

7000000 HIGHWAY SIGNING
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Mary Anne Koos
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Comment: (6-10-13) Shouldn't they be removed to be flush. If in the sidewalk a pedestrian could trip over and if in the grass a mower would hit them? Probably need to revise beginning to say "Removal or relocation...."

700-2.1.67.2 Removal or Relocation of Signs: *Relocation of signs shall consist of removing the existing sign assembly and installing the sign on a new foundation.*

When the Plans call for existing ground-mounted signs to be relocated or removed, immediately remove supports and footings that project more than 6 inches above ground surface after removing the sign panel from the assembly. Remove existing footings to a depth at least 12 inches below the ground surface. Restore the area of the sign removal or relocation to a similar condition of the immediate adjacent area. The costs will be included in the Contract unit price of the item to which it is incidental.

Response: Subarticle 700-2.1.6.2 deleted.

Melissa Hollis
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Comment: (6-12-13)

(1) Delete 700-2.1.6 and 700-2.1.7; Measurement and Payment for all static signs is covered under 700-2.3 and 700-2.4.

Response: 700-2.1.6, & 2.1.7 have been deleted. (6-13-13 Spec's Office)

(2) 700-4 DMS: Verify that pay item structure includes ground mount/single post installation.

Response: Will be addressed in pay item structure.

(3) We need to address payment for "special design" signs in the pay item structure.

Response: Will be addressed in pay item structure.

Karen Byram
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Comment: (6-20-13) The intent of identifying the two types of sign sheeting, Type IV and Type XI, is to differentiate between the intensity of the retroreflectance. Therefore, a statement should be added to the specification that states: Type XI sign sheeting cannot be substituted for Type IV sign sheeting.

Response: Agree. Revised wording in Section 994 to disallow use of ASTM classified types of sheeting's greater than Type IV for fluorescent yellow-green or fluorescent orange. Change Made in Section 994.

MaryJo Lewis

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Comment: (6-24-13) 700-1.2.43 Retroreflective Sign Sheeting Requirements: Use signs that meet the material and process requirements of Section 994. Use Type XI sheeting for all regulatory, warning and overhead signs. All the red ink signs must use a sheeting system that includes a colorless film overlay. 3M is aware of the red ink durability issues in Florida weathering. While a UV-protective overlay film can provide improvement in weathering performance, it is not entirely fool-proof in terms of other performance parameters, depending upon the experience and attention of the sign fabricator. The absolute requirement for an overlay film does not allow for improved ink development options that could obviate the need for the addition of a film. We recommend language that allows but does not require the use of an overlay film – for any sign sheeting system (as described in 994) when it is needed to meet the weathering requirements outlined in specification 994. (See attachment to e-mail with appendix)

Response: There is nothing that precludes a manufacturer from developing improvements to their system performance. We have been in discussions with manufacturers about the short comings of the current systems and have had limited resolution to our concerns. Requiring the overlay film is our response to extend the service values of the red sheeting systems.
No Change Made.

Tillander, Trey
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Comment: (6-25-13) Shouldn't 700-5.2.9, 700-5.2.10, and 700-5.2.12 all be under 700-5.2.8?

Response: Agree. Subarticles will be revised. Change Made.

Steven Norkus
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Comment: (7-1-13)

I would like to comment on the proposed use of type XI sheeting for the use on Regulatory, Warning and Guide signs. I am on the ASTM sign and pavement markings committee and involved with TRB as well. From the data and the research done over the last several years pertaining to Night time visibility and the repercussions from the lack of proper signs I feel that the State of Florida would benefit from the use of this material. We are in a state in which elderly drivers either move here for the weather or enjoy a winter vacation. We also know 1 out of 5 of us in the next 10 years will be 65 years or older on Florida highways. The largest population of baby boomers will be retiring which will increase nighttime driving by elders to a new record. To give the driver a more advanced warning for a Stop sign or Warning sign Could make all the difference in the world. We also know that the Type XI sheeting has an excellent lifespan and will pay for itself based on the long service life in the field.

