

**730.01**

**ITEM 730 TRAFFIC SIGN AND SUPPORT MATERIAL**

**730.01 Steel Tube and Pipe.** Provide steel tube and pipe in accordance with ASTM A 53, Grade B or ASTM A 501, except provide tubing for truss and end frame diagonals in accordance with 711.01.

**730.015 U-Channel Posts.** Fabricate U-channel posts from steel into a characteristic cross-section for use alone or paired to form a heavier post by bolting together back to back. Provide posts with a uniform cross section for their full length. Cut posts square to a length tolerance  $\pm 1$  inch ( $\pm 25$  mm). Remove any ragged or sharp edges, or cracks or other imperfections affecting strength or durability. The Contractor may fabricate the posts with flat backs or with raised longitudinal ribs.

Provide posts meeting the deflection criteria of ODOT Supplement 1075. Provide posts manufactured from rail or billet steel in accordance with ASTM A 499, Grade 60.

Provide a yield-type driven post without breakaway devices conforming to NCHRP 350 requirements. Provide a copy of the approval letter from FHWA.

The City may accept other material specifications for drive posts conforming to the dimensional requirements listed below.

Provide posts with a nominal weight before punching or galvanizing as follows:

| <b>Post Size Number</b> | <b>Weight lb/ft (kg/m)</b> | <b>Tolerances %</b> |
|-------------------------|----------------------------|---------------------|
| 1                       | 1.12 (1.7)                 | -3.5, +10.0         |
| 2                       | 2.00 (3)                   | -3.5, +10.0         |
| 3                       | 3.00 (4.5)                 | -3.5, +10.0         |

Provide posts with 3/8-inch (10 mm) diameter holes accurately punched on the centerline spaced at 1-inch (25 mm) centers beginning not more than 1 1/8 inches (30 mm) from the top of the post through the entire length, to allow bolting the posts back to back without re-drilling, using 5/16-inch (8 mm) diameter bolts.

Posts shall be either: galvanized in accordance with 711.02, after punching, or coated with a weather resistant, rust inhibited, high quality dark green baked alkyd resin enamel, which shall produce a hard mar resistant coating, free from paint cracks, blisters or other defects. The quality of the paint shall be such that when the finished post is struck a light blow with a sharp tool, the paint shall not crack or chip, and if scratched with a knife, shall not powder. The minimum thickness of the dry enamel film shall be one mil. It shall pass the standard 100 hour salt spray test (20% solution by spray of fog at 70° F (21° C)). Painting shall be the final process after all fabrication and punching has been completed. The paint shall be dry before posts are bundled.

Provide materials in accordance with the City's QPL.

**730.016 Square Posts.** Provide square posts fabricated from steel in accordance with ASTM A 1011 with a minimum yield strength of 60,000 pounds per square inch (415 MPa), with 7/16-inch (11 mm) diameter die-cut knockouts or open holes spaced every 1-inch (25 mm) on the centerline of all four sides, in true alignment and opposite each other. Provide posts with the dimensional requirements conforming to the Ohio Department of Transportation's Standard Construction Drawing TC - 41.20, Yielding Post. Provide posts finished with one of the following methods:

A. Apply hot-dip galvanizing to the inside and outside of the post in accordance with ASTM A 653 G-235.

B. Apply zinc coating to the outside of the post at a rate of 0.80 ounce per square foot (244 g/m<sup>2</sup>) followed by chromate conversion coating and a cross-linked polyurethane acrylic coating. Provide the inside of the post with a zinc organic coating.

C. Provide a yield type driven post without breakaway devices conforming to NCHRP 350 requirements. Provide a copy of the approval letter from FHWA.

The City may accept other material specifications for drive posts conforming to the dimensional requirements on ODOT SCD TC-41.20 and the performance requirements of NCHRP 350.

Provide materials in accordance with the City's QPL.

**730.02 Steel Anchor Bolts and Nuts.** Provide anchor bolts made of steel conforming to ASTM F1554 Grade 105, galvanized in accordance with 711.02 at least 2 inches (50 mm) beyond the threads, with the end either bent or with a drilled and tapped steel plate. Provide leveling nuts and anchor nuts capable of developing the full strength of the anchor bolt.

