Traffic Loads) (2 sheets)
4021F	Precast Curb Opening Catch Basin
4022A	Manhole or Catch Basin Cover (3 ft. X 2 ft. Opening)
4024A	48" Dia. Precast Shallow Depth Catch Basin - Design SD
4025B	Drop Inlets or Catch Basins - Design DI (Concrete & Metal)
4026A	Concrete Encased Concrete Adjusting Rings
4101D	Ring Casting For Manhole or Catch Basin
4108F	Adjusting Rings for Catch Basins and Manholes
4110F	Cover Casting for Manhole (For Use in all Traffic Areas) – Casting No. 715 and 716
4125D	Catch Basin Frame Casting (For Square Grate) – Casting No. 806
4126F	Catch Basin Frame Casting – Casting No. 801
4129G	Catch Basin Frame Casting (For Square Grate) - Casting No. 802A
4132G	Catch Basin Frame Casting (For Square Grate) – Casting No. 805
4133A	Curb Box Casting for Catch Basin - Casting No. 824
4134A	Curb Box Casting for Catch Basin (For Design B Curbs) - Casting No. 825
4140D	Special Grate Castings for Catch Basin (Convex and Concave) - Casting No. 720 and 721
4143E	Stool Grate & Concrete Frame (Median Drains) - Casting No. 731
4149C	Grate Casting for Catch Basin - Casting No. 810

PLATE NO.

- 4150C Grate Casting for All Pipe Drainage Structures
- 4151B Grate Casting for Catch Basin (Square Type) - Casting No. 811
- 4152C Catch Basin Grate Casting - Casting No. 814A
- 4153A Catch Basin Grate Casting - Casting No. 815
- 4154B Catch Basin Grate Casting - Casting No. 816
- 4155A ADA Grate Inlet Casting – Casting No. 817
- 4160D Curb Box Casting for Catch Basin - Casting No. 823A and 833A
- 4161F Curb Box Casting for Catch Basin - Casting No. 821B, 822 and 831A
- 4180J Manhole or Catch Basin Step

5000 SERIES—EROSION CONTROL STRUCTURES

- 5010A Reinforced Concrete Pipe Energy Dissipator

6000 SERIES—BLANK

7000 SERIES—CURB, CURB AND GUTTER, SIDEWALK

- 7000E Integrant Curbs (Design B, Design V and Design D)
- 7020K Concrete Curb (Design B, Design V, Design S, Design DR and Design BR) (2 Sheets)
- 7038A Detectable Warning Surface Truncated Domes
- 7065C Bituminous Curb
- 7100H Concrete Curb and Gutter (Design B and Design V)
- 7102K Concrete Curb and Gutter (Design D, Design S, and Design R)
- 7105C Concrete Median (Mountable Type)
- 7107I Entrance Nose (Urban Design)
- 7108G Exit Nose (Urban Design)
- 7109C Median Nose and Island (Undivided to Divided Roadway)
- 7111J Installation of Catch Basin Castings (Concrete Curb and Gutter)
- 7112C Installation & Reinforcement of Catch Basin & Manhole Castings (Concrete Integrant Curbs)
- 7113A Concrete Approach Nose Detail

