

MINNESOTA DEPARTMENT OF TRANSPORTATION

DEVELOPED BY: Design Standards

ISSUED BY: Office of Project Management and Technical Support,
Design Support Section

TRANSMITTAL LETTER NO. (15-04)

MANUAL: Standard Plates

DATED: November 23, 2015

SUBJECT: Geodetic Survey Disks, Standard Plate 9304

The following is a new Standard Plate:
9304, Geodetic Survey Disks

INSTRUCTIONS:

- Record the transmittal letter number, date, and subject on the transmittal record sheet located in the front of the manual. The previous Transmittal Letter No. issued for this manual was 15-03, dated September 1, 2015.
- Remove from the Standard Plate manual:
 - Standard Plate Index, Sheets 1-4 of 4, Numerical Index of Standard Plates
- Insert into the Standard Plate manual:
 - Standard Plate Index, Sheets 1-4 of 4, Numerical Index of Standard Plates (October 14, 2015)
 - Standard Plate 9304A, Geodetic Survey Disks) (October 14, 2015)
- Current Standard Plates including Transmittal Letters are available on the web at:
<http://standardplates.dot.state.mn.us/stdplate.aspx>
- Direct any technical questions regarding this transmittal to Ron Reemer, Design Standards Unit at (651) 366-4707.

Michael Elle

Michael Elle, P.E.
Design Standards Engineer

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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
- 1103K Typical Dowel Bar Assembly (2 Sheets)
- 1150R Concrete Header Joints (2 Sheets)
- 1210G Concrete Pavement Adjacent to Railway Crossing

2000 SERIES—BLANK

3000 SERIES—CULVERTS AND APPURTENANCES

- 3000L Reinforced Concrete Pipe (5 Sheets)
- 3001B Reinforced Concrete Reducer Pipe
- 3002B Reinforced Concrete Increaser Pipe
- 3006G Gasket Joint for R.C. Pipe (2 Sheets)
- 3007E Shear Reinforcement for Precast Drainage Structures
- 3014J Reinforced Concrete Pipe Arch (2 Sheets)
- 3020F Reinforced Precast Concrete Cattle Pass (60" & 72")
- 3022C Precast Concrete Safety Apron (3 Sheets)
- 3030A Precast Cattle Pass Transition Section
- 3031B Connection between Existing 4 Ft. X 6 Ft. Cattle Pass and New Precast Transition Section
- 3040F Corrugated Metal Pipe Culvert (Standard 2-2/3" x 1/2" Corrugation)
- 3041D 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)
3221C	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
4132F	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
- 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 Dissipater

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)
- 7035N Concrete Walk & Curb Returns at Entrances
- 7038A Detectable Warning Surface Truncated Domes
- 7065C Bituminous Curb
- 7100H Concrete Curb and Gutter (Design B and Design V)
- 7102J Concrete Curb and Gutter (Designs D, S, B4, B5 and D3) (2 Sheets)
- 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.

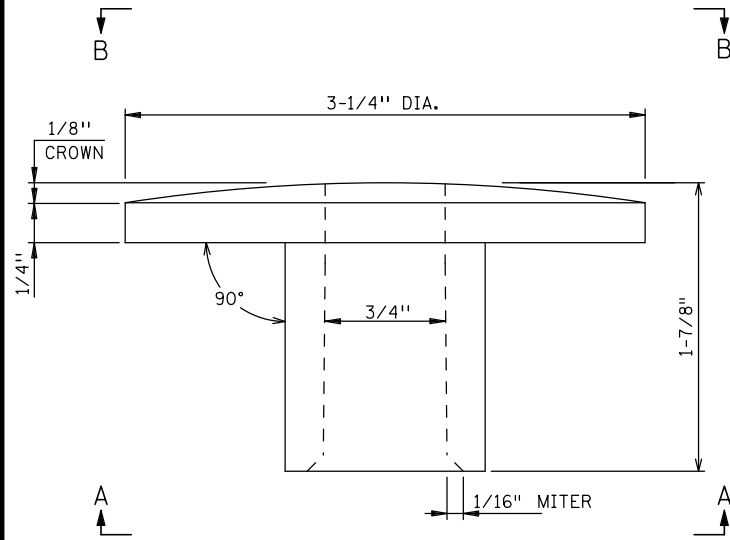
- 8000I Standard Barricades
- 8002G Permanent Barricade
- 8106D Equipment Pad B
- 8110E Traffic Signal Bracketing (Pole Mounted)
- 8111E Traffic Signal Bracketing (Pedestal Mounted) (3 Sheets)
- 8112I Pedestal Foundation (Traffic Control Signals)
- 8117G Precast Concrete HandHole With Vehicle Load
- 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)
8150C Installation of Culvert Markers
8307S W-Beam Guardrail & End Anchorages (Installation with Wood Posts) (4 Sheets)
8308B Reinforced Concrete Median Barrier Type F (Non-Glare Screen Type) Design 8308 (3 Sheets)
8309B Reinforced Concrete Median Barrier Type F & Glare Screen Design 8309 (3 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
8329I Eccentric Loader Breakaway Cable Terminal (ELT) (4 Sheets)
8330G 3-Cable Guardrail (With Wood Posts) (Assembly Details) (2 Sheets)
8331B 3-Cable Guardrail (With Steel Posts) (3 Sheets)
8332D Anchor Bolt Cluster and Base Plate for Light Poles
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)
8347A Portable Precast Concrete Barrier Anchors
8350A Thrie Beam Anchorage Plate
8400E Pipe Railing
8401C At Grade Pipe Railing (Adjacent to Sidewalk)

