GUIDE SIGNS

2' PREFERRED

ROUTE MARKERS

REGULATORY
R1-1 / R1-2

REGULATORY
OF EDGE
PAVT.

10' STANDARD
INTERSTATE)

6' MINIMUM
SHOULDER)

6' MINIMUM
SIGN PANEL

EDGE OF
SIGN PANEL

FACE OF
RAIL

NOTE: ADJUST SIGN LOCATION OR CLEARANCE SLIGHTLY TO AVOID PLACING POSTS IN DITCH BOTTOMS. SEE NOTE 4C BELOW.

GUIDE SIGNS

A) USE THE DIAGRAMS LOCATED ABOVE WHEN PLACING THESE SIGNS IN URBAN CONDITIONS WHERE THERE IS ADEQUATE SIGNS BEHIND GUARDRAIL IN RURAL CONDITIONS. USE COLUMN 3 WHEN PLACING THESE SIGNS IN URBAN CONDITIONS WHERE THERE IS ADEQUATE SIGN PANEL FACE OF RAIL AS PREFERRED SHOWN IN COLUMN 4.

A) USE DIAGRAMS LOCATED IN COLUMN 1 WHEN PLACING THESE SIGNS OR CLEARANCE SLIGHTLY TO AVOID PLACING POSTS IN DITCH BOTTOMS. SEE NOTE 4C BELOW.

3. FOR REGULATORY (ALL OTHER), WARNING AND ROUTE MARKER SIGNS, DWG. NO. 619-18 FOR PLACEMENT DETAILS.

FOR GUIDE SIGNS AND THEIR ASSEMBLIES:

4. WITHIN THE CITY LIMITS OR IN A SIDEWALK AND CURB AREA, MOUNT SIGNS D) SEE DTL. DWG. NO. 619-08 FOR MOUNTING HEIGHTS.

5. The exact location of the post and the main walking area of the sidewalk, or within 

B) FOR PLACEMENT OF THESE SIGNS IN URBAN CONDITIONS, SEE THE SIGN LOCATION AND SPECIFICATION SHEETS IN THE SIGNING PLANS FOR EACH INDIVIDUAL SIGN.

C) USE THE DIAGRAMS LOCATED IN COLUMN 2 WHERE SIGN LOCATION SHEETS IN THE SIGNING PLANS FOR EACH INDIVIDUAL SIGN.

D) SEE HARBORING THE REQUIREMENTS OF SECTION 204.

E) EVALUATE SIGNS WITHIN CLEAR ZONES BASED FOR SUPPORT REQUIREMENTS CONTACT MDT TRAFFIC SECTION FOR CRITERIA.

F) SEE DTL. DWG. NO. 619-08 FOR MOUNTING HEIGHTS.

G) SEE HARBORING THE REQUIREMENTS OF SECTION 204.

H) USE BREAKAWAY REQUIREMENTS (CONTACT MDT TRAFFIC SECTION FOR CRITERIA).

NOTE: WHEN AN INVESTIGATION OR ACCIDENT HISTORY INDICATES A HIGH PROBABILITY OF ACCIDENTS, CLEAR ZONE DISTANCES GREATER THAN 60' MAY BE PROVIDED AS INDICATED. CLEAR ZONES MAY ALSO BE LIMITED TO 60' TO PROVIDE A CONSISTENT HANDLING CAPABILITY WHEN EXPERIENCE WITH THE SAME SIGN INSTALLATION PROJECT INDICATES SATISFACTORY PERFORMANCE.

** FIXED OBJECTS, INCLUDING SIGN POSTS, SHOULD NOT BE ALLOWED IN THE VICINITY OF THE TOP OF THESE SLOPES. IN CASES WHERE OBJECTS ARE PRESENT, USE ADDITIONAL CONSIDERATIONS IN LOCATING SIGNS.

** CLEAR ZONE DISTANCES
(IN FEET FROM EDGE OF DRIVING LANE)

<table>
<thead>
<tr>
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1. Place all signs at the clearance and mounting heights shown.

2. For regulatory, warning, and route marker signs, and their associated clearance and mounting height requirements, use only those in Columns 1 and 2. Use Column 3 when placing these signs in urban conditions. Use Column 4 when placing these signs in rural conditions. See Column 4 for placement details.

3. For regulatory and route markers, warn and route markers, signs, and their associated clearance and mounting heights requirements, for standard rural conditions, the clearances listed in Column 2 may also be limited to 9 m to provide a clear zone for vehicles traveling the same speed or slower.

4. For guide signs and their accessories, use the diagrams located above when placing these signs in the open plain conditions.

**NOTES:**
- Place all signs at the clearance and mounting heights shown.
- For regulatory, warning, and route marker signs, and their associated clearance and mounting height requirements, use only those in Columns 1 and 2. Use Column 3 when placing these signs in urban conditions. Use Column 4 when placing these signs in rural conditions. See Column 4 for placement details.
- For regulatory and route markers, warn and route markers, signs, and their associated clearance and mounting heights requirements, for standard rural conditions, the clearances listed in Column 2 may also be limited to 9 m to provide a clear zone for vehicles traveling the same speed or slower.
- For guide signs and their accessories, use the diagrams located above when placing these signs in the open plain conditions.

**CLEAR ZONE DISTANCES (IN METERS FROM EDGE OF DRIVING LANE):**

<table>
<thead>
<tr>
<th>Speed</th>
<th>All Signs</th>
<th>Cut Signs</th>
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<tbody>
<tr>
<td>Under 70</td>
<td>2.0-3.0</td>
<td>2.0-3.0</td>
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<tr>
<td>70-90</td>
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<tr>
<td>Over 110</td>
<td>2.0-3.0</td>
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**HORIZONTAL CURVE ADJUSTMENTS**

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<thead>
<tr>
<th>Radius</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
<th>900</th>
<th>1000</th>
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<tbody>
<tr>
<td>50</td>
<td>1.1</td>
<td>1.2</td>
<td>1.3</td>
<td>1.4</td>
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<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>100</td>
<td>0.7</td>
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<td>0.9</td>
<td>1.0</td>
<td>1.1</td>
<td>1.2</td>
<td>1.3</td>
<td>1.4</td>
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<td>1.7</td>
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<tr>
<td>200</td>
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<td>0.4</td>
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<td>0.7</td>
<td>0.8</td>
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<td>1.2</td>
<td>1.3</td>
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<td>0.8</td>
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<td>0.4</td>
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<td>0.7</td>
<td>0.8</td>
<td>0.9</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>500</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
<td>0.6</td>
<td>0.7</td>
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<td>0.9</td>
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<td>700</td>
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<td>1.0</td>
<td>1.1</td>
</tr>
</tbody>
</table>

**NOTE:**
- When an investigation or accident history indicates a high probability of accidents, clear zone distances greater than 0 m may be provided as indicated. Clear zones may also be limited to 9 m to provide a clear zone for vehicles traveling the same speed or slower.