8000 SERIES—BARRICADES, SIGNALS, MARKERS, ETC.

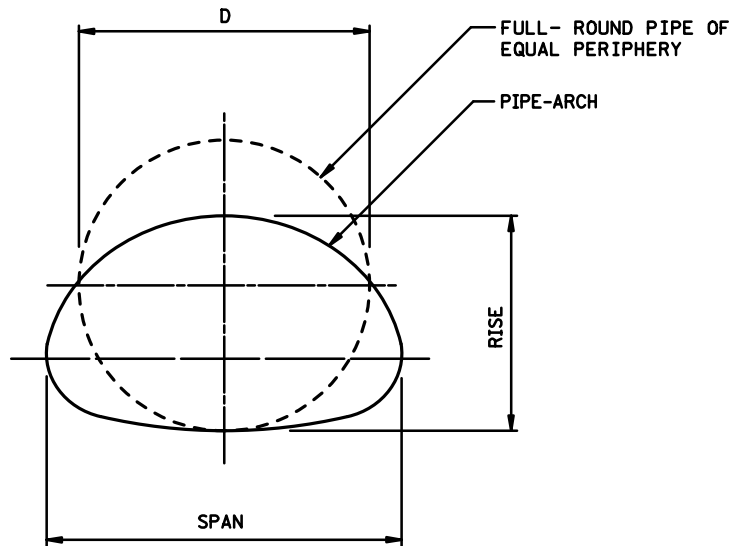
- 8000J Channelizers
- 8106D Equipment Pad B
- 8107A RLF Equipment Pad Foundation Layout
- 8110E Traffic Signal Bracketing (Pole Mounted)
- 8111E Traffic Signal Bracketing (Pedestal Mounted) (3 Sheets)
- 8112I Pedestal Foundation (Traffic Control Signals)
- 8117G Precast Concrete Handhole With Vehicle Load
- 8118D Service Equipment & Pole Traffic Control Signals
- 8119C Ground Mounted Cabinet Foundation
- 8120Q Pole Foundation (PA85)
- 8121H Transformer Base and Pole Base Plate (PA85, PA90 and PA100) (2 Sheets)
- 8122F Pedestal and Pedestal Base (For Traffic Control Signals Support) (2 Sheets)
- 8123G Pole and Mast Arm Luminaires and Traffic Lights Assembly (For All Pole Types) (2 Sheets)
- 8126L Pole Foundation (PA90 and PA100)
- 8127E Light Foundation - Design E, Precast/Cast-In-Place, 40 ft. Pole or Less (2 Sheets)
- 8128E Light Foundation - Design H, Precast/Cast-In-Place, 49 ft. Pole (2 Sheets)

PLATE NO.

8129A Shim and Washer (Traffic Control Signals and Roadway Lighting)
8130E Saw Cut Loop Detectors (3 Sheets)
8132B Preformed Rigid PVC Conduit Loop Detector (3 Sheets)
8133A Pole and Mast Arm - Type BA (9 Sheets)
8134C Pole Foundation - Type BA (4 Sheets)
8135A Anchor Rod Assembly for Light Tower Foundation
8150C Installation of Culvert Markers
8307S W-Beam Guardrail & End Anchorages (Installation with Wood Posts) (4 Sheets)
8308C Reinforced Concrete Median Barrier Type F (Non-Glare Screen Type) (4 Sheets)
8309C Reinforced Concrete Median Barrier Type F & Glare Screen (4 Sheets)
8316C Post Seat for Anchorage on Footing or Box Culverts
8318C Guardrail Anchorage Plate for Bridges and BCT'S
8326D Flexible Plastic Glare Screen
8330G 3-Cable Guardrail (With Wood Posts) (Assembly Details) (2 Sheets)
8331B 3-Cable Guardrail (With Steel Posts) (3 Sheets)
8332E Anchor Rod Assembly for Light Foundation - Barrier
8333B 3-Cable Guardrail Anchor (Anchor Details) (4 Sheets)
8337C Temporary Portable Precast Concrete Barrier (Type "F") (3 Sheets)
8338D W-Beam Guardrail & End Anchorages (Installation with Steel Posts) (4 Sheets)
8339A 3-Cable (Steel Posts) to W Beam (Wood Posts) Guardrail Transition
8340A 3-Cable (Steel Posts) to W Beam (Steel Posts) Guardrail Transition
8342B High-Tension Cable Barrier Line Post Foundation (Concrete Design)
8343A High-Tension Cable Barrier Line Post Foundation (Steel Design)
8347B Portable Precast Concrete Barrier Anchors
8350A Thrie Beam Anchorage Plate
8352B Thrie Beam Wedge Plate for Single Slope Barrier
8355A W-Beam guardrail
8356A W-Beam to Thrie-Beam Transition Guardrail
8357A Thrie Beam Guardrail
8360B Guardrail Post Length Marking
8361A Guardrail Steel Post (3 Sheets)
8365A BCT Timber Post
8366A BCT Foundation Tube
8368A CRT Wood Post
8369A Guardrail Blockout (2 Sheets)
8370A BCT Cable and Components (2 Sheets)
8400F Pipe Railing