Response: Thank you for your comments. No changes required.

douglas prager
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Comment: (7-2-13) Type XI sheeting increases our safety factor and is a cost effective tool to

ensure visibility of critical signs. Some states have removed external lighting when using this sheeting. For Florida it means in times of extreme weather conditions we will have the best possible signs for low light, or no light conditions often associated with storms and power outages.

Response: Thank you for your comments. No changes required.

Katie Bettman
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Comment: (7-2-13)

Why have we changed shall to must? Is there a different meaning in these two verbs? Most specifications use the verb shall.

Response: Based on current legal writing practices, “must” is preferred.” No Change Made.

John Simms
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Comment: (7-3-13)

1. 700-2.1.1 states that mutli-post sign assemblies will be installed on aluminum tube or I-beams. Will the aluminum tube option be put back into the FDOT Mutli-post sign program, and the U-channel removed if it will no longer be accepted? 700-2.2.2.1.2 states that the Engineer will allow hand mixing by approved methods. Can a definition of “approved methods” since this has become an issue in many areas lately? This is generally done by using a bag mix (Sakrete, Quickrete) and lately we have been asked to have QC on site and test this concrete, which on any projects I have done this on it has always passed, all test. Could the specs state that testing of this concrete per Section 346 not be required if Manufactures direction for mixing and placing is followed?

Response: No, the aluminum tube option will not be put back as an option for multi-post signs. The reason is that only the 3” or smaller tubes passed the crash testing requirements, which severely limits its use. The word tubing will be removed from section 700-2.1.1. Only the “MultiPost v4.01” program provides a u-channel post option. We have kept it in that program where cities and counties which continue to use u-channels could see its limitations. Change Made.

2. Section 700-2.2.2.1.2 is for overhead signs and hand mixing should not be allowed.

Response: Agree, Hand-mixing should not be allowed , subarticle referencing hand-mixing will be deleted.

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Paul Gentry
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Comment: (7-3-13) Text:

I. 700-1.2.4 Does the use of any "red color" on any sign require the use of the colorless film

overlay. It is understood for stop, yield and Do not Enter signs, but there are occasions where a sign is manufactured with "small signs that are red" placed on the bigger sign. This question was proposed to myself by a sign manufacturer.

Response: No, the specification will be revised to indicate only the R1-1, R1-2, R5-1, R5-1a will require the colorless film overlay. Change Made

2. If we are going to be downgrading sheeting from Type's VIII and IX (these are presently designated as a Type VII sheeting) down to a Type IV sheeting, are we going to allow Type XI sheeting to also be included in our Type IV sheeting on the QPL?

Response: Agree. Revised wording in Section 994 to disallow use of ASTM classified types of sheeting's greater than Type IV for fluorescent yellow-green or fluorescent orange. Change Made in Section 994.

3. Since we are unable to get the "one" manufacturer of orange mesh to submit to the department for Q.P.L. inclusion, can we remove the Q.P.L. requirement for this particular type of product?

Response: Orange mesh signs will not be included in the specification at this time. The specification has been modified to eliminate requirement for mesh signs.

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Kevin Malia
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Comment: (7-3-13) I support the type XI sheeting specification. The increased reflectivity will enhance visibility on guide signs and traffic control signage. Also, the increased life of the sheeting will maintain a higher minimum level of reflectivity and improve safety for drivers.

Response: Thank you for your comment. No change required.

John Mueller
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Comment: (7-3-13) The ADDSCO BRICK is a pioneer for the sign industry. ADDSCO has significantly expanded industry solutions to real-time information by inventing this unique and innovative approach to DMS. BRICK, a Modular Message Sign System, is the first and only sign of its type.

BRICK is environmentally sealed, eliminating the need for additional protection from any weather conditions. While traditional DMS require bulky, heavy, and unsightly sign cases for protection, the ADDSCO BRICK alleviates these design needs. This greatly expands the possibilities where legibility, size, weight, lead times and environmental durability are of formidable concern. The weatherproof modular components are designed to withstand harsh elements, providing exceptional legibility in all types of weather. No fans! No filters! No A/C! No heaters, defrosters or defoggers!

