

To: SUPERSEDED BY EE 11-018 EFFECTIVE 9/21/11		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 07-001
Title: STANDARD SPECIFICATIONS SECTION 729 TEMPORARY TRAFFIC CONTROL DEVICES			
Distribution: ☒ Manufacturers (18) ☒ Local Govt. (31) ☒ Agencies (32)		☒ Surveyors (33) ☒ Consultants (34) ☒ Contractors (39) ☐ _____ ()	
		Approved: _____ James F. Tynan Director, Construction Division	1-8-07 Date

ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of 09/06/07.
- This EI does not supersede any other issuance.
- The revisions issued with this EI will be incorporated into a future update of the Standard Specifications.

PURPOSE:

This EI issues a new Section 729 *Temporary Traffic Control Devices* of the Standard Specifications of May 4, 2006.

TECHNICAL INFORMATION:

- These new specifications combine all of the temporary traffic control device requirements in a single section, and support the Department's efforts in revising the Standard Specifications Section 619 *Maintenance and Protection of Traffic*, which currently contains the material requirements.
- Current MUTCD and NCHRP 350 requirements have been added to the specifications.
- The new Section 729 *Traffic Control Devices* contains the following subsections:
 - §729-01 *Drums*
 - §729-02 *Cones*
 - §729-03 *Temporary Tubular Markers*
 - §729-04 *Vertical Panels*
 - §729-05 *Stop/Slow Paddles*
 - §729-06 *Type I Construction Barricades*
 - §729-07 *Type II Construction Barricades*
 - §729-08 *Type III Construction Barricades*
 - §729-09 *Temporary Sign Supports*
 - §729-10 *Temporary Impact Attenuators - Redirective*
 - §729-11 *Temporary Impact Attenuators - Gating*
 - §729-12 *Truck-Mounted Impact Attenuators*
 - §729-13 *Temporary Sand Barrels*
 - §729-14 *Vehicle Arresting Systems*
 - §729-15 *Arrow Panels*
 - §729-16 *Portable Variable-Message Signs*
 - §729-17 *Temporary Glare Screens*
 - §729-18 *Warning Lights*
- These revisions will not have a significant cost impact.

IMPLEMENTATION:

- Main Office Design Quality Assurance Bureau will insert the standard specification shelf note into contract proposals beginning with projects submitted for the letting of 09/06/07.

TRANSMITTED MATERIALS:

Attached is a shelf note for Section 729 entitled *Temporary Traffic Control Devices*.

BACKGROUND:

This is the first of several steps required to update Maintenance and Protection of Traffic specifications. Other steps will include revision of Section 619 *Maintenance and Protection of Traffic*, revisions to other material requirement specifications, issuance of design guidance, and issuance of construction inspection guidance.

These specifications are for temporary items that typically remain the property of the Contractor, and therefore, the testing and approval processes to ensure durability are significantly reduced. Some of these items have, or will have similar permanent items specified in different sections that have enhanced testing and approval processes to ensure durability of items that will be permanently installed. The exceptions are impact devices that are Approved List items to ensure safety of workers and the public.

Because the State is following established national trend in policy and material requirements, significant problems with the new specifications are not expected.

CONTACT: Direct questions regarding this issuance to Tom Melander (TMelander@dot.state.ny.us) or Brian DeWald (BDeWald@dot.state.ny.us) of the Office of Construction at (518) 457-6472.

TEMPORARY TRAFFIC CONTROL DEVICES

Make the following changes to the Standard Specifications of May 4, 2006:
Page 972 **Delete** Section 729 (Vacant) and **Replace** it with the following:

SECTION 729 – TEMPORARY TRAFFIC CONTROL DEVICES

729-01 DRUMS

SCOPE. This specification covers the material, fabrication, and performance requirements for traffic drums. Drums are defined by NCHRP 350 as a Category I device.

