

992 POLE CABLE DISTRIBUTION SYSTEM.
(REV 2-3-05) (FA 2-9-05) (1-06)

ARTICLE 992-12 (Pages 940-944) is deleted and the following substituted:

992-12 Pole Cable Distribution System.

992-12.1 Conductor Splices: Unless otherwise authorized by the Engineer, splices shall be made with split bolt connectors. The connector shall be sealed in silicone gel that easily peels away leaving a clean connection. The gel will be contained in a closure that when snapped around the split bolt will provide a waterproof connection without the use of tools or taping. This closure will be UV resistant, impact resistant and abrasion resistant.

992-12.2 General (Roadway Lighting): These requirements are applicable for all systems rated up to and including 600 V.

The installed system shall be in compliance with the Design Standards, Index No. 17500, or as an alternate, shall meet the following requirements:

A modular color coded cable system consisting of rubber cords with integrally molded watertight submergible connectors, inline fuses, submergible surge arrestor and breakaway connectors shall be installed. The cables shall extend from a underground junction box near the base of the pole to the luminaires at the top of the pole. A cable system shall be required at each pole.

The cable system shall consist of the following described components:

Distribution Block: The red molded body shall contain a three wire female outlet integrally molded to a 24 inch [600 mm] length of 12/3 SOWA cable with an end molded to the body and the other end shall be spliced in the field to the distribution cable that feeds through the underground junction box near the base of the pole. The block shall be watertight and submergible when the integrally fused plug on the power cable is engaged and fully seated. Dimensions shall be approximately 2 by 3 by 3 inches [50 by 75 by 75 mm]. The size is important because of limited space.

Surge Arrestor Cable: Provide a 12 inch [300 mm] length of 10/2 SOWA cable with a red male plug to match the red female connector cable extending from the fused plug on the power cable. The other end of the surge arrestor cable shall be integrally molded to a MOV submergible surge arrestor. The red male plug shall make a submergible connection when mated to the red female connector on the power cable.

Power Cable: This cable feeds the Luminaire Cable and the Surge Arrestor Cable from the load side of its integrally fused red male plug end. The red fused plug shall contain FNQ 10 amp 600 volt fuses (13/32 by 1 1/2 inch) [(10 by 40 mm)] or equal. A solid copper slug shall be installed on neutral side for line to neutral service. Both lines shall be fused for line to line service. The section that feeds the Luminaire Cable shall be a 10 foot [3 m] section of 14/3 SOWA cable with an orange female connector molded to the end extending up into the base of the pole. This female connector shall pass easily through a standard size 35 PVC elbow and make a submergible connection when mated with the orange male plug on the Luminaire Cable. The section that feeds the Surge Arrestor Cable shall be 12 inches [300 mm] in length of 10/2 SOWA cable with a red female connector on the end. The red female connector

shall make a submergible connection when mated to the red male plug on the Surge Arrestor Cable.

Luminaire Cable: This cable is a variable length of 14/3 SOWA cable with an orange male molded plug molded to match the orange female end of the Power Cable. The connector shall require 25 pounds [100 N] of force to mate or disengage from the female end. When engaged, the connection shall be watertight and submergible. The cable strain relief shall extend approximately 2 inches [50 mm] from the connector. The length of the cable shall be the length of the pole and support arm plus 5 feet [1.5 m].

The Distribution Block and each connector shall be made of thermosetting synthetic polymer which is non-flame supporting and which remains flexible over a temperature range of -40 to 190°F [-40 to 85°C]. Hardness of the molded rubber shall be 65 durometer.

992-12.2.1 Testing and Performance Criteria: The system shall pass the following performance criteria in accordance with NEC 110.2:

Dielectric Test - No breakdown shall occur with a test potential of 1,960 volts applied between the primary conductors (tied together) and the protective ground for a period of one minute.

Leakage Current Test - Leakage current shall be measured on the mated connectors between the primary conductors and the protective ground conductor. When tested at the rated operating voltage, the leakage current shall not exceed 0.5 mA. The mated connectors shall then be wrapped in aluminum foil and the leakage current measured between the primary conductors and the foil wrap. When tested at the rated operating voltage, the leakage current shall not exceed 0.5 mA.

Flame Retardant Test - Flammability tests shall be conducted on the cable, the molded body of the connectors, and the molded protective caps. These materials shall be subjected to five flame applications on for 15 seconds and off for 15 seconds. The materials shall self-extinguish within one minute upon removal of the flame and not burn through.

Internal Temperature Test - The internal temperature rise of the contact area of the mated connectors shall not exceed a temperature rise of 54°F [12°C] referenced to 73°F [23°C] ambient temperature when operated at the maximum current rating.

External Temperature Test - The external temperature rise of the mated connectors and cable shall not be greater than 54°F [12°C] referenced to 73°F [23°C] ambient temperature when operated at the maximum current rating.

Fault Test - The mated connectors shall be fault tested by applying a test current of 1,000 amperes, 60 HZ, for a minimum of 3 cycles (50 ms). The mated connectors shall then satisfactorily pass the dielectric test.