It is our desire that FDOT evaluates the BRICK for what it is, a revolutionary and innovative design that for the last 16 years has altered the traditional DMS paradigm for the better across the U.S. and the world. We have many customers in Florida in particular that have purchased and are currently using the BRICK successfully in a wide variety of applications. Please contact me if

you would like to discuss any of the points we've identified in the attached specification review. Thank you for giving us the opportunity for consideration.

700-4 Dynamic Message Signs:

700-4.1 Sign Types: Dynamic Message Signs (DMS) must meet the requirements of NEMA TS4-2005. Dynamic Message Signs are classified by the type of sign display and the type of mechanical construction. Provide monochrome, tri-color, or full-color signs as shown in the Contract Documents. Use only equipment and components that meet the requirements of these minimum specifications and are listed on the Department's Approved Product List (APL). *ADDCO is in Compliance with the NEMA TS4-2005 specification for monochrome (amber LED) DMS.*

700-4.1.1 Front Access DMS: Ensure that front access signs meet the requirements of NEMA TS4 2005, section 3.2.5.

ADDCO is in Compliance

700-4.1.3 Embedded DMS: Embedded DMSs are DMSs that are typically mounted to Ground Traffic Signs, Overhead Traffic Signs, or Overhead Cantilever Traffic Signs. *ADDCO is in Compliance*

700-4.2 Sign Housing Requirements for all DMS: Ensure that the external skin of the sign housing is constructed of aluminum alloy 5052 H32 that is a minimum of 0.125 inch thick for walk-in DMS and 0.090 inch thick for front and embedded DMS. Ensure the interior structure is constructed of aluminum. Ensure that the sign housing design and appearance is approved by the Engineer. Ensure that no internal frame connections or external skin attachments rely upon adhesive bonding or rivets.

ADDCO is in Compliance

Ensure the sign housing meets the requirements of NEMA TS4 2005, section 3.2.8 for convenience outlets.

N/A with ADDCO Brick sign technology.

700-4.2.2 Sign Housing for Front Access and Embedded DMS: Ensure front access and embedded signs meet the requirements of NEMA TS4 2005, section 3.2.4. Ensure access does not require specialized tools or excessive force to operate.

ADDCO is in Compliance

700-4.2.3 Housing Face requirements for all DMS: Ensure the sign face meets the requirements of NEMA TS4 2005, section 3.1.3. Ensure that all sign face surfaces are finished with a matte black coating system that meets or exceeds American Architectural Manufacturers Association (AAMA) Specification No. 2605. Provide certification that the sign face parts are coated with the prescribed thickness. Except for Embedded DMS, ensure the sign face includes a contrast border that meets the requirements of NEMA TS4 2005, section 3.1.6.

ADDCO is in Compliance

700-4.2.3.2 Housing Face for Front Access and Embedded DMS: Any exposed fasteners on the housing face must be the same color and finish as the housing face. Only captive fasteners will be used on the housing face.

ADDCO Brick Displays are mounted or held into place by spring loaded lockdown fasteners. They are of the same color and finish as the housing face, but are not captive by design.

700-4.2.3.3 External Fascia Panels: If the sign includes external fascia panels, ensure that they are constructed using aluminum. Finish each fascia panel with a matte black coating system that meets or exceeds AAMA Specification No. 2605.

ADDCO is in Compliance

700-4.2.3.4 Lens Panel Assembly: If sign includes lens panel assemblies, ensure they are modular in design, removable, and interchangeable without misalignment of the lens panel and the light-emitting diode (LED) pixels. The lens panel assembly must consist of an environmental shielding layer coating to protect and seal the LEDs and internal electronics. The coating must be a minimum 90% ultraviolet (UV) opaque. Lens panels must have a matte black coating that meets or exceeds AAMA Specification No. 2605. Lens panels must include a mask constructed of 0.080 inch minimum thickness aluminum. Ensure that the mask is perforated to provide an aperture for each pixel on the display module. Ensure that the apertures do not block the LED output at the required viewing angle.

