

**KANSAS DEPARTMENT OF TRANSPORTATION
 SPECIAL PROVISION TO THE
 STANDARD SPECIFICATIONS, 1990 EDITION**

NOTE: This special provision is generally written in the imperative mood. The subject, the "Contractor" is implied. Also implied in this language are "shall", "shall be", or similar words and phrases. The word "will" generally pertains to decisions or actions of the Kansas Department of Transportation.

Page 645, Section 825 and page 664, Section 829. Delete these Sections and replace with this:

SECTION 825

PERMANENT SIGNING

1.0 DESCRIPTION.

Install highway signs, delineators, and object markers according to the details in the Contract Documents and the M.U.T.C.D. (latest edition).

<u>Bid Item</u>	<u>Unit</u>
Sign (* ¹) (High Performance)	Square Foot (square meter)
Sign Post (4" [100 mm] x 6" [150 mm] Wood) (* ²)	Linear Foot (meter)
Sign Post (* ³ Steel Beam)	Linear Foot (meter)
Sign Post (* ⁴ U Steel)	Linear Foot (meter)
Sign Post (* ⁵ Perforated Square Steel Tube)	Linear Foot (meter)
Sign Post (4" [100 mm] x 6" [150 mm] Structural Steel)	Linear Foot (meter)
Sign Post (3 I 2.25 [76 I 3.2] Aluminum)	Linear Foot (meter)
Sign Post Stub and Breakaway Base Plate (* ³)	Each
Sign Post Breakaway Base Plate (* ³)	Each
Sign Post Footing (* ⁶ Concrete)	Linear Foot (meter)
Sign Post Footing (* ⁵ Perforated Square Steel Tube)	Each
Signing Object Marker (* ⁷)	Each
Signing Delineator (* ⁸) (* ⁹ Rigid, "U" Post)	Each
Signing Delineator (* ⁸) (* ⁹ Flexible) (* ¹⁰ Anchor)	Each
Signing Delineator (* ⁸) (* ⁹ Bracket)	Each
Sign (Remove and Reset)	Lump Sum

*¹Type of substrate: Flat Sheet, Reinforced Panel, or Overlay

*²Type of sign: Flat Sheet Sign or Reinforced Panel Sign

*³Size and weight (mass) of post: S 3 x 5.7 (S 75 x 8.5), W 6 x 9 (W 150 x 13), W 10 x 12 (W 250 x 18), or W 10 x 22 (W 250 x 33)

*⁴Weight (mass) per foot (meter): 2 lbs./ft. (3 kg/m) or 3 lbs./ft. (4.5 kg/m)

*⁵Size of post: 1 3/4" (44 mm), 2" (51 mm), 2 1/4" (57 mm), or 2 1/2" (64 mm)

*⁶Diameter: 18" (450 mm) wood post, 24" (600 mm) steel beam post, or 30" (750 mm) steel beam post

*⁷Type: Type 2 or Type 3

*⁸Type: Type A or Type B

*⁹Color: Yellow or White

*¹⁰Type: Type 1 or Type 3

2.0 MATERIALS.

a. Materials for Permanent Signs.

(1) Provide Grade 3.6 (Grade 25) concrete, for sign post footings, that complies with the requirements of **Section 402**.

(2) Provide bituminous material, for sealing gap between the wood posts and the concrete footings, that is suitable for the intended use and is approved by the Engineer.

(3) Provide steel reinforcement bars, structural steel tubes, anchor bolts, steel fasteners, steel sign posts, steel delineator posts, aluminum sign blanks, aluminum sign overlay panels, aluminum I-beams, aluminum Z-bars, and aluminum post clips that comply with the requirements of **Section 1600**.

(4) Provide organic zinc-rich paint, for repairing damaged spelter coatings, that complies with the requirements of **Section 1800**.

(5) Provide retroreflective sheeting, process inks, and flexible delineator posts and anchoring devices that comply with the requirements of **Section 2200**.

(6) Provide wood posts that comply with the requirements of **Section 2300**. Provide materials for preservative treatment of field cuts and drilled holes that comply with the requirements of **Section 2300**.

b. Shop Fabrication of Signing Items.

(1) Flat Sheet Signs. Provide flat sheet sign blanks that comply with the dimensions and details shown in the Contract Documents. Remove warps, burrs, and other defects that occurred during fabrication.