MATERIAL REQUIREMENTS. Drums shall conform to the requirements of the MUTCD, shall be NCHRP 350 approved and shall be orange plastic, one-piece or two-piece construction, with a closed top. Drums shall be a minimum of 450 mm in diameter (visible from all directions), a minimum of 900 mm and a maximum of 920 mm in height. Drums shall have a maximum weight of 35 kg., including ballast. Two-piece drums shall consist of a base no more than 100 mm in height and an upper section. The base and upper section of two-piece drums shall be designed as a unit. One-piece drums shall include a base ring or elongation designed to hold ballast. The base and/or any nonflexible portion of the drum shall not extend more than 50 mm above the pavement surface.

Drums shall have 4 horizontal circumferential stripes of reflective sheeting a minimum of 100 mm wide, of alternating orange and white, starting with orange on the top. The top edge of the upper band shall be a maximum of 50 mm from the top edge of the drum. The space between stripes shall not exceed 50 mm.

Reflective sheeting shall conform to §730-05 *Reflective Sheeting* ASTM Type I or ASTM Type III. Reflective sheeting shall be firmly bonded to the drum with an adhesive; mechanical fasteners to bond reflective sheeting to the drum will not be allowed.

BASIS OF ACCEPTANCE. Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

729-02 CONES

SCOPE. This specification covers the material, fabrication, and performance requirements for traffic cones. Cones are defined by NCHRP 350 as a Category I device.

MATERIAL REQUIREMENTS. Cones shall conform to the requirements of the MUTCD, shall be NCHRP 350 approved and shall be orange rubber or plastic. Cones shall have a maximum weight of 9 kg, including ballast.

Standard cones shall be approximately 710 mm in height with a minimum conical bottom width of 250 mm. Standard cones shall have two horizontal circumferential stripes of white reflective sheeting, the upper a minimum of 150 mm wide, with the upper edge 75 to 100 mm from the top of the cone, and the lower a minimum of 100 mm wide with the upper edge approximately 50 mm below the upper stripe.

Tall cones shall be approximately 915 mm in height with a minimum conical bottom width of 250 mm. Tall cones shall have two horizontal circumferential stripes of white reflective sheeting, the upper a minimum of 150 mm wide, with the upper edge 75 to 100 mm from the top of the cone, and the lower a minimum of 100 mm wide with the upper edge approximately 50 mm below the upper stripe.

Extra tall cones shall be a minimum of 1050 mm in height with a minimum conical bottom width of 175 mm. Extra tall cones shall have a minimum of four horizontal circumferential stripes of reflective sheeting from 100 - 150 mm wide, of alternating orange and white starting with orange on the top. The upper edge of the sheeting shall be 100 mm from the top of the cone. Nonreflective spaces between the stripes shall not exceed 75 mm wide.

Reflective sheeting shall conform to §730-05 *Reflective Sheeting* ASTM Type I or ASTM Type III. Reflective sheeting shall be firmly bonded to the cone with adhesive.

TEMPORARY TRAFFIC CONTROL DEVICES

BASIS OF ACCEPTANCE. Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

729-03 TEMPORARY TUBULAR MARKERS

SCOPE. This specification covers the material, fabrication, and performance requirements for tubular markers. Tubular markers are defined by NCHRP 350 as a Category I device.

MATERIAL REQUIREMENTS. Tubular markers shall conform to the requirements of the MUTCD, shall be NCHRP 350 approved and shall be orange, with a minimum height of 900 mm and a minimum outside diameter of 50 mm. Tubular markers shall be circular or elliptical in cross section. Tubular markers shall have a maximum weight of 6 kg, not including a mounting base.

The markers shall have two horizontal circumferential stripes of white reflective sheeting a minimum of 75 mm wide. The top edge of the upper band shall be a maximum of 50 mm from the top of the marker. The space between shall not exceed 150 mm.

Reflective sheeting shall conform to §730-05 *Reflective Sheeting* ASTM Type I or ASTM Type III. The sheeting shall be bonded to the post with a precoated, pressure-sensitive adhesive or a tack-free, heat-activated adhesive. Mechanical fasteners to bond reflective sheeting to the post will not be allowed.

For free-standing tubular markers, the base and/or any nonflexible portion of the marker shall not be more than 50 mm in height.