**DEPARTED DIAGRAM**

- All dimensions are millimeters (mm) unless otherwise noted.
- All sign clearances and mounting heights (metric) are shown in the diagrams.
- Reference: DEPARTED DIAGRAM.
- Section: Reference.
- Date: September 2014.
- MONTANA DEPARTMENT OF TRANSPORTATION.
NOTES:

1. 6' [1.8 m] MINIMUM; 50' [15.2 m] MAXIMUM.

2. PLACE R1-1 SIGN AT THE BEGINNING OF CURB RADIUS OR SHOULDER RADIUS, OR 4 FEET [1.2 m] IN ADVANCE OF THE MARKED OR UNMARKED CROSSWALK.

3. SEE PLANS FOR FINAL SIGNING AND PAVEMENT MARKING LOCATIONS.

4. USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.
REFERENCES

METRIC BACKBRACING TABLE – ALUMINUM SIGNS

<table>
<thead>
<tr>
<th>SPACING (mm)</th>
<th>MAXIMUM WIDTH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 POST</td>
<td>1200</td>
</tr>
<tr>
<td>2 POST</td>
<td>1100</td>
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</tbody>
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BACKBRACING TABLE – ALUMINUM SIGNS

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NOTES:

1. CONFORM ALL ALUMINUM SIGNS TO SECTIONS 619, AND 704.
2. FOR SIGNS 4'-0" (1200) HIGH OR LESS USE A SINGLE SHEET OF ALUMINUM.
3. DO NOT USE HORIZONTAL JOINTS IN SIGNS 4'-0" (1200) IN HEIGHT AND SMALLER. THE MINIMUM SHEET WIDTH IS 2'-0" (600)
4. SIGNS OVER 6'-0" (1800) HIGH MAY HAVE HORIZONTAL AND VERTICAL JOINTS. THE MINIMUM SHEET SIZE IS 1'-6" (450) WIDE BY 1'-6" (450) HIGH.
5. CLEAN AND DRY POST CLIP NUTS, THEN TORQUE TO 225 INCH-POUNDS (25.4 N·m).
6. DO NOT USE HORIZONTAL JOINTS ON SIGNS 6'-0" (1800) IN HEIGHT AND SMALLER.
7. USE SCREWS, BOLTS AND LOCKWASHERS MEETING THE REQUIREMENTS OF SECTION 704.
8. LOCATION ALL HORIZONTAL JOINTS AT A "T"-SECTION.
9. NO SPLICES AND ALLOWED IN EXTENDED "T"-SECTIONS.
10. USE ONLY ALUMINUM RIVETS.
11. THE MAXIMUM GAP BETWEEN INDIVIDUAL SIGN PANELS AT JOINTS IS 1/16" (1.6) AT ANY POINT.
12. THE PROJECT MANAGER MAY APPROVE ADDITIONAL METHODS TO PREVENT LIGHT LEAKAGE THROUGH SIGN PANEL SEAMS.
USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.
THE PLANS SPECIFY OTHERWISE FOR SPECIAL DESIGN SIGNS.

CONSTRUCT PLYWOOD SIGNS OF ONE PIECE OF PLYWOOD UNLESS HIGH.
The minimum size panel is 1'-6" [450] wide by 4'-0" [1200] unless other units are shown.

May also use 4'-0" x 12'-0" [1200 x 3600] panels for signs over 10'-0" [3000] in height, the full height panels in lieu of using standard length panels as shown.

For signs over 10'-0" [3000] in height, the full height panels may be obtained with panels having a factory scarfed joint in lieu of using standard length panels as shown.

Do not use horizontal joints on signs less than 4'-0" [1200] in height.

On signs 4'-0" [1200] high and greater, do not use any horizontal joints.

Conform all plywood signs to sections 619 and 704.

Notes:
1. Do not use hardware meeting the requirements of section 704.

2. Do not use horizontal joints on signs less than 4'-0" [1200] in height.

3. For signs with widths that are not in multiples of 4'-0" [1200], place the odd length panel on the inside edge.

4. For signs over 10'-0" [3000] in height, the full height panels may be obtained with panels having a factory scarfed joint in lieu of using standard length panels as shown.

5. The maximum size panel is 1'-6" [450] wide by 4'-0" [1200] high.

6. Paint all edges.

7. Use hardware meeting the requirements of section 704.
POST SPACING WIDTH:
- 0.80 x b for 2 posts
- 0.55 x b for 3 posts

WHERE 3 POSTS ARE REQUIRED, THE CENTER POST IS DESIGNATED 2 POST.

POST SPACING WIDTH:
= 0.80 x b for 2 posts
= 0.55 x b for 3 posts

WHERE 3 POSTS ARE REQUIRED, THE CENTER POST IS DESIGNATED 2 POST.

NOTES:
1. MOUNTING SYSTEMS SHOWN ARE TYPICAL. OTHER SYSTEMS MAY BE APPROVED BY THE PROJECT MANAGER.
2. USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 10A.
3. SEE THE SIGNING PLANS FOR THE TYPES OF POSTS AND FOUNDATIONS.
4. MOUNT THE PANELS DIRECTLY TO WOOD POLES OR POSTS, WHERE SPECIFIED IN THE PLANS, BY BOLTING THROUGH THE SIGN PLATE AND THE POLE AS REQUIRED BY THE DETAIL DRAWINGS, SPECIFICATIONS AND DESIGN.
5. NO WINDING LINES OR SUPPLEMENTAL WINDING ADDER AFTER INITIAL SIGN INSTALLATION, FROM MAJOR SIGN PANELS OR BACKBRACING. ATTACHMENT TO MULTIPLE POSTS/POLES IS NOT ALLOWED.
6. USE POST SPACING, POST SIZE AND BREAKAWAY DEVICES SPECIFIED IN THE PLANS AND IN THE SPECIFICATIONS. FOR INFORMATION REGARDING APPROPRIATE BREAKAWAY DEVICES FOR NEW INSTALLATIONS NOT SUPPORTED BY THE PLANS, CONTACT THE PROJECT MANAGER.
7. IN LOCATING SIGNS, AVOID PLACING POSTS IN DITCH MOUTIONS WHERE THEY WOULD IMPede DRAINAGE.
8. DIMENSIONS ARE SPECIFIED IN THE SIGNING PLANS.