(2) Reinforced Panels. Provide reinforced panels of either extrusheet or extruded fabrication that comply with the dimensions and details shown in the Contract Documents and these requirements:

- Cut the ends of all panels at 90 degree angles, to within $\frac{1}{8}$ inch (3 mm) of the length shown in the Contract Document.
- If the panel is extrusheet fabrication, the mismatch between the edge of the sheet and the extrusion that it is fastened to must not exceed $\frac{1}{32}$ inch (800 μ m).
- Remove warps, burrs, and other defects that occurred during fabrication.

(3) Flat Sheet Sign Blank and Reinforced Panel Preparations. After fabrication, prepare the metal for sheeting application using a class 2 chromate conversion coating according to the requirements of ASTM B 449, "Standard Recommended Practice for Chromate Treatments on Aluminum.

Handle the metal with a mechanical device or with clean canvas gloves between and etching operation and the application of retroreflective sheeting. Prevent the metal from coming in contact with greases, oils, or other contaminants before the application of sheeting, films, or inks.

(4) Application of Retroreflective Sheeting. Use the color of the sheeting shown in the Contract Documents.

Use either heat activated or pressure sensitive retroreflective sheeting. Apply the sheeting to the treated blanks and panels using the equipment specified by the sheeting manufacturer and within the recommended application temperatures, or by a method that will produce an equivalent result.

During fabrication of sign faces comprised of 2 or more pieces of retroreflective sheeting or reinforced panels, carefully match adjacent pieces of sheeting for color to provide uniform appearance and brilliance under both day and night illumination. Any non-uniform or apparent contrast between adjacent pieces of applied sheeting or panels is cause for rejection of the sign.

Overlap pressure sensitive sheeting a minimum of $\frac{3}{16}$ inch (5 mm) at splices. If heat activated sheeting is spliced, the minimum overlap is $\frac{3}{16}$ inch (5 mm). If adjacent sheets of heat activated sheeting are butted together, the gap between adjacent sheets can not exceed $\frac{1}{32}$ inch (800) μm .

On reinforced panel signs, vertical splices, a minimum of 4 feet (1.2 m) apart, are permitted.

On flat sheet signs, 1 vertical or horizontal splice is permitted. Make horizontal lap splices with the uppermost piece overlapping the lower piece. Splicing is prohibited if the sign face is reverse screen process.

(5) Sign Legend and Border Details. Provide sign legend and border that complies with the requirements specified in the Contract Documents.

Use capital letters and numbers that comply with the standard rounded capital letter alphabets in the latest edition of Standard Alphabets for Highway Signs approved by AASHTO, USDOT, and FHWA.

Use lower case letters that comply with the design in the latest edition of Standard Lower Case Alphabet for Highway Signs approved by USDOT and FHWA. Use initial capital letters that are $1\frac{1}{2}$ times the loop height of the lower case letters, from a modified series "E" alphabet in which the stroke width is increased to approximately $\frac{1}{5}$ of the height of the letter or number.

Make the sign face for flat sheet signs using one of these processes:

- Direct Screen: the legend and border color is applied to the face of the sign by the silkscreen process.
- Reverse Screen: a transparent color is applied to the face of the sign by the silkscreen process to form the legend and border.
- Direct Applied: the legend and border is retroreflective sheeting applied to the face of the sign by the appropriate methods.

Use the Direct Applied process to make the sign face for reinforced panel signs.

(6) Application of Process Inks and Lettering Films. Use the color of film or ink that will result in the sign face, legend, and border being as shown in the Contract Documents.

Apply process inks to the sign faces as recommended by the manufacturer of the retroreflective sheeting, or by a method that will produce an equivalent result. Apply lettering films to the sign faces as recommended by the manufacturer of the lettering film, or by a method that will produce an equivalent result.

(7) Sign Identification. Paint this legend on the back of each sign with black exterior grade (non-water based) paint:

Sign Number(by sign fabricator)

Erection Date(by sign installer) (month-day-year)

Locate the legend horizontally, vertically, or diagonally along the bottom or right edge of the sign. Do not place the legend in a position that is covered up when the sign is installed.

On a sign with an area of less than 16 square feet (1.5 m²), the legend must be at least ½ inch (13 mm) in height. On a sign with an area of more than 16 square feet (1.5 m²), the legend must be at least 1 inch (25 mm) in height.

In lieu of painting the legend on the back of the signs, the Contractor has the option to use clear or light colored, pressure sensitive decals with a printed (not handwritten) black legend.

(8) Sign Overlays. Provide sign overlays that comply with the details shown in the Contract Documents. Fabricate the sign overlays from flat sheet blanks covered with retroreflective sheeting. Prepare the flat sheet blanks and apply the retroreflective sheeting as specified for flat sheet signs. Apply the legend and border to the retroreflective sheeting as specified for the direct applied process (flat sheet sign).