9000 SERIES—MISCELLANEOUS

9000E Approaches and Entrances - Recommended Standards
9101B Shaping and Sodding of Slopes at Box Culvert Ends
9303B Geodetic Survey Disks (Aluminum) (2 Sheets)
9304A Geodetic Survey Disks (Removable Type Disk)
9308A Survey Monument Cap (2 Sheets)
9309G PLS (Public Land Survey) Monument (2 Sheets)
9320G Woven Wire Fence (Wood Post)
9321E Woven Wire Fence (Steel Post)
9322K Chain Link Fence (2 Sheets)
9323D Barbed Wire Fence (Wood Post)
9324C Barbed Wire Fence (Steel Post)
9350A Mailbox Support (Swing-Away Type)



SHEET THICKNESS - GAGE RELATIONSHIP		
GAGE	THICKNESS - EQUIVALENT IN INCHES	
	GALV. STEEL	ALUM. ALLOY
18	.0516	.048
16	.0635	.060
14	.0785	.075
12	.1084	.105
10	.1382	.135
8	.1681	.164

ROUND PIPE			PIPE-ARCH				
PIPE DIA. (IN.)	END AREA SQ. FT.	3" x1" & 5" x1" GAGE (MIN.)	SPAN (IN.)	RISE (IN.)	END AREA SQ. FT.	3" x1" GAGE (MIN.)	5" x1" GAGE (MIN.)
36	7.1	16	40-1.8	31+1.8	7.0	14	--
42	9.6	16	46-2.1	36+2.1	9.4	14	--
48	12.6	16	53-2.4	41+2.4	11.7	14	12
54	15.9	16	60-2.7	46+2.7	15.6	14	12
60	19.6	16	66-3.0	51+3.0	19.3	14	12
66	23.8	16	73-3.3	55+3.3	23.2	14	12
72	28.3	16	81-3.6	59+3.6	27.4	14	12
78	33.2	14	87-4.4	63+4.4	32.1	14	12
84	38.5	12	95-4.8	67+4.8	37.0	12	12
90	44.2	12	103-5.2	71+5.2	42.4	12	12
96	50.4	12	112-5.6	75+5.6	48.0	12	12
102	56.7	12	117-5.9	79+5.9	54.2	12	12
108	63.6	10	128-6.4	83+6.4	60.5	10	10
114	70.9	8	137-6.9	87+6.9	67.4	8	8
120	78.5	8	142-7.1	91+7.1	74.5	8	8

ELONGATE ROUND PIPE VERTICAL AXIS 5% MORE THAN THE NORMAL DIAMETER WHEN CALLED FOR IN THE PLANS.

DO NOT VARY THE AVERAGE INSIDE DIAMETER OF CIRCULAR PIPE MORE THAN ONE PERCENT OR ONE-HALF INCH, WHICHEVER IS GREATER, FROM THE NOMINAL DIAMETER WHEN MEASURED ON THE INSIDE CREST OF THE CORRUGATIONS.

FOR PIPE ARCH THE NEGATIVE AND POSITIVE NUMBERS LISTED WITH SPAN AND RISE DIMENSIONS ARE NEGATIVE AND POSITIVE TOLERANCES. ALL DIMENSIONS ARE MEASURED FROM THE INSIDE CRESTS OF THE CORRUGATIONS.

REFER TO THE MnDOT DRAINAGE MANUAL FOR ALLOWABLE FILL HEIGHTS. 5" x 1" CORRUGATED METAL PIPE IS AVAILABLE IN 48" - 120" DIAMETERS.

APPROVED FEBRUARY 22, 2021

Rom Slin
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

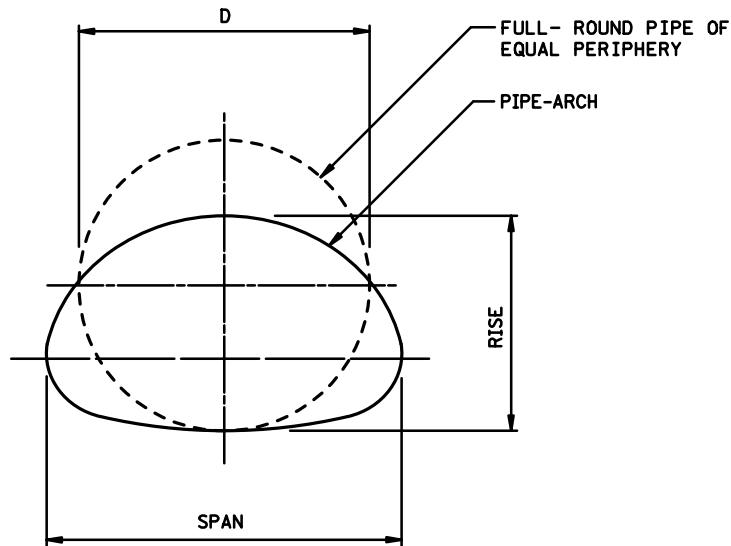
CORRUGATED METAL PIPE
3" x 1" OR 5" x 1" CORRUGATION