DEVICE (TYP.):
- 2 x 6" [50 x 3] STRAP
- 2 1/2" x 3 1/2" x 5/16" x 8" L
- 1" [25]
- 3/4" [19] HIGH DENSITY PLYWOOD SIGN

MOUNTING DETAILS:
- USE 4 BOLTS PER SIGN IN DOUBLE POLE MOUNTING (2 PER POST)
- 3/8" DIA. x 2" [M10 x 51] ALUMINUM POST CLIP BOLT, FLAT WASHER AND NUT
- 5/16" DIA. HEX BOLT, WASHERS, LOCKWASHER AND NUT

ALUMINUM POLE POST CLIP AND T-POST EACH SIDE OF POST

TREATED POLE
- USE 4 BOLTS PER SIGN IN SINGLE POST MOUNTING (2 PER POST)
- 5/16" [M8] HEX BOLT, LOCKWASHER AND NUT
- 1/4" [31.8] HIGH DENSITY PLYWOOD SIGN

SINGLE OR DOUBLE TREATED POLE
- LOCKNUT TO MAINTAIN LATERAL ALIGNMENT
- ALUMINUM POST CLIP BOLT, FLAT WASHER AND 3/8" DIA. [M10] ALUMINUM POST NUT

MOUNTING SYSTEMS SHOWN ARE TYPICAL. OTHER SYSTEMS MAY BE APPROVED BY THE PROJECT MANAGER.

DOUBLE POLE MOUNT
- USE 3 BOLTS PER SIGN IN SINGLE POST MOUNTING
- 2 1/2" x 3 1/2" x 5/16" x 8" L
- 1" [25] ± 1/8" OF TRANSPORTATION

NOTE: UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.
NOTES:

1. REMOVE ALL RAISED LETTERS, NUMERALS, SYMBOLS, BORDERS AND PREVIOUS SIGN OVERLAYS TO BE REPLACED, AND CLEAN SIGN FACE TO A SMOOTH SURFACE BEFORE OVERLAYING.

2. ALL LETTERS, NUMERALS, SYMBOLS AND BORDERS ARE TYPE "C" CUTOUT UNLESS OTHERWISE SPECIFIED, AND APPLIED TO THE BACKGROUND SHEETING PRIOR TO FIELD APPLICATION OF THE SIGN.

3. THE SIZE OF ALL GUIDE SIGN OVERLAYS AND LEGENDS MUST BE VERIFIED BY THE PROJECT MANAGER PRIOR TO FABRICATION.

4. AN ADHESIVE-BACKED SHEETING MAY BE USED AS AN ALTERNATIVE ON SIGN WIDTHS OF 6'-0" [1800] OR LESS IF IT IS PREFABRICATED TO A MINIMUM THICKNESS OF 0.005" [.13] AND CONSTRUCTED OF PREAPPLIED REFLECTIVE SHEETING ON ADHESIVE-BACKED ALUMINUM. APPLY ADHESIVE-BACKED OVERLAY SHEETING WHEN AIR AND SURFACE TEMPERATURES ARE ABOVE 50°F (10°C). DO NOT USE THIS TYPE OF OVERLAY MATERIAL ON OVERHEAD SIGNS.

5. PROVIDE A MINIMUM REFLECTIVE SHEETING INTENSITY OF TYPE 4, MEETING THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS, UNLESS SPECIFIED OTHERWISE.

6. APPLY ALL MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

7. USE ALUMINUM ALLOY TYPE 6061-T6 OR AA5052-H38. CONVERSION COAT ALL ALUMINUM WITH A PROCESS SUCH AS ALODINE 1200 (OR EQUAL), AND RINSE AND DRY THOROUGHLY. PROTECT IT FROM SOIL BY ACCEPTABLE METHODS.

8. SIGN OVERLAYS MAY REQUIRE REMOVAL OF THE SIGN FROM THE POSTS TO AVOID PROJECTING BOLT HEADS. DO NOT LEAVE WARNING AND REGULATORY SIGNS TO BE OVERLAYED UNDISPLAYED FOR MORE THAN ONE (1) HOUR DURING DAYLIGHT. DO NOT LEAVE GUIDE SIGNS UNDISPLAYED FOR MORE THAN TEN (10) HOURS DURING DAYLIGHT. INSURE SIGNS TO BE OVERLAYED ARE OPERATIONAL PRIOR TO DARKNESS.

9. OVERLAY SIGNS SMALLER THAN 4'-0" x 6'-0" [1200 x 1800] WITH ONE PANEL OF MATERIAL. FOR SEAMS IN LARGE OVERLAYS, USE RIVETS OR BOLTS SPACED AS SHOWN ON THIS DRAWING AND PLACE PARALLEL TO AND NO MORE THAN 3" [75] LATERAL FROM THE SEAM.

10. USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.

UNITs SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.
NOTES:
1. USE TUBULAR POSTS FOR SINGLE POST MOUNTED SIGNS ONLY.
2. USE 3/4" (19.05 mm) DIA. STEEL POSTS AND 3/4" (19.05 mm) DIA. TUBE SIGNS AT EACH LOCATION. SEE TABLES FOR DIAMETER COMPARISON.
3. USE PLATE FOR BASE CONSTRUCTION ASSEMBLY.
4. ALL BOLTS ARE ASTM A 325 [325M]. FOR BASE CONNECTION ASSEMBLY.

TABLE OF WEIGHTS

<table>
<thead>
<tr>
<th>PIPE DIA. (IN.)</th>
<th>WEIGHT (LB./FT.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>38.44</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>148.93</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>413.54</td>
</tr>
<tr>
<td>1&quot;</td>
<td>662.97</td>
</tr>
</tbody>
</table>

NOTES:
1. USE STEEL PIPE CONFORMING TO THE REQUIREMENTS OF ASTM A 53 (ERW) TYPE S, GRADE B OR ASTM A 500 (SAW) GRADE B OR S.
2. USE GAUGE EQUIVALENT PLATES WITH A SMOOTH FINISH.
3. USE AN ANCHOR PLATE TO ATTACH THE SIGN TO THE FOUNDATION.
4. USE STEEL SIGNS CONFORMING TO THE REQUIREMENTS OF ASTM A 36.