Drop Test - The connectors shall not break, crack or suffer other damage when subjected to eight consecutive drop tests from 3 feet [1 m] above the concrete floor with the connectors having been rotated 45 degrees between each drop.

Crushing Test - No breakage or deformation shall result when the mated and unmated connectors are subjected to a crushing force of 500 pounds [2.2 kN] for one minute. Following the crush test, the dielectric test shall be satisfactorily passed.

Impact Resistance Test - No breakage or deformation shall result when the connectors are subjected to an impact caused by dropping a cylindrical 10 pound [4.5 kg] weight having a flat face 2 inches [50 mm] in diameter from a height of 18 inches [450 mm].

Flex Test - No detachment or loosening shall result when each connector is subjected to a 5,000 cycle flex test at the cable/bond area back and forth in a plane through an angle of 180 degrees. Following the flex test the dielectric test shall be satisfactorily passed.

No Load Endurance Test - No excessive wear shall result when the male and female connectors and protective cap and female connector were subjected to 2,000 cycles of complete insertion and withdrawal.

Rain Test - The mated and capped connectors shall be subjected to a continuous water spray (simulating worst case outdoor rain down pour) for at least one hour at a rate of at least 18 inches [450 mm] per hour at an operating pressure of 5 psi [34 kPa]. The dielectric and leakage current tests shall be satisfactorily passed. The connectors shall be unmated and caps removed. Inspection shall indicate that water had been successfully prevented from reaching the contact areas of the connectors.

Watertight (Immersion) Tests - The mated and capped connectors shall be immersed in water for one hour in which the highest point of the test samples is at least 3 feet [1 m] below the water level. Immediately following the immersion, a satisfactory dielectric and leakage current tests shall be performed. The connectors shall be unmated and caps removed. Inspection shall indicate that water had been successfully prevented from reaching the contact areas of the connectors.

Exposure to Deteriorating Liquids - The cable and connectors shall be dried at 212°F [100°C] for one hour. The samples shall then be immersed in ASTM Reference Oil No. 1 and ASTM Reference Fuel C liquids for one hour. The samples shall show no evidence of bubbling, cracking or corrosion. Within one hour after being removed from the fluids, the test samples shall satisfactorily pass the flammability test.

992-12.2.2 Qualified Products List: Pole Cable Distribution Systems installed as alternates to the Design Standards, Index No. 17500, shall be one of the products listed on the Qualified Products List. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

992-12.3 General (Highmast Lighting): These requirements are applicable for all systems rated up to and including 600 V.

A modular cable system consisting of rubber covered cables with watertight connectors, and surge arrestor shall be installed. The cables shall extend from an underground junction box near the base of the pole to the luminaires at the top of the pole. A cable system shall be required at each highmast pole.

Power Cable: This cable shall be a 15 foot [4.6 m] section of 10/3 SOWA cable that is wired to the line side of the Circuit Breaker in the pole and the other end shall be spliced to the distribution cable that feeds through the underground junction box near the base of the pole.

Circuit Breaker Cable: This cable is a 8 foot [2.4 m] length of 10/3 SOWA cable with no connector at the end that is fed from the load side of the circuit breaker and a female connector on the other end. This female connector shall mate with the male plug on the pole cable, the male flanged receptacle on the ring junction box, and also the male plug on the lowering hoist.

Pole Cable: The length of this cable is the mounting height of the pole plus 6 feet [1.8 m]. The cable shall be 10/3 SOWA with a male plug on one end that mates with the connector on the circuit breaker cable. The other end fits under the lugs in junction box mounted on the fixture ring at the top of the pole.

Junction Box Cable: This cable is a 3 foot [1 m] length of 10/3 SOWA cable with a female connector on one end that fits the male flanged receptacle on the ring mounted junction box. The other end shall fit under the same lugs as the pole cable.

Junction Box Male Flanged Receptacle: This male flanged receptacle shall mate with the junction box cable. The back of the flanged receptacle shall be wired to the fixture bus in the junction box.

The plugs, connectors and receptacles in the highmast system shall meet the requirements of NEMA 6 or IP 67.

Surge Arrestor: The surge arrestor shall be installed in the circuit breaker panel.

992-12.4 General (Wall Mounted Lighting): These requirements are applicable for all bridge mounted and barrier wall mounted systems rated up to and including 600V.

A cable system consisting of rubber covered cables, in-line fuses and a surge arrestor shall be installed. The cables shall extend from a junction box in the wall to the luminaire at the top of the pole.

A 14/3 SOWA cable shall be spliced to the distribution cable in the junction box and feed in-line fuses and a surge arrestor located in the junction box. The fuses shall be FNQ 10 amp 600 volt fuses. A solid copper slug shall be installed on the neutral side for line to neutral service. Both lines shall be fused for line to line service. The surge arrestor shall be connected on the load side of the fuses. The cable shall continue to the luminaire at the top of the pole.