SPECIFICATION
REFERENCE

2501
2502
2503

STANDARD
PLATE
NO.

3041E



SHEET THICKNESS - GAGE RELATIONSHIP		
GAGE	THICKNESS - EQUIVALENT IN INCHES	
	GALV. STEEL	ALUM. ALLOY
18	.0516	.048
16	.0635	.060
14	.0785	.075
12	.1084	.105
10	.1382	.135
8	.1681	.164

ROUND PIPE			PIPE-ARCH				
PIPE DIA. (IN.)	END AREA SQ. FT.	3" x1" & 5" x1" GAGE (MIN.)	SPAN (IN.)	RISE (IN.)	END AREA SQ. FT.	3" x1" GAGE (MIN.)	5" x1" GAGE (MIN.)
36	7.1	16	40-1.8	31+1.8	7.0	14	--
42	9.6	16	46-2.1	36+2.1	9.4	14	--
48	12.6	16	53-2.4	41+2.4	11.7	14	12
54	15.9	16	60-2.7	46+2.7	15.6	14	12
60	19.6	16	66-3.0	51+3.0	19.3	14	12
66	23.8	16	73-3.3	55+3.3	23.2	14	12
72	28.3	16	81-3.6	59+3.6	27.4	14	12
78	33.2	14	87-4.4	63+4.4	32.1	14	12
84	38.5	12	95-4.8	67+4.8	37.0	12	12
90	44.2	12	103-5.2	71+5.2	42.4	12	12
96	50.4	12	112-5.6	75+5.6	48.0	12	12
102	56.7	12	117-5.9	79+5.9	54.2	12	12
108	63.6	10	128-6.4	83+6.4	60.5	10	10
114	70.9	8	137-6.9	87+6.9	67.4	8	8
120	78.5	8	142-7.1	91+7.1	74.5	8	8

ELONGATE ROUND PIPE VERTICAL AXIS 5% MORE THAN THE NORMAL DIAMETER WHEN CALLED FOR IN THE PLANS.

DO NOT VARY THE AVERAGE INSIDE DIAMETER OF CIRCULAR PIPE MORE THAN ONE PERCENT OR ONE-HALF INCH, WHICHEVER IS GREATER, FROM THE NOMINAL DIAMETER WHEN MEASURED ON THE INSIDE CREST OF THE CORRUGATIONS.

FOR PIPE ARCH THE NEGATIVE AND POSITIVE NUMBERS LISTED WITH SPAN AND RISE DIMENSIONS ARE NEGATIVE AND POSITIVE TOLERANCES. ALL DIMENSIONS ARE MEASURED FROM THE INSIDE CRESTS OF THE CORRUGATIONS.

REFER TO THE MnDOT DRAINAGE MANUAL FOR ALLOWABLE FILL HEIGHTS. 5" x 1" CORRUGATED METAL PIPE IS AVAILABLE IN 48" - 120" DIAMETERS.