METRIC BASE CONNECTION DATA

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>BOLT SIZE</th>
<th>BOLT DIAM.</th>
<th>BOLT TOLERANCE</th>
<th>BOLT THICK.</th>
<th>BOLT THREAD</th>
<th>BOLT LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>89 mm</td>
<td>M12 x 63</td>
<td>1/2&quot;</td>
<td>ISO 4014</td>
<td>1.5 mm</td>
<td>M12</td>
<td>300 mm</td>
</tr>
<tr>
<td>75 mm</td>
<td>M10 x 50</td>
<td>5/16&quot;</td>
<td>ISO 4017</td>
<td>2.0 mm</td>
<td>M10</td>
<td>220 mm</td>
</tr>
</tbody>
</table>

METRIC FOUNDATION DATA

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>FOUNDATION BOLT</th>
<th>FOUNDATION NUT</th>
<th>FOUNDATION WASHER</th>
<th>FOUNDATION PLATE</th>
<th>FOUNDATION PLATE THICK.</th>
</tr>
</thead>
<tbody>
<tr>
<td>89 mm</td>
<td>M12 x 63</td>
<td>M12</td>
<td>M12</td>
<td>M12</td>
<td>10.0 mm</td>
</tr>
<tr>
<td>75 mm</td>
<td>M10 x 50</td>
<td>M10</td>
<td>M10</td>
<td>M10</td>
<td>8.0 mm</td>
</tr>
</tbody>
</table>

TABLE OF BOLTS

<table>
<thead>
<tr>
<th>BOLT SIZE</th>
<th>BOLT DIAM.</th>
<th>BOLT TOLERANCE</th>
<th>BOLT THICK.</th>
<th>BOLT THREAD</th>
<th>BOLT LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>1/2&quot;</td>
<td>ISO 4014</td>
<td>1.5 mm</td>
<td>M12</td>
<td>300 mm</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>5/16&quot;</td>
<td>ISO 4017</td>
<td>2.0 mm</td>
<td>M10</td>
<td>220 mm</td>
</tr>
</tbody>
</table>

NOTES:
1. USE STEEL PIPE CONFORMING TO THE REQUIREMENTS OF ASTM A 53 (ERW) TYPE S, GRADE B OR ASTM A 500 (SAW) GRADE B OR S.
2. USE GAUGE EQUIVALENT PLATES WITH A SMOOTH FINISH.
3. USE AN ANCHOR PLATE TO ATTACH THE SIGN TO THE FOUNDATION.
4. USE STEEL SIGNS CONFORMING TO THE REQUIREMENTS OF ASTM A 36.

METRIC TABLE OF WEIGHTS

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>WEIGHT (KG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>89 mm</td>
<td>695</td>
</tr>
<tr>
<td>75 mm</td>
<td>210</td>
</tr>
</tbody>
</table>

NOTES:
1. USE STEEL PIPE CONFORMING TO THE REQUIREMENTS OF ASTM A 53 (ERW) TYPE S, GRADE B OR ASTM A 500 (SAW) GRADE B OR S.
2. USE GAUGE EQUIVALENT PLATES WITH A SMOOTH FINISH.
3. USE AN ANCHOR PLATE TO ATTACH THE SIGN TO THE FOUNDATION.
4. USE STEEL SIGNS CONFORMING TO THE REQUIREMENTS OF ASTM A 36.

DETAILS DRAWING

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>DRAWING</th>
<th>SCALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>619-32</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TUBULAR SIGN POST DETAILS

<table>
<thead>
<tr>
<th>TUBULAR SIGN POST</th>
<th>WEIGHT (LB.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 1/2&quot; (64 mm)</td>
<td>413.54</td>
</tr>
<tr>
<td>3&quot; (75 mm)</td>
<td>662.97</td>
</tr>
</tbody>
</table>

NOTES:
1. USE STEEL PIPE CONFORMING TO THE REQUIREMENTS OF ASTM A 53 (ERW) TYPE S, GRADE B OR ASTM A 500 (SAW) GRADE B OR S.
2. USE GAUGE EQUIVALENT PLATES WITH A SMOOTH FINISH.
3. USE AN ANCHOR PLATE TO ATTACH THE SIGN TO THE FOUNDATION.
4. USE STEEL SIGNS CONFORMING TO THE REQUIREMENTS OF ASTM A 36.

REFERENCE:

<table>
<thead>
<tr>
<th>DETAIL NO.</th>
<th>SECTION DWG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>619-32</td>
<td>556,619,704,711</td>
</tr>
</tbody>
</table>

MT. DTX: MONTANA DEPARTMENT OF TRANSPORTATION
**SUPPORT AND CORRESPONDING ANCHOR**

<table>
<thead>
<tr>
<th>Size</th>
<th>MIN. Weight</th>
<th>MAX. Weight</th>
<th>WALL THICKNESS</th>
<th>Size</th>
<th>MIN. Weight</th>
<th>MAX. Weight</th>
<th>WALL THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot; (51)</td>
<td>2.25 LB./FT.</td>
<td>3.14 LB./FT.</td>
<td>0.105 (12 GAUGE)</td>
<td>2&quot; (51)</td>
<td>2.25 LB./FT.</td>
<td>3.14 LB./FT.</td>
<td>0.105 (12 GAUGE)</td>
</tr>
<tr>
<td>2.25&quot; (57)</td>
<td>2.77 LB./FT.</td>
<td>3.75 LB./FT.</td>
<td>0.105 (12 GAUGE)</td>
<td>2.25&quot; (57)</td>
<td>2.77 LB./FT.</td>
<td>3.75 LB./FT.</td>
<td>0.105 (12 GAUGE)</td>
</tr>
<tr>
<td>2.5&quot; (64)</td>
<td>3.6 LB./FT.</td>
<td>4.37 LB./FT.</td>
<td>0.105 (12 GAUGE)</td>
<td>2.5&quot; (64)</td>
<td>3.6 LB./FT.</td>
<td>4.37 LB./FT.</td>
<td>0.105 (12 GAUGE)</td>
</tr>
</tbody>
</table>

**Notes:**
- 1. Breakaway devices must be listed on the department's qualified products list.
- 2. Use class general concrete with wood fill trench on top. Form top with neat concrete.
- 3. Zinc rich based paint is required. All work must be done as noted in the shop drawings.
- 4. Submit shop drawings to be approved by the Montana Department of Transportation before fabrication has begun.

**Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.**

---

**Reference:**
- DWG. NO. 619-14
- SECTION 556, 619, 704, 710

**Square Tubular Breakaway Devices**

- Bend post into anchor with 3/4" dia. (19 mm) anchor bolt. Insert anchor bolts (M12) with 3/4" washers into opposite side of expected impact. Insert single nose into opposite side for additional stability.
NOTES:

1. REFER TO FHWA MANUAL "STANDARD HIGHWAY SIGNS" FOR STANDARDS FOR MOUNTING IN SIGNS.
2. USE POST CLIPS AS SHOWN IN SIGNING DETAIL. DIMENSIONS FOR MOUNTING IN SIGNS ARE SHOWN IN MILLIMETERS (mm). TO THE TOP OF EACH CLIP.
3. USE POSTS ONE SIZE LARGER THAN THOSE REQUIRED FOR STANDARD MOUNTINGS.
4. USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.
5. USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.
6. DIMENSIONS FOR POST CLIP SPACING ARE SHOWN REQUIRED FOR STANDARD MOUNTINGS.
7. USE POST CLIPS AS SHOWN IN SIGNING DETAILED DRAWING NO. 619-12 WHEN CANTILEVER MOUNTING SIGNS" FOR STANDARD HOLE SPACING IN SIGNS.
8. SEE DETAIL D FOR SIGN STABILITY.