For tubular markers fastened to pavement, the bonding system used to shall be a fast-setting chemical compound, mastic-type material, or mechanical fastener capable of fixing the tubular marker to either concrete or asphalt pavement. The bonding system shall not present a hazard to traffic if the tubular marker or base unit becomes unfixed from the pavement.

BASIS OF ACCEPTANCE. Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

729-04 VERTICAL PANELS

SCOPE. This specification covers the material, fabrication, and performance requirements for vertical panels. Vertical panels are defined by NCHRP 350 as a Category II device.

MATERIAL REQUIREMENTS. Vertical panels shall conform to the requirements of the MUTCD, shall be NCHRP 350 approved and shall be constructed of plastic, aluminum, or other lightweight materials. Vertical panels shall be supported by a base capable of maintaining the panel in an upright position and in the proper position and orientation.

Vertical panels shall have 100 to 150 mm wide diagonal stripes of alternating orange and white reflective sheeting, sloping downward at an angle of 45° toward the side on which traffic is to pass. Vertical panels which are 915 mm and larger shall have 150 mm wide diagonal stripes.

Standard vertical panels shall be a minimum of 600 mm in height and a minimum of 200 mm in width. The top of the panel shall mounted a maximum of 920 mm high. Support posts for standard vertical panels shall not be located on the traffic face of the panel.

Oversized vertical panels shall be a minimum of 900 mm in height and have a minimum reflective area of 0.18 m².

Reflective sheeting shall conform to §730-05 *Reflective Sheeting* ASTM Type I or ASTM Type III.

BASIS OF ACCEPTANCE. Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

TEMPORARY TRAFFIC CONTROL DEVICES

729-05 STOP/SLOW PADDLES

SCOPE. This specification covers the material requirements for stop/slow paddles.

MATERIAL REQUIREMENTS. Stop/slow paddles shall conform to the requirements of the MUTCD and shall be constructed of plastic, aluminum, or other lightweight materials. Stop/slow paddles shall be a minimum of 600 mm wide and shall be mounted on a support staff with a minimum height of 1.8 m to the bottom of the panel. Reflective sheeting shall conform to §730-05 *Reflective Sheeting* ASTM Type IX.

BASIS OF ACCEPTANCE. Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

729-06 TYPE I CONSTRUCTION BARRICADES

SCOPE. This specification covers the material, fabrication, and performance requirements for Type I construction barricades. Type I construction barricades are defined by NCHRP 350 as a Category II device.

MATERIAL REQUIREMENTS. Type I construction barricades shall conform to the requirements of the MUTCD and shall be NCHRP 350 approved. Type I construction barricades shall be constructed of an A-frame with a single rail panel 200 mm to 300 mm wide and a minimum of 600 mm long. Rails on barricades used on expressways and other high-speed roadways shall have an area of at least 0.175 m². The top of the upper panel shall be mounted at a minimum height of 915 mm. Barricade frames shall be designed to maintain the proper orientation and location of the device during windy conditions. Nonrigid ballast may be placed on the frame, close to the ground, to hold the barricade in position, and shall not obscure the view of the rail panels to approaching traffic.

Barricade rail panels shall have 100 mm wide reflective, alternating orange and white diagonal stripes sloping at an angle of 45°. Reflective sheeting shall conform to §730-05 *Reflective Sheeting* ASTM Type I or ASTM Type III.

BASIS OF ACCEPTANCE. Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

729-07 TYPE II CONSTRUCTION BARRICADES

SCOPE. This specification covers the material, fabrication, and performance requirements for Type II construction barricades. Type II construction barricades are defined by NCHRP 350 as a Category II device.

MATERIAL REQUIREMENTS. Type II construction barricades shall conform to the requirements of the MUTCD and shall be NCHRP 350 approved. Type II construction barricades shall be constructed of a frame with two rail panels 200 mm to 300 mm wide and a minimum of 600 mm long. Rails on barricades used on expressways and other high-speed roadways shall have an area of at least 0.175 m². The top of the upper panel shall be mounted at a minimum height of 915 mm. Barricade frames shall be designed to maintain the proper orientation and location of the device during windy conditions. Nonrigid ballast may be placed on the frame, close to the ground, to hold the barricade in position, and shall not obscure the view of the rail panels to approaching traffic.