(9) Delineators. Provide the types of delineators specified in the Contract Documents.

Fabricate delineators for steel post mount or bracket mount from flat sheet blanks covered with retroreflective sheeting. Prepare the flat sheet blanks and apply the retroreflective sheeting as specified for flat sheet signs.

(10) Object Markers. Provide the type of object markers specified in the Contract Documents.

Fabricate Type 1 object markers from 18 inches (450 mm) x 18 inches (450 mm) flat sheet blanks covered with yellow high performance retroreflective sheeting.

Fabricate Type 2 object markers from 6 inches (150 mm) x 12 inches (300 mm) flat sheet sign blanks covered with yellow high performance retroreflective sheeting.

Fabricate Type 3 object markers from 12 inches (300 mm) x 36 inches (900 mm) flat sheet blanks covered with yellow high performance retroreflective sheeting with black non-reflective hash marks as shown in the Contract Documents.

Prepare the flat sheet blanks and apply the retroreflective sheeting as specified for flat sheet signs.

(11) Fabrication of Sign Posts. The total length of posts shown in the Contract Documents is estimated. The number, type, and size of posts shown in the Contract Documents are determined from theoretical sections. Before ordering, determine the length of each post for the sign or the sign assembly to provide the specified horizontal and vertical clearance.

Wood posts may be ordered in stock lengths and cut to the required length in the field. Drill breakaway holes in the posts at the project site. Treat all field cuts and drilled holes with preservative material.

Fabricate steel beam posts, base plates, and fuse plates to the specified dimensions. Drill the specified holes in the posts and plates. The preferred method of cutting plates is saw cuts; however, flame-cutting is permitted. Grind all edges smooth and remove all burrs projecting beyond the planes of the plate faces, cuts, or drilled holes.

After the base plates are galvanized, remove all runs or beads in the areas where washers are placed.

Steel "U" posts and perforated square steel tube posts may be ordered in stock lengths and cut to the required length in the field. Cut the steel posts by methods other than torch-cutting. Paint all cut ends with zinc-rich paint.

3.0 CONSTRUCTION REQUIREMENTS.

a. General. The Engineer expects that the Contractor will erect the permanent signing as necessary to expedite the completion of the project and the opening of the highway. The Engineer may require that the Contractor mobilize his permanent signing operations whenever it is feasible to complete a portion of the project. The Contractor may have to mobilize and, upon completion of all currently feasible work, suspend the permanent signing operations more than once before the project is completed.

At the Contractor's request, the Engineer will provide the Contractor with the best information available regarding the locations of all underground utilities that occur in the vicinity of the sign installations. It is the Contractor's responsible to verify the utility locations.

If a temporary sign interferes with the installation of a permanent sign, remove and reset the temporary sign at a location designated by the Engineer.

b. Sign Location and Orientation. Locate and stake each sign installation according to the details in the Contract Documents. Orient the signs in relation to the highway alignment as shown in the Contract Documents.

If the Contract does not include the item of Contractor Construction Staking, the Engineer will stake the location of each sign.

c. Sign Post Lengths. Provide the Engineer with the information necessary to determine the length of each sign post. Provide the Engineer with the vertical measurement from the top of the pavement edge to:

- the ground line (for posts with no footings)
- the top of the footing (for posts with footings)
- the top of the stub post base plate (for steel beam breakaway posts)

The Engineer will provide the Contractor with the length of each sign post.

If the Contract does not include the item of Contractor Construction Staking, the Engineer will obtain the measurements necessary to determine the length of each sign post.

d. Sign Post Installation.

(1) Footings.

(a) Post Holes for Wood Posts. Excavate the post holes to the shape and dimensions shown in the Contact Documents. Prevent water from entering the excavated holes.

(b) Concrete Footings for Wood Posts and Steel Beam Stub Posts. Excavate the footings to the shape and dimensions shown in the Contract Documents. Remove all non-compacted material from the excavation. Form the top 12 inches (300 mm) of the footings. Place the reinforcing steel and post sleeves (or stub posts) in the footings. Place the post sleeves (or stub posts) at the specified depth and alignment, plumb them, and secure them in place. Vibrate the concrete placed in the footings to remove all voids. Finish the tops of the footings as detailed in the

Contract Documents. After the concrete footings have cured, backfill the footings as detailed in the Contract Documents. Place the backfill soil in uniform layers (maximum layer of 8 inches [200 mm], loose measurement) around the footings, and compact each layer until no further consolidation is observed.