USE TYPICAL BACK BRACING WITH USE OF A 3" (76 mm) 90° ELBOW PIPE. INSERT BOLTS WHERE THE UPPER BOLTS MEET AND BACK BRACINGS ARE SHOWN WITH DASHED LINES.

AUXILIARY SIGNS FOR SIDEWALK AREAS

USE THE STANDARD TYPE MOUNTING BEHIND SIDEWALKS IF R/W LIMITS ALLOWS.

USE THE STANDARD TYPE MOUNTING BEHIND SIDEWALKS IF R/W LIMITS ALLOWS.

REFERENCES

MDT STANDARD PROCEDURE

REFERENCE

DWG. NO. 619-18

CANTILEVER TYPE SIGN SUPPORT DETAILS

FOR SIDEWALK AREAS

DETAILS DRAWING

SECTION 59416.01

DATE

SEPTEMBER 2014
UNIT SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

NOTES:
1. SEE THE PLANS FOR BACKBRACING REQUIREMENTS.
2. USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.
### Street Name Sign Installation

The cost for mounting D-3 signs is absorbed in other bid items of the contract. Refer to MDT's "Standard Highway Signs" for D-3 street name sign typical layout.

### Footing Details

- **D-3 Signs Mounted Back to Back**: D-3 signs may be mounted back to back on wood poles.
- **Breakaway Details**: Use two 16d nails through the cleat and into the pole. Attach a 2" x 4" x 12" [50 x 100 x 300] board 12" [300] from the bottom of the pole to prevent spinning.
- **Foundation**: Use soil cement for the foundation — per Section 619.
- **Hole Diameter**: Drill two 1/2" [12.5] chamfered holes, followed by two 1/2" [12.5] plate washers, then two 5/16" [M8] dia. hex head bolts, lockwashers, and nuts, followed by additional plate washers and nuts as required. The maximum cross-sectional area at a point 4" [100] above ground must be protected.
- **Hole Diameter May Be Enlarged**: If necessary to ensure this requirement is met.

### Top End Treatment

- **Breakaway Details**: Standard for all wood poles listed in Table, for half the length of each pole.
- **Foundation**: Conform all wood poles to the requirements of Section 704.
- **Hole Diameter**: Ensure the maximum cross-sectional area at a point 4" [100] above ground level. Use two 16d nails through the cleat and into the pole. Attach the cleat by driving two 16d nails through the cleat and into the pole. Attach the cleat by driving two 16d nails through the cleat and into the pole.
- **Foundation**: Use soil cement for the foundation — per Section 619.
- **Hole Diameter**: Drill two 1/2" [12.5] chamfered holes, followed by two 1/2" [12.5] plate washers, then two 5/16" [M8] dia. hex head bolts, lockwashers, and nuts, followed by additional plate washers and nuts as required. The maximum cross-sectional area at a point 4" [100] above ground must be protected.

### Typical Sign Mounting

- **Sign Mounting Dimensions**

### Reference

- September 2014
- MDT 2014
- Reference: Standard-108
- Section 619.20
- Effective: DWG. NO.
- Reference: TREATED WOOD POLE SIGN MOUNTING AND SUPPORT DETAILS
- TREATED WOOD POLE SIGN MOUNTING AND SUPPORT DETAILS
- SHEET SIZE: REFERENCE SHEET SIZE
- DRAWING: MONTANA DEPARTMENT OF TRANSPORTATION
- SCALE 704-20
- EFFECTIVE: SEPTEMBER 2014
- DWG. NO.
- REFERENCE: SECTION 619.20
- NOTES: SHOWN IN EXAMPLES I, II, AND III ARE METRIC AND ARE IN MILLIMETERS UNLESS OTHER UNITS ARE SHOWN.
NOTE:

1. Signs of these sizes and larger require wood backbracing.
2. Smaller signs may require backbracing if the conditions warrant (see signing plans). In this case, the contractor has the option in this case, the contractor has the option in this case, the contractor has the option (see dtl. dwg. no. 619-22).

WOOD BACKBRACE INSTALLATIONS

5/16" Dia. (M8) hex head bolt, plate washer, lockwasher and nut

5/16" (M8) plate washer

2" x 4" (50 x 100) backbrace

COUNTERSUNK BOLT HEAD AND WASHER

SIGN PANEL

WOOD POLE

5/16" Dia. (M8) hex head bolt, plate washer, lockwasher and nut

2" x 4" (50 x 100) backbrace

DETAIL A

(BACKBRACE)

5/16" Dia. (M8) hex head bolt, plate washer, lockwasher and nut

2" x 4" (50 x 100) backbrace

DETAIL A

(BACKBRACE)

NOTES:

1. Conform all wood poles to the requirements of section 704.
2. Gain all poles on the sign side the minimum width shown in the table on dtl. dwg. no. 619-20, for half the length of each pole.
3. Use treated 2" x 4" (50 x 100) S4S lumber for all wood backbracing, conforming to the requirements of section 704.
4. Use hardware meeting the requirements of section 704.
5. See dtl. dwg. no. 619-20 for breakaway and support details.

SIGN MOUNTING DETAIL

GAIN DETAIL

TOP END TREATMENT

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.
WARNING SIGNS

NO PASSING PENNANTS

REGULATORY SIGNS

STEEL BACKBRACE INSTALLATIONS

STEEL BACKBRACE DETAILS

<table>
<thead>
<tr>
<th>POLE DIA.</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot; [75]</td>
<td>2 (1/8) [54.0]</td>
<td>2 (1/8) [54.0]</td>
<td>3 3/4&quot; [95.3]</td>
</tr>
<tr>
<td>4&quot; [100]</td>
<td>(3&quot; [76.2] (TYP.)</td>
<td>(3&quot; [76.2] (TYP.)</td>
<td>3 3/4&quot; [95.3]</td>
</tr>
<tr>
<td>6&quot; [150]</td>
<td>(5 1/4&quot; [133.4]</td>
<td>(4 1/4&quot; [108.0]</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:

1. USE COMMERCIAL QUALITY, MILD STEEL THAT IS HOT-DIPPED AFTER FABRICATION. GALVANIZE IN ACCORDANCE WITH SUBSECTION 711.08.
2. SEE DTL. DWG. NO. 619-20 FOR ADDITIONAL SIGN MOUNTING REQUIREMENTS. MOUNT SIGN FACE TO POLE BEFORE INSTALLING BACKBRACING.
3. SEE DTL. DWG. NO. 619-20 FOR BREAKAWAY AND SUPPORT DETAILS.
4. USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

SIGN MOUNTING DETAIL

TREATED WOOD POLE

OPTIONAL BACKBRACE

EFFECTIVE: SEPTEMBER 2014
**STEEL PIPE MOUNTING**

**WOOD POST MOUNTING**

Mount 2 Chevron signs on each post with each panel adjusted to approximate right angle to roadway centerline. Exact location and angle to be determined by the project manager.

