

## SECTION 1700 TRAFFIC CONTROL SIGNING

1701 SCOPE. The work of this Section shall consist of all labor, materials, equipment and services necessary to complete the supplementary traffic control signing as shown on the Plans and herein specified.

1702 GENERAL. The signs shall meet the requirements of the latest edition of the Manual of Uniform Traffic Control Devices, unless otherwise required in the Special Provisions or contract drawings.

The Contractor shall locate the signs in the field in accordance with the Plans, the Manual on Uniform Traffic Control Devices, and subject to the approval of the Engineer. Dimensions on the detailed drawings on the Plans shall take precedence. The contractor will be responsible for orientation, elevation, offset and level of all signs erected.

The Contractor shall verify, prior to erecting any sign, that underground utilities will not be damaged as a result of placing the signpost.

### 1703 MATERIALS.

#### A. “U” Channel Steel Sign Posts:

1. Steel: ASTM A 446, commercial quality.
2. Shape and Holes: The posts furnished under this specification shall be formed from hot rolled high carbon rail steel. After all fabrication including punching, is completed, the posts shall be hot dipped galvanized to comply with the requirements of ASTM A123. Posts shall be painted green after galvanizing.
  - a. All posts shall have a uniform "U" cross section and shall be the lengths designated on the plans.
  - b. The posts shall weigh, before punching, not less than three (3) pounds per linear foot of post length.
  - c. Posts shall be punched on the centerline of the web while hot. The holes shall be three-eighths (3/8) inch in diameter and shall be punched one (1) inch apart on centers starting one (1) inch from the top of the post and extending down for six (6) feet.

#### B. Square Steel Sign Posts:

1. Steel: ASTM A570, Grade 50. Yield strength after cold-forming is 60,000 psi minimum.
2. Shape and Holes: Steel Square Sign Posts. The posts furnished under this specification shall be formed of 14 gauge (.083 U.S.S. gauge) steel, carefully rolled to size and shall be welded directly in the corner by high frequency

resistance welding and externally scarfed to agree with corner radii. After all fabrication is completed, the posts shall be hot-dipped galvanized conforming to ASTM A653, G90, Structural Quality, Grade 50 Class 1. The corner weld is zinc coated after scarfing operation. Both interior and exterior of the post shall be galvanized.

Perforated signposts shall be one or more of the following sizes:

Size	U.S.S. Gauge	Weight/ft
1 3/4" x 1 3/4"	14	1.71
2" x 2"	14	1.99

Holes shall be 7/16" +/- 1/64" in diameter on one (1) inch centers on all four sides down the entire length of the post. On square tubing, holes shall be on centerline on each side in true alignment and opposite each other directly and diagonally. The finished posts shall be straight and have a smooth, uniform finish. It shall be possible to telescope all consecutive sizes of square tubes freely and for not less than ten (10) feet of their length without the necessity of matching any particular face to any other face. All holes and ends shall be free from burrs and ends shall be cut square. Permissible variation is straightness is 1/16 of an inch in 3 feet.

C. Bolts and Nuts. ASTM Design A307 galvanized in accordance with ASTM Design A153. Bolts shall be round-headed as shown on plans and shall have screwdriver slots.

D. Aluminum Flat Sheets. ASTM B209, Alloy 6061-T6.

E. Reflective Sheeting:

1. Description. This material shall be a reflective sheeting capable of being used to reflectorize any properly prepared, smooth, flat, wood or metal surface. It shall be furnished in two classes, as follows:

Flat Surface (Enclosed Lens)

Class 1 - Heat Activated Adhesive

Class 2 - Pressure Sensitive Adhesive

All sheeting that is used on R1-1 (stop sign) and R2-1 (yield) signs shall be high intensity (3M or approved equal) or super engineering grade (Nikkalite or approved equal). R1-1 (stop sign) may require vertical post reflector. Detail D17-1B

2. Construction and Materials:

a. A uniform monolayer of spherical glass lens elements shall be embedded in a binder over light reflecting material resulting in an optical reflective system. The light reflecting material shall have a pre-coated adhesive backing protected by a removable liner.