(c) Perforated Square Steel Tube Post Footings. Install the perforated square steel tube post footings according to the details in the Contract Documents. Install the perforated square steel tube post footings so that the portion above ground is plumb. Install the perforated square steel tube post footings by methods that do not alter the cross-sectional dimensions of the perforated square steel tubes or damage the galvanized coating. Remove and replace perforated square steel tube post footings that are damaged during installation.

(2) Post Installation. Install the posts according to the details in the Contract Documents. Plumb the sign posts as they are installed. The maximum allowable tolerance from vertical is 1 inch (25 mm) (from the top of the post to the ground line).

(a) Wood Posts in Soil. Place the posts in the post holes, plumb the posts, and backfill the posts with the soil from the post hole excavation. Place the backfill soil in uniform layers (maximum layer of 8 inches [200 mm], loose measurement) around the posts, and compact each layer until no further consolidation is observed. Continue the backfill to the original ground line. After the backfill is completed, drill breakaway holes in the posts according to the details in the Contract Documents. Treat the breakaway holes with preservative materials.

(b) Wood Posts in Concrete Footings. After the concrete footings are cured, place the posts into the post sleeves, plumb the posts, secure the posts with wedges, and seal the gaps between the posts and the post sleeves with bituminous material. After the posts are secure in the post footings, drill breakaway holes in the posts according to the details in the Contract Documents. Treat all field cuts and drilled holes in wood posts with materials for preservative treatment.

(c) Steel Beam Breakaway Posts. After the concrete footings are cured, place the steel beam post with base plate onto the stub post base plate. Plumb the post and tighten the base plate bolt assemblies to their final position as detailed in the Contract Documents. Attach the structural tubing to the steel posts.

(d) Perforated Square Steel Tube Posts. Install and attach the perforated square steel posts in the footings as detailed in the Contract Documents.

(e) Steel "U" Posts. Install the posts by driving, either by hand or with mechanical devices. Exercise caution so that the driving does not alter the cross-sectional dimensions of the posts or damage the coating. Remove and replace damaged posts.

e. Sign Installation. Mount the signs as shown in the Contract Documents. Position the signs so the sign face is vertical. If drilling holes after the sign fabrication, drill the holes from the sign face sheeting side.

After the sign is installed, the post must be plumb and secure in the ground.

Repair damaged retroreflective sheeting on the sign faces. Place pressure sensitive retroreflective sheeting to patch the damaged areas. Match the retroreflective sheeting patch to the adjacent pieces of sheeting for color and uniform appearance and brilliance under both day and night illumination. The retroreflective sheeting patch must overlap the damaged area a minimum of ¼ inch (6 mm).

Repair damaged galvanized areas on posts and structural members by cleaning and painting with zinc rich paint.

f. Delineators and Object Markers. Install delineators and object markers at the locations designated in the Contract Documents. Install the delineators and object markers according to the details in the Contract Documents.

g. Remove and Reset Existing Signs. Remove, transport, store, and reset existing signs according to the details in the Contract Documents. Provide new bolts, nuts, washers, post clips, and other attachments as necessary to reset the existing signs. Repair or replace, as the Engineer directs, all existing signs damaged during the removal and resetting operations.

4.0 MEASUREMENT AND PAYMENT.

The Engineer will measure completed and accepted flat sheet signs, reinforced panel signs, and sign overlays by the square foot (square meter) (measured to the nearest 0.001 sq. ft. [m²], and paid to the nearest 0.01 sq. ft. [m²]) of sign face.

The Engineer will measure the various sizes of completed and accepted wood posts, steel beam posts, “U” steel posts, perforated square steel tube posts, structural steel posts, and aluminum posts by the linear foot (meter) (measured to the nearest 0.01 ft. [m], and paid to the nearest 0.1 ft. [m]) of post in place. If the alternate grade of steel beam posts are provided, the measurement is based on the primary grade steel size and weight (mass) posts.

The Engineer will measure the various sizes of completed and accepted concrete footings by the linear foot (meter) (measured to the nearest 0.01 ft. [m], and paid to the nearest 0.1 ft. [m]) of post in place.

The Engineer will measure various sizes and types of each completed and accepted sign stub post with breakaway base plate, sign post breakaway base plate, perforated square steel tube sign post footing, object marker, and delineator.

The Engineer will measure the completed and accepted removal and resetting of existing sign as a unit.

Payment for the various permanent signing bid items at the Contract unit prices is full compensation for the specified work.