APPROVED FEBRUARY 22, 2021

Rom Slin
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

CORRUGATED METAL PIPE
3" x 1" OR 5" x 1" CORRUGATION

SPECIFICATION
REFERENCE
2501
2502
2503

STANDARD
PLATE
NO.
3041E

COUPLING TYPE	PIPE DIMENSIONS		BAND - MINIMUMS		BAND CONNECTING METHOD								
	PIPE CORRUGATION (IN.)	PIPE SIZE I.D. (IN.)	W OR A (IN.)	BAND THICKNESS (IN.) (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.)
STANDARD JOINTS													
UNIVERSAL BAND (DIMPLED)	2-2/3 X 1/2	THRU 36	12	0.052 (18 GA.)	0.079 (14 GA.) DBL. 0.079 (14 GA.)	2 X 2 X 3/16 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 2 X 2 X 3/16 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 & 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.) 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 & 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.) 0.079 (14 GA.) 0.079 (14 GA.) 0.079 (14 GA.)	2 X 2 X 5/16 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.) 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 & 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.)									
POSITIVE JOINTS													
UNIVERSAL BAND (DIMPLED)	2-2/3 X 1/2	THRU 36	12	0.064 (16 GA.)	0.079 (14 GA.) 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 2 X 2 X 3/16 2 X 2 X 5/16 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 & 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.) 0.109 (12 GA.) DBL. 0.079 (14 GA.) 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 & 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.) 0.079 (14 GA.) 0.079 (14 GA.) 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.) 0.109 (12 GA.) DBL. 0.079 (14 GA.) 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 & 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.

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DEPARTMENT OF TRANSPORTATION

**CORRUGATED STEEL PIPE
COUPLING BAND**

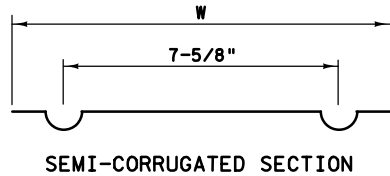
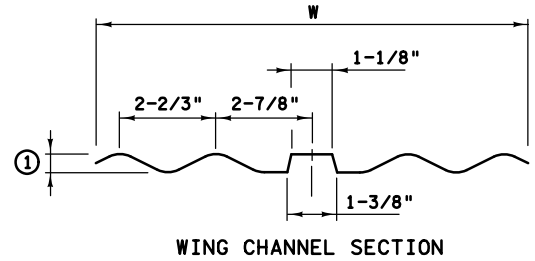
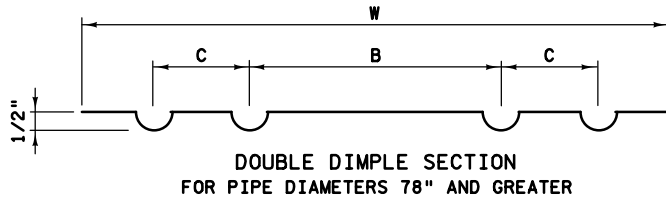
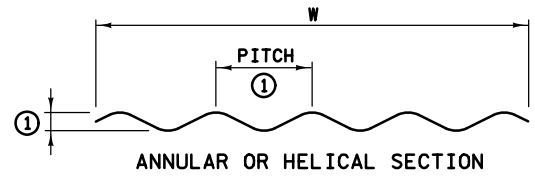
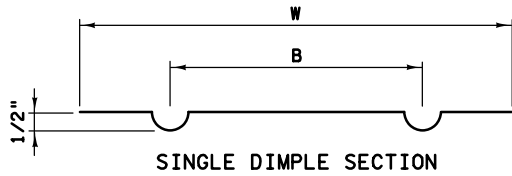
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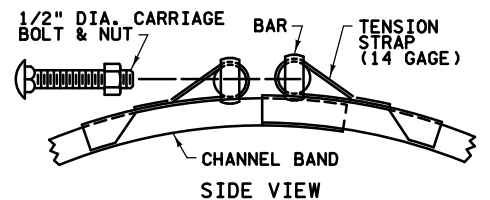
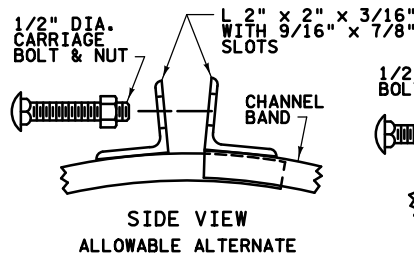
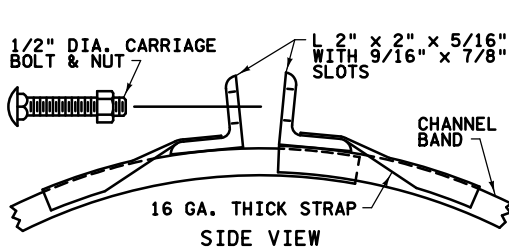
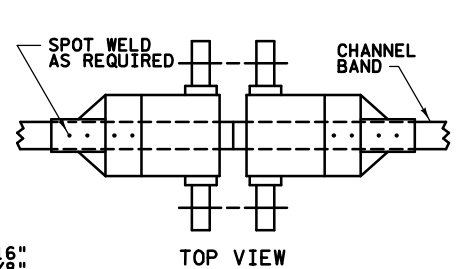
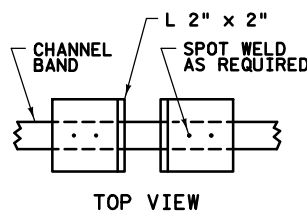
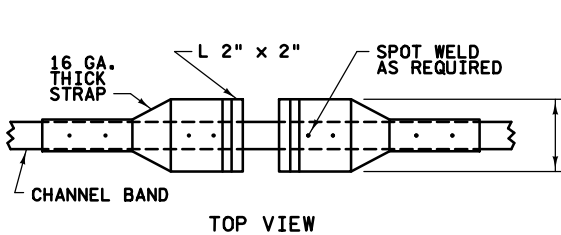
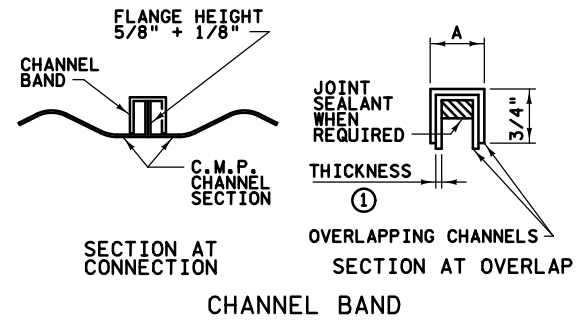
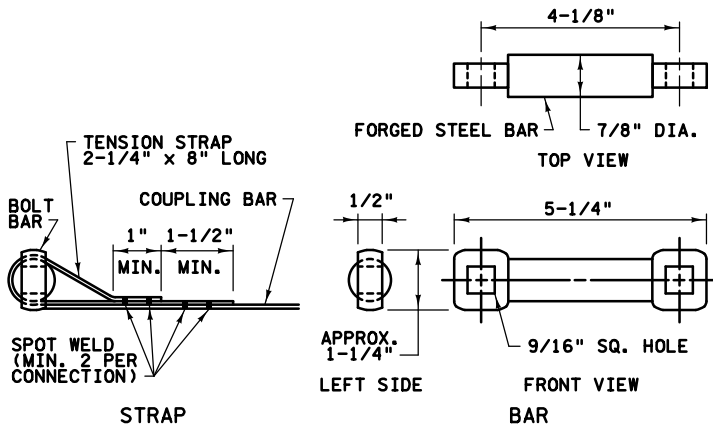
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W - SEE JOINT TABLE FOR DIMENSIONS.
 B - AS REQUIRED TO FIT HELIX ANGLE 7" MIN.
 C - AS REQUIRED TO FIT HELIX ANGLE 2-2/3" MIN.
 ① SEE JOINT TABLE FOR DIMENSIONS.