Provide materials in accordance with the City's QPL.

**730.03 Steel Poles and Arms.** Provide poles and arms made of steel with a minimum yield strength of 52,000 pounds per square inch (359 MPa) and galvanized in accordance with 711.02.

Provide certified material in accordance with ODOT Supplement 1093

**730.04 Base and Arm Plates.** Provide support or pole anchor bases and arm attachment plates fabricated from steel plate in accordance with ASTM A 36 (A 36M) or ASTM A 572 (A 572M), Grade 42. Weld plates to supports, poles, or arms both inside and outside with fillet or full penetration welds equal to the wall thickness, or by AWS prequalified welding joints TC U4a-S or TC U4c-GF. The Contractor may use a cast steel base of equivalent strength.

Provide certified material in accordance with ODOT Supplement 1093.

**730.05 Handhole Covers.** Provide handhole covers for poles and overhead sign supports made of 0.109-inch (2.7 mm) galvanized steel or 0.125-inch (3 mm) nominal aluminum alloy.

Provide certified material in accordance with ODOT Supplement 1093.

**730.06 Pole Caps.** Provide pole caps made of aluminum, galvanized ferrous metal, or zinc die casting.

Provide certified material in accordance with ODOT Supplement 1093.

**730.07 Arm Caps.** Provide arm caps made of steel that cover at least 50 percent of the end area.

Provide certified material in accordance with ODOT Supplement 1093.

**730.08 Steel Hardware.** Provide bolts 5/8-inch (16 mm) diameter or larger in accordance with ASTM A 325 (A 325M). Provide bolts and screws less than 5/8-inch (16 mm) diameter in accordance with SAE J429, Grade 5. Provide nuts of all size,

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except anchor nuts and leveling nuts, in accordance with SAE J995, Grade 2. Provide flat washers in accordance with ANSI B18.22.1. Provide lock washers in accordance with ASME B18.21.1. Provide U-bolts in accordance with ASTM A 307. Provide hot-dipped galvanized hardware in accordance with ASTM A 153 or mechanically galvanized in accordance with ASTM B 695, Class 50.

Provide certified material in accordance with ODOT Supplement 1092 or 1093.

**730.09 Stainless Steel.** Provide any AISI 300 or 400 series stainless steel.

Provide certified material in accordance with ODOT Supplement 1093.

**730.10 Stainless Steel Hardware.** Provide stainless steel hardware in accordance with ASTM A 320/A 320M (AISI 300 series). Provide bolts, screws, nuts, washers, handhole cover chains, and U-bolts from passivated commercial grade stainless steel.

Provide certified material in accordance with ODOT Supplement 1092 or 1093.

**730.11 Aluminum Sheet and Plate.** Provide sheets for extrusheet panels in accordance with ASTM B 209 (B 209M), 3003-H18, or 5052-H38. Provide sheets for flat sheet and overlay signs, and sign post reflectors, in accordance with ASTM B 209 (B 209M), 3004-H38, 5052-H38, or 6061-T6. Provide plates for sign support structures in accordance with ASTM B 209 (B 209M), 6061-T6.

Provide certified material in accordance with ODOT Supplement 1092 or 1093.

**730.12 Aluminum Extrusions.** Provide extruded panels and extrusions for extrusheet panels in accordance with ASTM B 221 (B 221M), 6063-T6. For sign support structures, provide rolled or cold finished bar, rod, and wire in accordance with ASTM B 211 (B 211M), 6061-T6. Provide extruded bars, rods, shapes, and tubes in accordance with ASTM B 221 (B 221M), 6061-T6.

Provide certified material in accordance with ODOT Supplement 1092 or 1093.

**730.13 Aluminum Tube and Pipe.** Provide seamless pipe and seamless extruded tube in accordance with ASTM B 241/B 241M, 6061-T6. Provide extruded structural pipe and tube in accordance with ASTM B 429, 6061-T6.

Provide certified material in accordance with ODOT Supplement 1092 or 1093.