Barricade rail panels shall have 100 to 150 mm wide reflective, alternating orange and white diagonal stripes sloping at an angle of 45°. Barricade rail panels 915 mm and longer shall have 150 mm wide stripes. Reflective sheeting shall conform to §730-05 *Reflective Sheeting* ASTM Type I or ASTM Type III.

BASIS OF ACCEPTANCE. Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

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729-08 TYPE III CONSTRUCTION BARRICADES

SCOPE. This specification covers the material, fabrication, and performance requirements for Type III construction barricades. Type III construction barricades are defined by NCHRP 350 as a Category II device.

MATERIAL REQUIREMENTS. Type III construction barricades shall conform to the requirements of the MUTCD and shall be NCHRP 350 approved. Type III construction barricades shall be constructed of a frame with three rail panels 200 mm to 300 mm wide and a minimum of 1220 mm long. The top of the upper panel shall be mounted at a minimum height of 1525 mm. Barricade frames shall be designed to maintain the proper orientation and location of the device during windy conditions. Nonrigid ballast may be placed on the frame, close to the ground, to hold the barricade in position, and shall not obscure the view of the rail panels to approaching traffic.

Barricade rail panels shall have 150 mm wide reflective alternating orange and white diagonal stripes sloping at an angle of 45°. Reflective sheeting shall conform to §730-05 *Reflective Sheeting* ASTM Type I or ASTM Type III.

Warning lights, when used, shall be securely mounted directly to the barricade frame, above the top rail, using a bolt, nut, and washer of sufficient strength to ensure that the light does not detach if impacted by a vehicle, and no part of the light or wiring shall cover the face of the rail. Batteries shall be placed at ground level, except that integral batteries weighing a maximum of 3.2 kg may be mounted on the barricade frame. Warning lights shall not be attached to the barricade rail.

BASIS OF ACCEPTANCE. Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

729-09 TEMPORARY SIGN SUPPORTS

SCOPE. This specification covers the material, fabrication, and performance requirements for temporary sign supports. Temporary sign supports are defined by NCHRP 350 as a Category II device.

MATERIAL REQUIREMENTS. Temporary sign supports shall conform to the requirements of the MUTCD and shall be constructed in accordance with the Standard Sheets or shall be commercially manufactured, temporary sign supports that are NCHRP 350 approved.

BASIS OF ACCEPTANCE. Upon request, the Contractor shall provide a material certification that the product conforms to this specification.

729-10 TEMPORARY IMPACT ATTENUATORS - REDIRECTIVE

SCOPE. This specification covers the material and performance requirements for temporary impact attenuators. Temporary impact attenuators are defined by NCHRP 350 as a Category III device.

MATERIALS REQUIREMENTS. Temporary impact attenuators shall be NCHRP 350 approved as a redirective, non-gating device. Temporary impact attenuators that use liquid or other materials as a filler or to provide ballast will be evaluated for potential environmental impacts and/or seasonal limitations. Temporary impact attenuators meeting the requirements of NCHRP 350 Test Level 2 are acceptable only as Test Level 2 devices. A Temporary impact attenuator accepted as a Test Level 3 device is also acceptable as Test Level 2 device. Temporary impact attenuators will be approved for use in shielding an object of a maximum width as specified in the Approved List, and specific configurations may be approved for maximum speeds. Approach ends of Temporary impact attenuators shall have impact attenuator markings in accordance with the MUTCD.

TEMPORARY TRAFFIC CONTROL DEVICES

Concrete Grouting Material	701-05
Anchoring Materials - Chemically Curing	701-07

If a temporary foundation slab is required, concrete shall be Class A concrete conforming to Section 501 *Portland Cement Concrete - General*; reinforcing steel shall conform to §709-01 *Bar Reinforcement, Grade 420*.