COUPLING BAND TYPES



ANGLE CONNECTION CHANNEL

BAR & STRAP CONNECTION CHANNEL

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CORRUGATED STEEL PIPE
COUPLING BAND

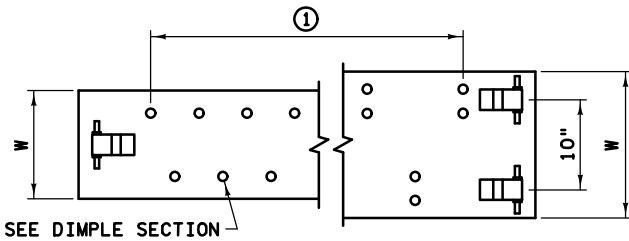
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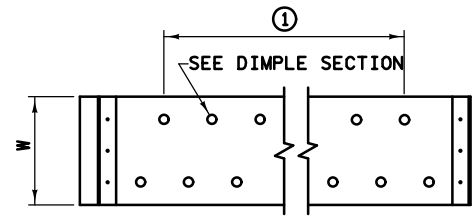
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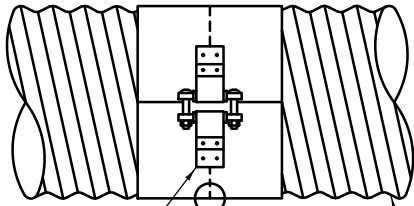
2 OF 3