**METRIC DIMENSIONS (mm)**

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 x 600</td>
<td>6 x 50 x 580</td>
<td>380</td>
<td>275</td>
<td>450</td>
<td>450</td>
</tr>
<tr>
<td>600 x 750</td>
<td>6 x 50 x 655</td>
<td>455</td>
<td>300</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>750 x 900</td>
<td>6 x 50 x 735</td>
<td>535</td>
<td>375</td>
<td>750</td>
<td>750</td>
</tr>
<tr>
<td>900 x 1200</td>
<td>6 x 50 x 810</td>
<td>610</td>
<td>450</td>
<td>900</td>
<td>900</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Install chevrons with a minimum 10'-0" (3.1 m) horizontal clearance and a 3'-0" (1.5 m) vertical mounting height.
2. Spacing for design purposes is double the spacing shown in the table on DTL DWG. NO. 619-36. Up to a maximum chevron spacing of 200' (60 m), a minimum of 3 visible chevrons are required through a curve.
3. Field inspect the chevrons at night and adjust their locations to achieve 500' [150 m] of visibility.
4. Use hardware meeting the requirements of Section 704.

**CHEVRON MOUNTING DETAILS**

**DETAILED DRAWING**

**REFERENCE**

DWG. NO. 619-24

**STANDARD SPEC.**

MONTANA DEPARTMENT OF TRANSPORTATION

**EFFECTIVE**

SEPTEMBER 2014
**MH-5**

24" x 24" (600 x 600)
Margin = none

Corner radius = 1 1/2" (37.5)
Black legend and border on a retro-reflectORIZED WHITE BACKGROUND.

**Series "D" Numerals**

- **2 Digit** = 10" (250) SERIES "D"
- **3 Digit** = 10" (250) SERIES "D"

**Series "C" Numerals**

- **2 Digit** = 10" (250) SERIES "C"
- **3 Digit** = 10" (250) SERIES "C"

**Series "B" Numerals**

- **2 Digit** = 10" (250) SERIES "B"
- **3 Digit** = 10" (250) SERIES "B"

**Series "A" Numerals**

- **2 Digit** = 10" (250) SERIES "A"
- **3 Digit** = 10" (250) SERIES "A"

**Notes:**
- Center all numerals used on panels and shields optically about vertical centerline.
- Use hardware meeting the requirements of Montana.
- Special designs are available from the Traffic Engineering Division.
- See the traffic signs and signing materials catalog for complete listing of signs and sign sizes.
- Use hardware meeting the requirements of Section 619.

* **MONTANA 20**

- **Series "D" Numerals**
  - Margin = none
  - Corner radius = 1 1/2" (37.5)
  - Black legend and border on a retro-reflectORIZED WHITE BACKGROUND.

* **MONTANA 200**

- **Series "C" Numerals**
  - Margin = none
  - Corner radius = 1 1/2" (37.5)
  - Black legend and border on a retro-reflectORIZED WHITE BACKGROUND.

* **MONTANA 272**

- **Series "C" Numerals**
  - Margin = none
  - Corner radius = 1 1/2" (37.5)
  - Black legend and border on a retro-reflectORIZED WHITE BACKGROUND.

---

**TABLE:**

<table>
<thead>
<tr>
<th>Numerals</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Digit</td>
<td>28</td>
<td>28</td>
<td>12.5</td>
<td>3.5</td>
<td>2</td>
<td>1.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3 Digit</td>
<td>12.5</td>
<td>12.5</td>
<td>3.5</td>
<td>2</td>
<td>1.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**M1-5**

30" x 30" (750 x 750)
Margin = none

Corner radius = 1 1/2" (37.5)
Black legend and border on a retro-reflectORIZED WHITE BACKGROUND.

**Series "D" Numerals**

- **2 Digit** = 10" (250) SERIES "D"
- **3 Digit** = 10" (250) SERIES "D"

**Series "C" Numerals**

- **2 Digit** = 10" (250) SERIES "C"
- **3 Digit** = 10" (250) SERIES "C"

**Series "B" Numerals**

- **2 Digit** = 10" (250) SERIES "B"
- **3 Digit** = 10" (250) SERIES "B"

**Series "A" Numerals**

- **2 Digit** = 10" (250) SERIES "A"
- **3 Digit** = 10" (250) SERIES "A"

---

**MH-10**

24" x 24" (600 x 600)
Margin = none

Corner radius = 1 1/2" (37.5)
Black legend and border on a retro-reflectORIZED WHITE BACKGROUND.

**Series "D" Numerals**

- **2 Digit** = 10" (250) SERIES "D"
- **3 Digit** = 10" (250) SERIES "D"

**Series "C" Numerals**

- **2 Digit** = 10" (250) SERIES "C"
- **3 Digit** = 10" (250) SERIES "C"

**Series "B" Numerals**

- **2 Digit** = 10" (250) SERIES "B"
- **3 Digit** = 10" (250) SERIES "B"

**Series "A" Numerals**

- **2 Digit** = 10" (250) SERIES "A"
- **3 Digit** = 10" (250) SERIES "A"

---

**SPECIAL DESIGN ROUTE MARKER PANELS AND SHIELDS**

- See the traffic signs and signing materials catalog for complete listing of signs and sign sizes.
- Use hardware meeting the requirements of Section 619.
- Center all numerals used on panels and shields optically about vertical centerline.
- Use hardware meeting the requirements of Montana.
- Special designs are available from the Traffic Engineering Division.
ALUMINUM SHEET MOUNTING