BASIS OF APPROVAL. Manufacturers or material suppliers desiring to have Test Level 2 or Test Level 3 temporary impact attenuators approved shall prepare and submit copies of drawings, specifications, test reports, and Federal acceptance letters to the Director of the Materials Bureau. The review process requires a minimum of 30 calendar days. Upon approval, the name of the manufacturer and the product will be placed on the Approved List.

BASIS OF ACCEPTANCE. Test Level 2 or Test Level 3 temporary impact attenuators will be accepted on the basis of the product appearing on the Approved List and a material certification that the product is the same as the one appearing on the Approved List and that it conforms to this specification.

729-11 TEMPORARY IMPACT ATTENUATORS - GATING

SCOPE. This specification covers the material and performance requirements for temporary impact attenuators. Temporary impact attenuators are defined by NCHRP 350 as a Category III device.

MATERIALS REQUIREMENTS. Temporary impact attenuators shall be NCHRP 350 approved as a gating device. Temporary impact attenuators that use liquid or other materials as a filler or to provide ballast will be evaluated for potential environmental impacts and/or seasonal limitations. Temporary impact attenuators meeting the requirements of NCHRP 350 Test Level 2 are acceptable only as Test Level 2 devices. A Temporary impact attenuator accepted as a Test Level 3 device is also acceptable as Test Level 2 device. Temporary impact attenuators will be approved for use in shielding an object of a maximum width as specified in the Approved List, and specific configurations may be approved for maximum speeds. Approach ends of Temporary impact attenuators shall have impact attenuator markings in accordance with the MUTCD.

Concrete Grouting Material	701-05
Anchoring Materials - Chemically Curing	701-07

If a temporary foundation slab is required, concrete shall be Class A concrete conforming to Section 501 *Portland Cement Concrete - General*; reinforcing steel shall conform to §709-01 *Bar Reinforcement, Grade 420*.

BASIS OF APPROVAL. Manufacturers or material suppliers desiring to have Test Level 2 or Test Level 3 temporary impact attenuators approved shall prepare and submit copies of drawings, specifications, test reports, and Federal acceptance letters to the Director of the Materials Bureau. The review process requires a minimum of 30 calendar days. Upon approval, the name of the manufacturer and the product will be placed on the Approved List.

BASIS OF ACCEPTANCE. Test Level 2 or Test Level 3 temporary impact attenuators will be accepted on the basis of the product appearing on the Approved List and a material certification that the product is the same as the one appearing on the Approved List and that it conforms to this specification.

TEMPORARY TRAFFIC CONTROL DEVICES

729-12 TRUCK-MOUNTED IMPACT ATTENUATORS

SCOPE. This specification covers the material and performance requirements for Truck-Mounted Impact Attenuators (TMAs) mounted on the rear of work vehicles. Impact attenuators are defined by NCHRP 350 as a Category III device.

MATERIALS REQUIREMENTS. Truck-Mounted Impact Attenuators shall be NCHRP 350 approved. TMAs meeting the requirements of NCHRP 350 Test Level 2 are acceptable only as Test Level 2 devices. A TMA accepted as a Test Level 3 device is also acceptable as a Test Level 2 device. Approach ends of TMAs shall have impact attenuator markings in accordance with the MUTCD.

BASIS OF APPROVAL. Manufacturers or material suppliers desiring to have products considered for inclusion on the Approved List shall prepare and submit copies of drawings, specifications, test reports, and Federal Acceptance Letters to the Director of the Materials Bureau. The review process requires a minimum of 30 calendar days. Upon approval, the name of the manufacturer and the product will be placed on the Approved List.

BASIS OF ACCEPTANCE. Test Level 2 or Test Level 3 TMAs will be accepted on the basis of the product appearing on the Approved List and a material certification that the product is the same as the one appearing on the Approved List and that it conforms to this specification.

729-13 TEMPORARY SAND BARRELS

SCOPE. This specification covers the material and performance requirements for sand barrels. Sand barrels are defined by NCHRP 350 as a Category III device.

MATERIAL REQUIREMENTS. Sand barrels of each size module shall be NCHRP 350 approved. Sand barrels shall be yellow, durable, waterproof, ultraviolet-stable plastic. The first barrel in the array shall have impact attenuator markings in accordance with the MUTCD.