ADDCO Brick Displays do not use lens panel assemblies.

700-4.2.4 Sign Housing Ventilation System:

N/A with ADDCO Brick sign technology.

700-4.2.5 Sign Housing Temperature Sensor: Ensure that the sign controller continuously measures and monitors the temperature sensors. Ensure that the sign blanks when a critical temperature is exceeded and that the sign will report this event when polled. Ensure that remote and local computers can read all temperature measurements from the sign controller.

N/A with ADDCO Brick sign technology.

700-4.2.6 Sign Housing Humidity Sensor:

N/A with ADDCO Brick sign technology.

700-4.2.7 Sign Housing Photosensors:

ADDCO is in Compliance

700-4.3 Display Modules: Provide display modules manufactured by one source and fully interchangeable throughout the manufacturer's sign system(s). Ensure that removal or replacement of a complete display module or LED board can be accomplished without the use of special tools.

ADDCO is in Compliance

700-4.3.1 LED and Pixel Specifications: Ensure that LED lamps have a minimum viewing angle of 30 degrees.

ADDCO is in Compliance

Provide a pixel test as a form of status feedback to the transportation management center (TMC) from the local sign controller. Ensure that the operational status of each pixel in the sign can be automatically tested once a day. Ensure that the pixel status test determines the functional status of the pixel as defined by the pixel Failure Status object in National Transportation Communications for ITS Protocol (NTCIP) 1203v0239 and does not affect the displayed message for more than half a second.

ADDCO's approach to pixel diagnostics is more exhaustive than the typical method implemented by other manufactures, in addition to the standard electronic results we incorporate a visual verification element that adds a higher level of confidence.

700-4.3.2 Optical, Electrical, and Mechanical Specifications for Display

Modules: Ensure the display modules are rectangular and have an identical vertical and horizontal pitch between adjacent pixels. Ensure that the separation between the last column of one display module and the first column of the next module is equal to the horizontal distance between the columns of a single display module. Full-color signs must have a pitch equal to or less than 35mm.

The ADDCO Standard Density Brick display module have an identical vertical and horizontal pixel pitch of 70mm. The ADDCO High Density Brick display module has a horizontal pixel pitch of 40mm and a vertical pitch of 43mm or vice versa depending on the Brick orientation, which is nominal and not perceivable by traffic viewers.

Ensure that there are a minimum of two power supplies that are wired in a parallel configuration for redundancy. Ensure that if one or 25% of the supplies in a group, whichever is greater, completely fails, the sign shall still be supplied with enough power to run 40% of all pixels at a 100% duty cycle with an ambient operating temperature of 165°F.

ADDCO is in Compliance

Ensure that the sign controller continuously measures and monitors all LED module power supply voltages and provides the voltage readings to the TMC or a laptop computer on command.

N/A with ADDCO Brick sign technology.

700-4.4 Characters, Fonts, and Color: Ensure that the signs are capable of displaying American Standard Code for Information Interchange (ASCII) characters 32 through 126, including all uppercase and lowercase letters and digits 0 through 9, at any location in the message line. Submit a list of the character fonts to the Engineer for approval.

ADDCO is in Compliance

700-4.5 Main Power Supply and Energy Distribution Specifications:

ADDCO is in Compliance

700-4.6 Uninterruptible Power Supply (UPS):

ADDCO is in Compliance

700-4.8 Components: All components must meet the requirements of NEMA TS4 2005, Section 8.

ADDCO is in Compliance

700-4.8.1 Mechanical Components:

ADDCO is in Compliance with all hardware specifications.

700-4.8.2 Sign Controller: Ensure that the sign controller monitors the sign in accordance with NEMA TS4 2005, Section 9. Ensure the sign monitors the status of any photocells, LED power supplies, humidity, and airflow sensors. Ensure sign controllers use fiber optic cables for data connections between the sign housing and ground-level cabinet.