9000 SERIES--MISCELLANEOUS

9000E Approaches and Entrances - Recommended Standards
9101B Shaping and Sodding of Slopes at Box Culvert Ends
9102E Turf Establishment Areas (At Pipe 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)



MATERIAL

DISKS SHALL BE OF ALUMINUM OR BRONZE ALLOY.

REMOVABLE TYPE DISK

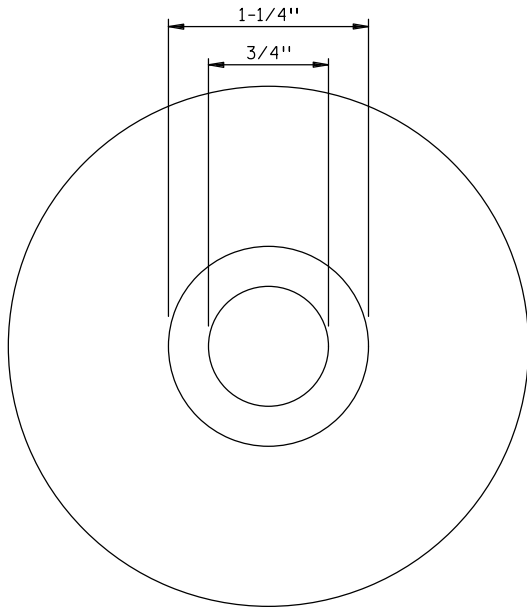
THE DISK SHALL HAVE A HOLLOW CENTER ALLOWING IT TO FIT FREELY OVER A 3/4" ROD. THE DISK SHALL BE DESIGNED SUCH THAT NO PERMANENT CONNECTION WILL BE MADE TO THE ROD.

LEGEND

THE LEGEND SHALL BE PRESSED INTO THE UPPER SURFACE OF THE DISK IN SUCH A MANNER THAT THERE IS NO RAISING OF THE ADJACENT SURFACES. ALL LETTERS SHALL BE APPROXIMATELY 3/16" HIGH. THE DEPTH OF ALL LETTERS SHALL BE APPROXIMATELY 1/32" DEEP WITH A "U" SHAPED CROSS SECTION.

NO LETTER SHALL FIT CLOSER TO THE OUTER RIM OF THE DISK THAN 1/16". ALL LETTERS MUST LIE ALONG A RADIUS. THE LEGEND MUST BE CENTRALLY LOCATED.

FOR IDENTIFICATION, GEODETIC SURVEY DISKS SHALL BE HAND STAMPED IN THE FIELD USING 3/16" DIES ACCORDING TO PROCEDURES OUTLINED IN THE SURVEYING AND MAPPING MANUAL.



VIEW A-A



VIEW B-B

APPROVED OCTOBER 14, 2015

Christy M. Ry
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

GEODETIC SURVEY DISKS
REMOVABLE TYPE DISK

SPECIFICATION
REFERENCE

STANDARD
PLATE
NO.

9304A

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