Sand barrels shall resist deformation from dynamic loadings due to vibration in the placement area and long-term stresses induced by thermal expansion/contraction and fill settlement. Sand barrels shall be free draining with respect to residual moisture in the fill sand. Lids shall divert precipitation and prevent moisture from entering the module. Lids shall be fastened or otherwise secured to provide a closed, reasonably vandal-resistant barrel.

The fill sand shall conform to the requirements of either §703-06 *Cushion Sand* or §703-07 *Concrete Sand*. Sodium chloride, as dry rock salt, equal to 3-5 percent by weight of the sand, shall be thoroughly mixed into the sand. Sodium chloride shall meet the requirements of §712-03 *Sodium Chloride*.

BASIS OF APPROVAL. Manufacturers or material suppliers desiring to have products considered for inclusion on the Approved List shall prepare and submit copies of drawings, specifications, test reports, and Federal Acceptance Letters to the Director of the Materials Bureau. The review process requires a minimum of 30 calendar days. Upon approval, the name of the manufacturer and the product will be placed on the Approved List.

BASIS OF ACCEPTANCE. Sand barrels will be accepted on the basis of the product appearing on the Approved List and a material certification that the product is the same as the one appearing on the Approved List and that it conforms to this specification.

TEMPORARY TRAFFIC CONTROL DEVICES

729-14 VEHICLE-ARRESTING SYSTEMS

SCOPE. This specification covers the material and performance requirements for vehicle-arresting systems. Vehicle-arresting systems are defined by NCHRP 350 as a Category III device.

MATERIAL REQUIREMENTS. Vehicle-arresting systems shall be NCHRP 350 approved.

BASIS OF APPROVAL. Manufacturers or material suppliers desiring to have products considered for inclusion on the Approved List shall prepare and submit copies of drawings, specifications, test reports, and Federal Acceptance Letters to the Director of the Materials Bureau. The review process requires a minimum of 30 calendar days.

BASIS OF ACCEPTANCE. Vehicle-arresting systems will be accepted on the basis of the product appearing on the Approved List and a material certification that the product is the same as the one appearing on the Approved List and that it conforms to this specification.

729-15 ARROW PANELS

SCOPE. This specification covers the material and performance requirements for arrow panels. Arrow panels are defined by NCHRP 350 as a Category IV device.

MATERIAL REQUIREMENTS. Arrow panels shall be trailer mounted or truck mounted. The lamps shall flash at a rate of not less than 25 nor more than 40 flashes per minute with the lamp illuminated for at least 50 percent of the cycle. The lamps shall be recess mounted or alternatively equipped with an hood over the top half of the lamp that projects a minimum of 50 mm at top center.

The flashing arrow shall be sufficiently bright and with adequate lateral and vertical beam spread to attract the attention of approaching motorists and be clearly legible continuously from any point within the roadway (inclusive of shoulders) from the beginning of the lane closure taper to a distance 500 m in advance of the closure taper. Any arrow panel which cannot provide a sufficiently bright and clearly legible arrow display at any point within the roadway within the above distance shall be rejected.

Diesel-powered arrow panels shall be powered by self-contained, engine-driven generator systems capable of energizing the arrow displays for 72 hours, unattended and shall be capable of being powered by 110V AC supply.

Solar-powered arrow panels shall be capable of energizing the arrow displays continuously for 21 days, unattended.

The lamps shall be equipped with an automatic, solar-cell-controlled dimming switch. Activation will be at a level of approximately 5 candelas. The solar cell shall be located and equipped with a delay to prevent undesirable actuation from vehicle lights. The dimming voltage to the lamps shall be manually controllable over an effective range of 5 - 12 volts.

