

OBJECT MARKERS AND DELINEATORS
(REV 10-22-20)

SECTION 993 is deleted and the following substituted:

SECTION 993
OBJECT MARKERS AND DELINEATORS

993-1 Object Markers.

993-1.1 General: Object markers shall meet the general requirements outlined in the Manual of Uniform Traffic Control Devices (MUTCD). For uniformity, all Type 1 markers shall be OM1-3 style markers, all Type 2 markers shall be OM2-2V style markers, and all Type 4 (end of road) markers shall be OM4-3 style markers.

993-1.2 Retroreflective Sheeting:

993-1.2.1 Retroreflective Sheeting: The retroreflective sheeting for object markers shall meet the requirements of Section 994, sheeting Types IV, V or XI. The retroreflective area shall be in accordance with the MUTCD. The retroreflective sheeting shall be permanently adhered to 0.040-inch sheet aluminum for Type 2 markers and 0.080-inch sheet aluminum for Type 1, 3 and end of the road markers. Aluminum shall be of 6061-T6 (ASTM B209) prepared in accordance with recommendations of the sheeting manufacturer.

993-1.2.2 Assembly: Type 2 and 3 markers shall be mounted directly to the post by two holes on the face of the marker. The mounting holes shall be 1/4-inch square holes to receive 1/4-inch carriage bolts, or other 1/4-inch bolts and shall be spaced to fit holes on the post spaced at 1-inch centers.

993-1.3 Posts: The marker posts shall be of steel or aluminum as shown in the Standard Plans or the Plans. Steel posts shall be 3 lb/ft. flanged U-Channel. The U-channel posts shall meet the mechanical requirements of ASTM A499, Grade 60. Provide U-channel posts that have been galvanized after fabrication in accordance with ASTM A123 and have a smooth uniform finish free from defects affecting strength, durability, and appearance. For each U-channel, punch or drill 3/8-inch diameter holes on 1-inch centers through the center of the post, starting approximately 1 inch from the top and extending the full length of the post. Punching or drilling operations shall be completed prior to galvanization. The weight per foot of a manufacturer's U-channel size shall not vary more than plus or minus 3.5% of its specified weight per foot. Machine-straighten the U-channel to a tolerance of 0.4% of the length. U-channel posts shall be listed on the APL. Round aluminum posts shall meet the requirements of Standard Plans, Index 700-010.

Use attachment hardware (nuts, bolts, clamps, brackets, braces, etc.) of aluminum or galvanized steel.

993-2 Delineators.

993-2.1 General: Delineators shall be classified into the following types: flexible post delineators, nonflexible post delineators, barrier delineators, and linear barrier delineators.

993-2.2 Flexible Post Delineators:

993-2.2.1 Dimensions: The post shall have a minimum width of 3 inches facing traffic and of such length to generally provide a height of 48 inches above the pavement surface.

993-2.2.2 Color: The post shall be opaque white. The yellowness index shall not exceed 12 when tested in accordance with ASTM E313. The daytime 45 degrees, 0 degrees luminance factor, Cap Y, shall be a minimum of 70, tested in accordance with ASTM E1347 or ASTM E1164.

993- 2.2.3 Retroreflective Sheeting: The reflective sheeting shall be Types IV, V, or XI and meet the requirements of Section 994. The reflective sheeting shall have a minimum width of 3 inches and have a minimum area of 30 square inches.

993-2.2.4 Impact Performance: Six of the eight posts shall be capable of returning to a vertical position plus or minus 10 degrees with no delaminating. No post shall split, crack, break, or separate from base. Posts shall be tested and evaluated according to the National Testing Product Evaluation Program (NTPEP) Evaluation of Temporary Traffic Control Devices: Flexible Delineators, for the following categories:

993-2.2.4.1 Pavement/Surface mounted: Use the Metropolitan Delineator Applications category for Hot Weather with a minimum of 10 impacts (default testing procedure uses a maximum of 200 impacts).

993-2.2.4.2 Ground mounted: Use the Ground Mount Side of Roadway Applications category for Hot Weather (default testing procedure uses a maximum of 10 impacts).

993-2.3 Nonflexible Post Delineators:

993-2.3.1 Posts: The posts shall meet the requirements of 993-1.4, except the steel delineator post shall be 1.1 lb/ft.

993-2.3.2 Retroreflective Sheeting: The retroreflective sheeting shall be Types IV, V or XI sheeting and meet the requirements of Section 994. The reflective sheeting shall have a minimum width of 4 inches and have a minimum area of 32 square inches. The retroreflective sheeting shall be permanently adhered to 0.040-inch sheet aluminum.

993-2.4 Barrier Delineators:

993-2.4.1 General: Barrier delineators shall consist of retroreflective sheeting permanently adhered to 0.090-inch minimum thick body. The body shall have a flexible hinge which allows the reflector to fold down and spring back to an upright position after impact. Barrier delineators for guardrail shall be designed for mounting to the web of steel posts or designed for mounting to the top of wood posts. Barrier delineators for concrete barrier, traffic railings, and vehicular longitudinal channelizing devices (LCDs) shall be designed for mounting to the top of each device.

993-2.4.2 Retroreflective Sheeting: The sheeting for barrier delineators shall be Type IV or XI meeting the requirements of Section 994. The sheeting shall be yellow or white, depending on the locations of use for each. The dimensions of the retroreflective sheeting shall be 3 inches wide by 4 inches high. The sheeting shall be installed by the delineator manufacturer.

993-2.5 Linear Barrier Delineators:

993-2.5.1 General: Linear barrier delineators shall consist of retroreflective sheeting permanently adhered to a substrate capable of being attached to the face of the barrier. Linear barrier delineators for guardrail shall be designed for mounting between post bolt slots in the trough of the W-Beam panel along the centerline of the post bolt slots. Linear barrier delineators for concrete barrier and concrete traffic railings shall be designed for mounting to the traffic face at a height of 2 feet from the gutter line.

993-2.5.2 Retroreflective Sheeting: The sheeting for linear barrier delineators shall be Type IV or XI meeting the requirements of Section 994. The sheeting shall be yellow or

white. Linear barrier delineators for guardrail shall have retroreflective sheeting with dimensions of 1 1/2 inches by a length ranging from 31 inches to 36 inches. Linear barrier delineators for concrete barrier and concrete traffic railings shall have retroreflective sheeting with dimensions of 6 inches by a length ranging for 31 inches to 36 inches. The sheeting shall be installed on the substrate by the linear barrier delineator manufacturer.

993-3 Product Acceptance on the Project.

Acceptance will be made in accordance with the requirements of Section 705. Manufacturers seeking evaluation of their product must submit an application in accordance with Section 6.

Do Not Use Without
CO Specs Authorization