- HASP KEEPER
- DRIVE RIVET
- 0.125" (3.2) ALUMINUM SIGN PANEL
- 0.200" (5) ALUMINUM SHIM

- 0.100" (2.5) ALUMINUM SIGN PANEL
- 0.200" (5) ALUMINUM SHIM

PLYWOOD MOUNTING

- HASP KEEPER
- MACHINE SCREW
- 3/4" (19) HIGH DENSITY PLYWOOD PANEL

NOTES:
1. SEE SIGNS AND SIGNING MATERIALS CATALOG FOR COMPLETE LISTING OF SIGNS AND SIGN SIZES. DESIGNS ARE AVAILABLE FROM THE TRAFFIC ENGINEERING DIVISION. DETAILS SHOWN ARE FOR STANDARDS COMPLIANT SIGNS, UNLESS OTHERWISE NOTED.
2. THE SIGN PANEL CONSISTS OF 3/4" (19) HIGH DENSITY PLYWOOD OR 0.125" (3.2) ALUMINUM SHEET MOUNTING AS Specified ON THE PLANS. THE HINGED PANEL CONSISTS OF 0.100" (2.5) SHEET ALUMINUM.
3. PAINT ALL HARDWARE VISIBLE ON THE SIGN FACE OR COVER WITH RETRO-REFLECTIVE SHEETING. THE SAME COLOR AS THE SIGN.
4. SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.
5. SUPPLEMENTAL SIGN PANELS BELOW MAJOR SIGN PANEL MUST HAVE RETRO-REFLECTIVEIZED LEATHER AND BACKGROUND MACHINED COLORS OF MAJOR PANEL.
6. THE MINIMUM MOUNTING HEIGHT TO THE BOTTOM OF THE SECONDARY PANEL IS 5'-0" (1.5 m).
7. USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.
### Panel Dimension Information

#### Imperial

<table>
<thead>
<tr>
<th>Dimension</th>
<th>D10-2 (1 Digit)</th>
<th>D10-3 (2 Digit)</th>
<th>D10-4 (3 Digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10.0&quot;</td>
<td>10.0&quot;</td>
<td>10.0&quot;</td>
</tr>
<tr>
<td>B</td>
<td>2.0&quot;</td>
<td>2.0&quot;</td>
<td>2.0&quot;</td>
</tr>
<tr>
<td>C</td>
<td>4.0&quot;</td>
<td>4.0&quot;</td>
<td>4.0&quot;</td>
</tr>
<tr>
<td>D</td>
<td>6.0&quot;</td>
<td>6.0&quot;</td>
<td>6.0&quot;</td>
</tr>
<tr>
<td>E</td>
<td>7.5&quot;</td>
<td>7.5&quot;</td>
<td>7.5&quot;</td>
</tr>
</tbody>
</table>

#### Metric Panel Dimension Information

<table>
<thead>
<tr>
<th>Dimension</th>
<th>D10-2 (1 Digit)</th>
<th>D10-3 (2 Digit)</th>
<th>D10-4 (3 Digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>200 mm</td>
<td>200 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td>B</td>
<td>50 mm</td>
<td>50 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td>C</td>
<td>100 mm</td>
<td>100 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>D</td>
<td>150 mm</td>
<td>150 mm</td>
<td>150 mm</td>
</tr>
<tr>
<td>E</td>
<td>200 mm</td>
<td>200 mm</td>
<td>200 mm</td>
</tr>
</tbody>
</table>

### Typical Panel Mounting

1. **Milepost Panels** consist of a retro-reflectORIZED white panel and a retro-reflectORIZED white panel.
2. **Mount all Mileposts on Steel U-Posts** (MIN. 2 LB/FT [3 KG/MT]) as noted in the signing plans.
3. **Use galvanized or cadmium plated 5/16" [8] bolts, nuts, and washers** and jam threads after tightening.
4. **Use aluminum or cadmium plated bolt rivets or paint and wasHER after tightening**.
5. **Mount all Mileposts on Steel U-Posts** (MIN. 2 LB/FT [3 KG/MT]) as noted in the signing plans.
6. **Do not relocate or move a milepost once it has been properly placed**.
7. **Use hardware meeting the requirements of Section 744**.

### Placement Information

<table>
<thead>
<tr>
<th>Placement Dimension</th>
<th>Non-International</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>200 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>50 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>100 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>150 mm</td>
<td>150 mm</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>200 mm</td>
<td>200 mm</td>
</tr>
</tbody>
</table>

### Notes

- **Milepost panels** consist of a retro-reflectORIZED white panel and a retro-reflectORIZED white panel.
- **Mount all Mileposts on Steel U-Posts** (MIN. 2 LB/FT [3 KG/MT]) as noted in the signing plans.
- **Use galvanized or cadmium plated bolt rivets or paint and washers after tightening**.
- **Use aluminum or cadmium plated bolt rivets or paint and washers after tightening**.
- **Mount all Mileposts on Steel U-Posts** (MIN. 2 LB/FT [3 KG/MT]) as noted in the signing plans.
- **Do not relocate or move a milepost once it has been properly placed**.
- **Use hardware meeting the requirements of Section 744**.

---

*Optically center digits on vertical edge of panel.
*All units are in millimeters only.
## Horizontal Curve Spacing Table

<table>
<thead>
<tr>
<th>Radius (ft)</th>
<th>Spacing on Curve (ft)</th>
<th>Spacing on Both Approach Tangents (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5730' &amp; up</td>
<td>300'</td>
<td>400' 400' 400' 400' 400'</td>
</tr>
<tr>
<td>2865' - 5729</td>
<td>225'</td>
<td>400' 400' 400' 400' 400'</td>
</tr>
<tr>
<td>1910' - 2864</td>
<td>160'</td>
<td>200' 400' 400' 400' 400'</td>
</tr>
<tr>
<td>1433' - 1909</td>
<td>130'</td>
<td>260' 400' 400' 400' 400'</td>
</tr>
<tr>
<td>955' - 1432</td>
<td>110'</td>
<td>220' 330' 400' 400' 400'</td>
</tr>
<tr>
<td>716' - 954'</td>
<td>90'</td>
<td>185' 275' 400' 400' 400'</td>
</tr>
<tr>
<td>479' - 715'</td>
<td>75'</td>
<td>150' 230' 300' 400' 400'</td>
</tr>
<tr>
<td>287' - 477'</td>
<td>60'</td>
<td>125' 180' 275' 300' 400'</td>
</tr>
<tr>
<td>9 - 286'</td>
<td>45'</td>
<td>90' 140' 275' 400' 400'</td>
</tr>
</tbody>
</table>

## Metric Horizontal Curve Spacing Table

<table>
<thead>
<tr>
<th>Radius (m)</th>
<th>Spacing on Curve (m)</th>
<th>Spacing on Both Approach Tangents (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1750' &amp; up</td>
<td>90'</td>
<td>120' 120' 120' 120' 120'</td>
</tr>
<tr>
<td>900' - 1749</td>
<td>65'</td>
<td>120' 120' 120' 120' 120'</td>
</tr>
<tr>
<td>600' - 999</td>
<td>50'</td>
<td>95' 120' 120' 120' 120'</td>
</tr>
<tr>
<td>450' - 599</td>
<td>40'</td>
<td>75' 120' 120' 120' 120'</td>
</tr>
<tr>
<td>300' - 449</td>
<td>35'</td>
<td>65' 100' 120' 120' 120'</td>
</tr>
<tr>
<td>200' - 299</td>
<td>25'</td>
<td>55' 80' 120' 120' 120'</td>
</tr>
<tr>
<td>150' - 199</td>
<td>20'</td>
<td>45' 70' 90' 120' 120'</td>
</tr>
<tr>
<td>100' - 149</td>
<td>20'</td>
<td>35' 55' 90' 120' 120'</td>
</tr>
<tr>
<td>0 - 99</td>
<td>15'</td>
<td>25' 40' 80' 120' 120'</td>
</tr>
</tbody>
</table>

**Notes:**

1. Furnish retro-reflective sheeting according to the standard specifications for retro-reflective sheeting B (high intensity). Position delineator faces perpendicular to the tangent to curve centerline as shown in Figure B.