ADDCO is in Compliance

700-4.8.3 Display System Hardware: Ensure the sign utilizes a system data interface circuit for communications between the sign controller and display modules. Except for embedded DMS, ensure that the following components reside inside the sign housing: sign controller (master or slave), display system interface circuits, display modules, power supplies, local and remote control switches, LED indicators, Electronic Industries Alliance (EIA)-232 null

modem cables (minimum of 4 feet long for connecting laptop computer to sign controller), and surge protective devices.

Other than surge protection devices, which are located in a separate junction box on the sign structure, the ADDCO Brick sign technology does not require these components inside the sign housing. They are located in the ground level control cabinet for ease of service. The ADDCO Brick DMS is 100% maintenance free.

700-4.8.4 Control Cabinet:

ADDCO is in Compliance

700-4.8.5 Sign Controller Communication Interfaces:

ADDCO is in Compliance

700-4.9 Message and Status Monitoring:

ADDCO is in Compliance

Response: Thank you for the information regarding ADDCO's products as they relate to the specification requirements of this section. Many aspects of the ADDCO design are unique. As such, some existing FDOT requirements for DMS may not be entirely applicable to your product. Our Traffic Engineering Research Lab (TERL) Approved Product List (APL) process will help determine if ADDCO's signs are able to meet the minimum functional and operational requirements of FDOT. It will also provide a means to determine if future changes to the specification are necessary and warranted to accommodate alternative product designs. No change made.

Moe Madar
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Comment: (7-4-13)

700-1.2.4 Retroreflective Sign Sheeting: Avery does not produce a permanent Fluorescent Yellow or Yellow-green, or a fluorescent orange.

Response: Thank you for your comment. No Changes Made.

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D4

Comment: (7-5-13) District 4 Const. has the following comments:

1. 700-2.1 Materials: Multi-column signs mention aluminum tubing, however the 2013 Design Standards only include W or S columns.

Response: You are correct, the sentence will be corrected. Change Made.

2. 700-2.2.5 "dimidions" should be "dimensions"

Response: The spelling will be corrected. Change Made.

3. Not sure the DMS's belong in this section. Although they have "sign" in their description, they are a component of an ITS system and much differnt than a static sign.

Response: The intent of the specification revision was to put all sign specifications into one Section no matter how they are used. No changes made.

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C. Matt Hills

<mailto:matt.hills@averydennison.com>

Comment: (7-26-13) In Section 700-1.2.4: Fluorescent Yellow Green School and Supplemental Panels are intended to be high conspicuity applications, thus the state requires fluorescent performance. Using Type XI in place of Type IV retains the important safety aspects of these high impact signs. For instance, school zones signs are some of the MOST critical signs, and allowing for standard reflectivity is counter productive, when requiring fluorescent performance. Please alter the performance of FYG to require Type XI retroreflectivity.

The section states that all vinyl work zone signs need to be fluorescent orange, but this excludes nonvinyl, rigid work zone signs. I believe the intent of the state is to use FLO in all work zone applications. If this is true, please remove the word 'vinyl' from the first sentence, otherwise contractors will deliver standard orange signs for rigid applications.

Response: We have had instances where the higher retroreflective sheeting is too bright and the blooming effect impacts the legibility of the sign. The problem that we have is that we have not determined which sheeting produces that effect. Our first solution was to reduce the sheeting type to a Type IV but we have since found that we would only have one manufacturer on the QPL that is a true Type IV. The second solution is to only preclude Type XI from being downgraded to a Type IV for the fluorescent colors which would allow all the manufacturers to have a fluorescent sheeting listed as a Type IV.

By our next specification revision, we are going to look at all the fluorescent sheeting types and colors to try and determine which ones create the effect we are trying to eliminate and propose an appropriate specification revision based on field observations. We would also appreciate any research you can provide in this area.

The term 'vinyl' is meant to be a generic material term – the word 'vinyl' will be eliminated to avoid confusion.