Arrow panels shall have flashing yellow lights arranged on a panel to operate in four different modes. The arrow display shall cover the entire area of the panel and be composed of lamp units with 5 lamps in the arrowhead and 5 lamps in the shaft. Lamps shall be arranged and controlled to provide the following mode selections: Left Arrow, Right Arrow, Left and Right Arrow, and Caution. In the 3 directional modes, the lamps in the shaft next to the arrow point shall not illuminate. The caution mode shall consist of either 2 pairs of alternately flashing lamps arranged in a pattern that does not indicate direction, or 4 lamps simultaneously flashing in each of the four corners of the board. The rear face of the arrow panel shall contain 1 or more clear lamps to indicate that the arrow board is operating properly.

Trailer-Mounted. Arrow panels shall be transportable, self-contained units consisting of a 2400 mm x 1200 mm rectangular solid finished in nonreflective black, and shall be mounted so that the bottom of the panel is a minimum of 2.1 m above the roadway. Arrow panel operation controls shall be mounted in a lockable enclosure.

TEMPORARY TRAFFIC CONTROL DEVICES

The arrow display shall be visible at a minimum distance of 1600 m and legible at a minimum distance of 800 m on a bright, sunny day or a clear night when the sight line is unobstructed.

Truck-Mounted Series B. Arrow panels shall be transportable, self-contained units consisting of a 1500 mm x 750 mm rectangular solid finished in nonreflective black, and shall be mounted so that the bottom of the panel is a minimum of 1.5 m above the roadway.

The arrow display shall be visible at a minimum distance of 1200 m and legible at a minimum distance of 600 m on a bright, sunny day or a clear night when the sight line is unobstructed.

Truck-Mounted Series C. Arrow panels shall be transportable, self-contained units consisting of a 2400 mm x 1200 mm rectangular solid finished in nonreflective black, and shall be mounted so that the bottom of the panel is a minimum of 1.5 m above the roadway.

The arrow display shall be visible at a minimum distance of 1600 m and legible at a minimum distance of 800 m on a bright, sunny day or a clear night when the sight line is unobstructed.

BASIS OF APPROVAL. Manufacturers or material suppliers desiring to have products considered for inclusion on the Approved List shall prepare and submit copies of drawings, specifications, test reports, and Federal Acceptance Letters to the Director of the Materials Bureau. The review process requires a minimum of 30 calendar days.

BASIS OF ACCEPTANCE. Arrow panels will be accepted on the basis of the product appearing on the Approved List and a material certification that the product is the same as the one appearing on the Approved List and that it conforms to this specification.

729-16 PORTABLE VARIABLE-MESSAGE SIGNS (PVMS)

SCOPE. This specification covers the material and performance requirements for variable-message signs. Variable-message signs are defined by NCHRP 350 as a Category IV device.

MATERIAL REQUIREMENTS. Solar-powered, portable variable-message signs (PVMS) shall meet the requirements of the MUTCD. The PVMS shall be trailer mounted and equipped for use on public highways in accordance with NYS Vehicle and Traffic Law. The trailer shall have four (4) leveling jacks capable of leveling the trailer on grades up to 1 on 6 and capable of stabilizing the trailer in winds up to 130 km/h.

The unit shall operate primarily from a solar-powered electrical system and shall be capable of energizing the message display for a minimum of 21 days without auxiliary charge. The electrical system shall consist of batteries and a solar array panel and on-board auxiliary charging system to enable the batteries to be recharged via a 110V AC connection.

The PVMS shall have a three line display with a minimum of eight, 450 mm high characters per line, shall be capable of displaying three (3) separate messages in a cyclical sequence. Messages shall be clearly legible from a distance of 275 meters and illumination intensity shall automatically adjust for all daytime and nighttime ambient conditions.

The PVMS shall be equipped with a sign control console, mounted in a lockable, weather-resistant compartment. The sign controller shall have programmable memory capable of storing messages pertinent to planned construction activities, including emergency messages. The controller shall be equipped with 14 day calendar programming capability, providing the ability to start and stop the display of a minimum of three (3) different messages on a repeating schedule without an operator present. The controller shall be capable of producing an accurate log of all messages and times messages were displayed. The controller shall have programmable messages, display rate, and display interval settings. The controller shall blank the sign if the output voltage drops below the manufacturer's recommended output level.