2. Mount delineators on metal U-posts (1.12 lb./ft. [1.7 kg/m] min. and 2 lb./ft. [3 kg/m] max.) with 3/16” [5] diam. cadmium plated bolt(s). Drill or punch a minimum of twelve 3/8” [9.5] maximum diameter holes on 1 inch [25] centers from the top of the post. 1/4” [6.4] square holes may be used. If square holes are used, use a large headed bolt or an appropriate washer. Jam threads after tightening the nut to prevent removal.

3. Place delineators at a constant clearance distance from the edge of the pavement except where guardrail or other obstructions interfere. Align the delineators with the inside edge of the obstruction. Clearances for delineators is 6” [0.15 m] on interstate highways, 2” [0.05 m] on 6’-0” [1.8 m] on primary and secondary highways as determined by the project manager. The standard mounting height is 4’-0” [1.2 m] to the top of the post. Supply post lengths to maintain the proper mounting height and a minimum of 18” [0.45 m] embedment.

4. Space delineators according to the distances found in the table above or as specified in the plans. In Figure A, if “F” is greater than 20’ [6 m] add one regular delineator in at “A” spacing. Under normal spacing, should a delineator fall within a crossroad or approach, it may be moved in either direction a distance not to exceed one quarter of the normal spacing. Eliminate delineators still falling in such areas.

5. All delineator reflectors have 3/4” [18.75] corner radii except design “E”.

6. Mount the delineator reflector 1” [25] below the top of the metal U-post.

7. Use hardware meeting the requirements of Section 704.

**Units:**

- Heights and clearances are in millimeters (mm) unless otherwise noted.
DELINEATORS

FLEXIBLE SURFACE-MOUNTED

DELINEATORS

NOTES:

1. MOUNT OR DRIVE FLEXIBLE DELINEATORS TO THE MANUFACTURER'S SPECIFICATIONS.

2. THE EXACT LOCATION AND PLACEMENT OF THE FLEXIBLE DELINEATORS ARE SHOWN IN THE SIGNING PLANS.

3. USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.

DETAILS ARE REPRESENTATIVE ONLY. ACTUAL DESIGN USED/SPECIFIED MAY VARY (SEE PLANS).

FLEXIBLE DRIVABLE

DELINEATORS

DETAILS ARE REPRESENTATIVE ONLY. ACTUAL DESIGN USED/SPECIFIED MAY VARY (SEE PLANS).
**PERMANENT BARRICADE**

**BARRICADE DETAILS**

- **B2 BARRICADE**
  - Dimensions:
    - 2" x 10' (50 x 295)
    - 2" x 8' (50 x 244)
    - 2" x 6' (50 x 183)
    - 2" x 4' (50 x 122)

- **NOTE:**
  - All non-treated barricade members with two coats of white paint in accordance with Section 710.
  - Use hardware meeting the requirements of Section 704.

- **SIGN MOUNTING DETAILS**

- **SIDE OF SHOULDER**
  - 4" (100)
  - TSP (DIA. ROUND POST)
  - 2" x 4" (50 x 100) BACKBRACING

**BARRICADE DETAILS**

- Dimensions:
  - 2" x 10' (50 x 295)
  - 2" x 8' (50 x 244)
  - 2" x 6' (50 x 183)
  - 2" x 4' (50 x 122)

- **NOTE:**
  - All non-treated barricade members with two coats of white paint in accordance with Section 710.
  - Use hardware meeting the requirements of Section 704.

- **SIGN MOUNTING DETAILS**

- **SIDE OF SHOULDER**
  - 4" (100)
  - TSP (DIA. ROUND POST)
  - 2" x 4" (50 x 100) BACKBRACING

**REFERENCE**

- DWG. NO. 619-42
- SECTION 619, 704, 710
- EFFECTIVE: SEPTEMBER 2014

**NOTE:**

- Dimensions shown in brackets [ ] are in inches and in millimeters (mm) unless other units are shown.

**USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.**

**BARRICADE DESIGN DETAILS**
UP TO $250 FINE AND /OR 60 DAYS IMPRISONMENT FOR INJURY TO OR POSSESSION OF THIS SIGN
INSTALLED 2010
SIGN FABRICATOR'S NAME HERE

DATE TAG DETAIL

DATE TAG COLOR SEQUENCE
DATE TAG COLOR CORRESPONDS TO THE LAST DIGIT OF THE INSTALLATION YEAR AS FOLLOWS:
0 - YELLOW
1 - WHITE
2 - LIGHT BLUE
3 - GOLD
4 - LIGHT GREEN
5 - RED
6 - PURPLE
7 - ORANGE
8 - BLUE
9 - GREEN

NOTES:
① FURNISH AND PLACE INSTALLATION DATE TAGS ON ALL SIGNS PRIOR TO FINAL ACCEPTANCE OF THE PROJECT.
② THE TAGS DISPLAY THE YEARS IN WHICH THE SIGNS WERE INSTALLED. SEE THE COLOR SEQUENCE TABLE SHOWN ON THIS DRAWING FOR THE APPROPRIATE COLORS. DATE TAGS ARE TO BE RETRO-REFLECTIVE.
③ PLACE A TAG ON THE BACK OF EACH SIGN, LOCATED NEAR THE LOWER CORNER OF THE SIGN NEAREST THE EDGE OF ROADWAY, TO BE VISIBLE FROM THE ROADWAY AS SHOWN IN THE EXAMPLES ABOVE.
④ PLACE TAGS ON ANY NEW SIGN INSTALLED IN THE FIELD AS ROUTINE MAINTENANCE BY MDT FORCES. MAINTENANCE DESIGN DATE TAGS CAN BE ORDERED FROM THE SIGN SHOP IN HELENA.
⑤ USE HARDWARE MEETING THE REQUIREMENTS OF SECTION 704.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.