Moe Madar

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Comment: (7-26-13) 1) You are requiring Type IV for all fluorescent yellow-green signs, which include important signs such as School Crossings and Pedestrian Crossings. These signs are fluorescent due to their high conspicuity and visibility requirements. To require an HIP grade sheeting that is fluorescent is odd because the requirements are conflicting. It is also odd that the state would require Type XI sheeting on nearly all their signs, except for school zones and pedestrian crossings. The industry standard has always been Type VIII or higher for fluorescent colors because it combines high visibility for both night and daytime hours. **In fact, Avery Dennison and 3M only produce fluorescent yellow-green sheeting in Types VIII, IX, & XI** because anything else is not typically requested. The best course would be to move these requirements to Type XI where fluorescent yellow-green is available. This would also ensure that these signs are not overshadowed by your higher performing signs.

Response: Type XI or greater is deliberately being excluded. Sentenced updated.

2) Your specification still does not address the 70% requirement of initial retro values for screen printed signs. You have had many issues of colors fading which we believe is due to your higher than industry standard retroreflectivity requirements. The industry standard is to require 70% of initial retro values, which allows for fabricators and manufactures to place a more consistent layer of ink on the sign, thereby increasing durability. As the ink fades, the retro values actually rise over time. Both Avery and 3M recommend 70% in their respective product data bulletins, as do most states specifications. Requiring a clear overlay on your signs is a good step towards higher durability, however, I believe **you will continue to have issues until the initial retro requirements are aligned with industry standard and manufacturer recommendations.**

Response: We will allow field testing of red products with inks that provide a deeper color but do not meet the ASTM initial retroreflectivity requirements. If they look like a promising solution, we may proceed with the proposed the specification revision

700-1.2.4 Retroreflective Sign Sheeting: (It should be stated that all sheeting types referenced herein are ASTM D4956 sheeting types) Use signs that meet the material and process requirements of Section 994.

Use Type XI sheeting for all regulatory, warning and overhead signs. The R1-1, R1-2, R5-1 and R5-1a signs must use a sheeting system that includes a colorless film overlay.

Type XI sheeting shall also be used for all limited access advance exit and exit guide signs.

Use Type IV yellow-green fluorescent sheeting for school S1-1, S3-1, S4-3, S4-5 and supplemental panels used with S1-1 signs. Do not mix signs having fluorescent yellow-green sheeting with signs having yellow retroreflective sheeting. (Fluorescent colors are generally specified due to their conspicuity and requirements of higher visibility. Requiring an HIP grade (Type IV) sheeting for work-zones is fine because the signs are positioned so close to the road, where there is an abundant amount of headlight. But it is odd to require a fluorescent yellow-green type IV for school zones or pedestrian crossings, where the nature of the sign location generally requires high conspicuity and visibility. **This requirement combination is so unique that Avery does not even produce a Type IV fluorescent yellow-green sheeting. Avery only produces them in Types VIII, IX, & XI which are the industry standards.**)

Use fluorescent orange for all vinyl work zone signs (Is this refereeing to roll-up signs only? The word “vinyl” should be removed as it is too restricting. Manufacturers may choose to use any combination of polymers which they find best meets requirements. Not all work-zone signs are made of vinyl). Vinyl roll-up signs shall meet the requirements of Type VI sheeting.

Response: We have had instances where the higher retroreflective sheeting is too bright and the blooming effect impacts the legibility of the sign. The problem that we have is that we have not determined which sheeting produces that effect. Our first solution was to reduce the sheeting type to a Type IV but we have since found that we would only have one manufacturer on the QPL that is a true Type IV. The second solution is to only preclude Type XI from being downgraded to a Type IV for the fluorescent colors which would allow all the manufacturers to have a fluorescent sheeting listed as a Type IV.

By our next specification revision, we are going to look at all the fluorescent sheeting types and colors to try and determine which ones create the effect we are trying to eliminate and propose an appropriate specification revision based on field observations. We would also appreciate any research you can provide in this area.