**730.14 Aluminum Castings.** Provide sand castings in accordance with ASTM B 26/B 26M, 356-T6 or T7. Provide permanent mold castings in accordance with ASTM B 108, 356-T6 or T7.

Provide certified material in accordance with ODOT Supplement 1092 or 1093.

**730.15 Aluminum Forgings.** Provide forgings in accordance with ASTM B 247 (B 247M), 6061-T6.

Provide certified material in accordance with ODOT Supplement 1092 or 1093.

**730.16 Aluminum Welding Rods.** Provide welding rods in accordance with AWS ER-4043.

**730.17 Aluminum Hardware.** Provide hardware in accordance with the following requirements:

|                  | <b>ASTM Designation</b> | <b>Alloy</b>         | <b>Condition/ Temper</b> |
|------------------|-------------------------|----------------------|--------------------------|
| Bolts and screws | B 211 (B 211M)          | 2024<br>6061         | T4<br>T6                 |
| Studs-welded     | B 211 (B 211M)          | 1100                 | H16                      |
| Nuts-hex         | B 211 (B 211M)          | 6061<br>6262         | T6<br>T9                 |
| Nuts-lock        | B 211 (B 211M)          | 2017                 | T4                       |
| Washers-flat     | B 209 (B 209M)          | Clad 2024<br>6061    | T4<br>T6                 |
| Lock washers     | B 211 (B 211M)          | 7075                 | T6                       |
| Rivets-solid     | B 316/B 316M            | 6053<br>6061         | T6<br>T6                 |
| Rivets-blind     | B 316/B 316M            | 2017<br>2117<br>5052 | F<br>F<br>F              |

In addition, provide break-mandrel aluminum blind rivets with a stainless steel or aluminum mandrel.

Provide certified material in accordance with ODOT Supplement 1092.

**730.18 Reflective Sheeting Type F.** Provide sheeting in accordance with ASTM D 4956, Type II, including supplemental requirement S1.

**730.19 Reflective Sheeting Type G.** Provide Type G reflective sheeting in accordance with ODOT Supplement 1049, and in accordance with ASTM D 4956, Type III or IV, including supplemental requirement S1.

Provide materials in accordance with the City's QPL.

**730.191 Reflective Sheeting Reboundable.** Provide reboundable reflective sheeting in accordance with ODOT Supplement 1049, and in accordance with ASTM D 4956, Type III, IV, VIII, IX or XI, including supplemental requirements S1 and S2, with watermarks or other identification marks inconspicuously incorporated into the face of the sheeting on a repeating pattern, if necessary, to distinguish the sheeting from other similarly appearing sheeting.

Provide materials in accordance with the City's QPL.

**730.192 Reflective Sheeting Type H.** Provide Type H reflective sheeting in accordance with ODOT Supplement 1049, and in accordance with ASTM D 4956, Type VIII including supplemental requirement S1.

Provide materials in accordance with the City's QPL.

**730.193 Reflective Sheeting Type J.** Provide Type J reflective sheeting in accordance with ODOT Supplement 1049, and in accordance with ASTM D 4956, Type IX or XI, including supplemental requirements S1.

Provide materials in accordance with the City's QPL.

**730.20 Nonreflective Sheeting.** Provide non-reflective sheeting in accordance with ASTM D 4956, except do not provide sheeting incorporating optical elements.

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Provide materials in accordance with the City's QPL.

**730.22 Silk Screen Inks.** Provide opaque and transparent process color inks used in the silk screen process accepted and warranted by the manufacturer of the reflective sheeting in accordance with ODOT Supplement 1049. Use inks providing a tough, durable film of uniform thickness and appearance on the sign surface. Provide transparent process color inks used in the reverse screen process in accordance with the color specification limits in ASTM D 4956, Table 17.

**730.23 Transparent Electronic Cuttable Films.** Provide transparent electronic cuttable films warranted by the manufacturer of the reflective sheeting in accordance with ODOT Supplement 1049. Use films providing a uniform appearance on the sign surface. Provide films in accordance with the color specification limits in ASTM D 4956, Table 17.