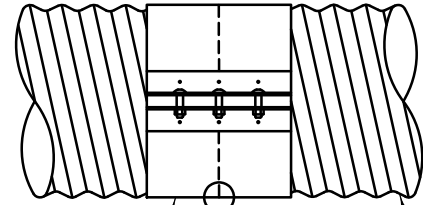
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BAR & STRAP DIMPLE BAND



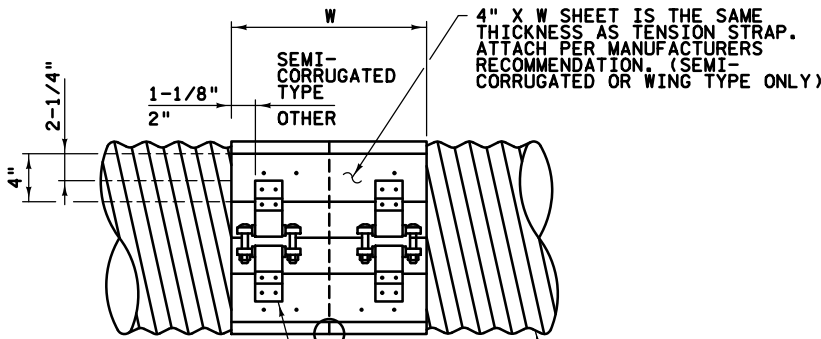
SEE DIMPLE SECTION
ANGLE DIMPLE BAND



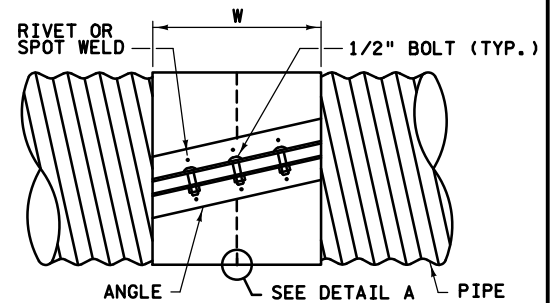
SEE BAR & STRAP DETAILS
 SEE DETAIL A PIPE
TYPICAL SINGLE STRAP



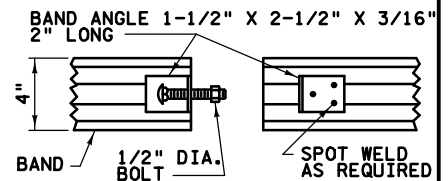
SEE ANGLE CONNECTION DETAIL
 SEE DETAIL A PIPE
TYPICAL ANGLE CONNECTION



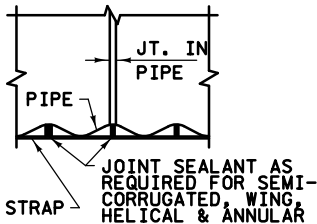
SEE BAR & STRAP DETAILS
 SEE DETAIL A PIPE
TYPICAL DOUBLE STRAP BAND



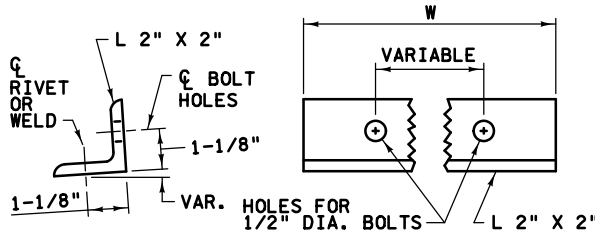
SKewed ANGLE CONNECTION



TOP VIEW



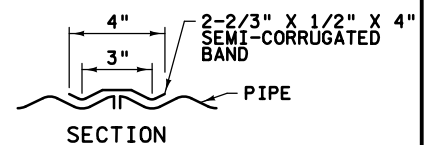
DETAIL A



END VIEW

SIDE VIEW

BAND COUPLER ANGLE



SECTION

SEMI-CORRUGATED BAND WITH 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.

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 COUPLING BAND**

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