- (1) Type 1 Sheeting (Flat Surface-Enclosed Lens) shall have a transparent flexible covering, applied as a sheet or a sprayed-on coating, to produce a flat, smooth, moisture-resisting film over the lens elements.
  - b. Adhesive Backing. The adhesive backing shall produce a bond to support a one and three-quarters (1 - 3/4) pound weight for five (5) minutes without the bond peeling more than a distance of two (2) inches when tested according to (4.4.4) Federal Specification L-S-300A. The adhesive for Class 1 shall be as specified in (b) (2.1) and for Class 2 shall be as specified in (b) (2.2).
    - (1) Class 1 Adhesive. The backing for Class 2 Sheeting shall have a tack-free adhesive which shall be activated by applying heat to the material in a temperature range of 175 F. to 250 F. The adhesive must be such that the sheeting can be positioned at temperatures up to 100 F without damage to the sheeting.
    - (2) Class 2 Adhesives. The backing for Class 2 Sheeting shall have a pressure sensitive adhesive which requires no heat, solvent, or other preparation for adhesion to smooth, dry, clean surfaces.
  - c. Liner. The adhesive backing of the sheeting shall be completely covered by a protective liner which shall be easily removable without soaking in water or other solvents. During removal, the liner shall not break or tear, and shall not remove the adhesive from the backing when tested according to (4.4.4) of Federal Specification L-S-300A. Removal of the liner shall cause no dimension change or other defect in the sheeting.
3. Color. The colors, by visual inspection, shall conform to the colors shown and specified in the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways".
4. Uniformity. The surface appearance of the sheeting shall be uniform. There shall be no streaks, discoloration or other condition that will cause the sheeting to show a non-uniform appearance when examined at a distance of fifty (50) feet in daylight or at night in the light from an automobile headlamp. In a single sign, variation in color or reflectivity of the sheeting noticeable at a distance of not less than 50 feet under day or night conditions shall be cause for rejection of the sign.
5. Performance:
  - a. Specular Glass. When measured with an 85 Gloss Meter, Type I sheeting shall have a specular gloss reading of not less than 40. Gloss shall be measured according to Federal Standard Test Method

141/6103.

- b. Reflective Intensity. The reflective intensity values of the sheeting shall not be less than the values specified in Table I. The reflective values shall be determined according to (4.4.7) of Federal Specification L-S-300A.
- c. Shrinkage. When tested as in (4.4.11) of Federal Specification L-S-300A, the sheeting shall not shrink more than one thirty-second (1/32) of an inch in ten (10) minutes or more than one-eighth (1/8) of an inch in twenty-four (24) hours.
- d. Accelerated Weathering.
  - 1. When subjected to twelve-hundred (1200) hours of accelerated weathering, the sheeting shall be substantially equal in appearance to the unweathered sheeting. There shall be no more than a slight loss of gloss and no evidence of cracking, scaling, pitting, delamination, edge lifting or curling or more than one thirty-second (1/32) of an inch of shrinkage or expansion. The lens elements shall show no cracking or other deterioration except that slight etching or crazing of the elements will be permitted.
  - 2. Accelerated weathering will be conducted in a twin arc ATLAS WEATHEROMETER operated according to ASTM E42, Apparatus D, with the following additions and exceptions.
    - a. At the end of each twenty (20) hour cycle the panels will be placed in a cold cabinet at approximately 0 F for one (1) hour. After removal from the cold cabinet the panels will be returned to the weatherometer to await the start of the next cycle.
    - b. Water used in the weatherometer will be city water softened to a total hardness content of less than five (5) parts per million expressed as calcium carbonate.

F. SUBMITTALS:

- 1. The Contractor shall show manufacturer's certifications attaching typical test results representative of the materials and certifying that all materials supplied conform to all of the requirements specified.
- 2. The Contractor shall furnish a written statement from the sheeting manufacturer guaranteeing satisfactory performance of the sheeting materials.

G. FABRICATION OF FLAT SHEET SIGN PANELS:

Flat sheet signs shall be cut to the size and shape shown on the plans. They shall be free from buckles, warps, dents, cockles, burrs and other defects caused by fabrication. Signs shall be attached to posts as shown on the plans.

H. APPLICATION OF REFLECTIVE SHEETING:

1. Preparation of metal and application of reflective sheeting shall be strictly in accordance with the sheeting manufacturer's instructions.
2. The applicator shall use equipment recommended by the sheeting manufacture and shall be experienced in the application of the particular sheeting specified.

1704 INSTALLATION. Installation shall be in accordance with the details on the plans and as specified herein. The posts shall be erected by driving, either by hand or with mechanical devices. The method of driving shall not substantially alter the cross-sectional dimensions of the posts or materially damage the spelter coating. All areas where the galvanizing has been removed or damaged shall be cleaned and painted with zinc rich paint. Battered tops will not be permitted. Posts, which are bent or otherwise damaged during or after erection, shall be removed from the site and replaced at the contractor's expense. After driving, the portion of the posts above ground shall be oriented as required above and the posts shall be firm in the ground.

1705 EXISTING SIGNS. The Contractor shall preserve all existing traffic signs in useful condition so as to provide traffic control during construction. All existing traffic signs except those signs to be removed shall be reused and relocated, as shown on the plans, after construction. All existing signs that are to be removed after construction shall be carefully protected and shall be removed and returned to a place designated by the City Engineering Department.