

9920205 HIGHWAY LIGHTING MATERIAL
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Comments: (12-2-21, Industry)

HIGHWAY LIGHTING MATERIALS
(REV 10-13-21)

SUBARTICLE 992-2.5 is deleted and the following substituted:

992-2.5 Luminaire Cable: Pole and bracket cable shall be multi-conductor Type XHHW-2 XLP TC with three No. 10 AWG, where the ground wire has green-colored insulation.

1. This Type of cable is one of many acceptable types and the specification should at best state the cable type may be or equivalent performing type. This type first showed up simply because it was the type being used by the PCDS seeking to replace the previous FDOT Standard. This type of cable was never specifically sought by FDOT or tested by FDOT for any particular and unique requirement. It just showed up by default as being the type of choice of the contractor submitting the current PCDS kit now shown in the 715-001 Index.

Response: This comment does not refer to the proposed revisions and is outside the scope of changes for the July 2022 publication (revisions shown in red). This comment will be logged and considered for the following publication. Please note that, to allow time for the internal vetting process and FHWA approval, the deadline for miscellaneous new proposals for this cycle was November 15th. Thank you.

2. Again... #10 AWG cable size was what was needed by the KIT that someone submitted to replace the old standard which is now the Alternate. If you do the math or use any online wire size to voltage calculator, it is unquestionably clear that #10 is greatly overkill and the original #14 AWG used in what is now the Alternate PCDS, is more that sufficient considering the load of the respective light fixtures whether HID or LED. I challenge the review team to consider the actual light fixture loads being used across the state where PCDS is being used... and then provide the proof showing or explaining why #10AWG is required. It cannot be done. #14awg more than sufficient (at least in the Alternate version)based upon the actual fixture loading and thus should be allowed.

Response: Please see comment 1 response.

SUBARTICLE 992-2.6 is deleted and the following substituted:

992-2.6 In Line Fuse Holders: In line fuse holders shall provide a breakaway connection and be UL recognized per Guide IZLT2 and rated for 600V. The wire connections in the fuse holders shall be ~~of the~~ copper or equivalent type setscrew ~~type~~. Fused connections shall utilize an ATQ or FNQ 10 amp time delay fuse rated for 500V. Fuses shall be UL listed to Standard 248-14. The rating for the fuse holders shall be water resistant or submersible rated.

3. Water resistant and submersible are two greatly different performance characteristics. A specification stating that fuse holders shall be one OR the other, In a Low Bid World, will always be the lesser. The way this is written, FDOT will have no choice but to accept something that is simply water resistant. Your rain coat may be water resistant and keep you from getting wet in the rain... but if you jump in the lake wearing that water resistant rain coat... your going to find yourself completely saturated. So... it is not helpful to list the requirement as water resistant or submersible. They are two different things. It is similar to saying a pole should be wood or steel. You will always get the cheaper wood version. FDOT not only needs to determine if these fuse holders (and frankly every component in a PCDS) merely has to be water resistant or actually submersible. Then, the next step... is to identify what is actually meant by such. In the world of submersible products and testing, a product can be considered submersible if it continues to function under only a 3 inch level of water for 30 minutes. BUT... that is not the real world for any of the components of a PCDS in Florida. Some or all of the PCDS components may sit under as much as 3 or more feet for hours (or longer). Which is why the "Alternate" which at one time was the standard statewide... demanded all plug connections be rated per IP 68 level of submersibility at a defined 6ft for at least 24 hours. Whatever PCDS FDOT decides to install across Florida roadways should be clearly more than water resistant... but rather Submersible... and Submersible to a defined depth and length of time associated with real life on the Florida roadways to ensure the safety of all.

Response: Please see comment 1 response.

992-2.8 Pole Cable Distribution System:

992-2.8.1 General: These requirements are applicable for all systems rated up to and including 600V. The installed system shall be in compliance with Standard Plans, Index 715-001.

Systems installed as alternates to the Standard Plans shall be one of the products listed on the APL. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. **Alternate Systems shall meet the following requirements:**

A modular color coded cable system consisting of rubber cords with integrally molded **watertight submersible** connectors, inline fuses, submersible surge arrester and breakaway connectors shall be installed. The cables shall extend from an underground pull 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:

1. Distribution Block: The red molded body shall contain a three wire female outlet integrally molded to a 24 inch length of 10/3 SOOW 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 pull box near the base of the pole. The block shall be **watertight and submersible** when the integrally fused plug on the power cable is engaged and fully seated. Dimensions shall be approximately 2 inches by 3 inches by 3 inches. The size is important because of limited space.

2. Surge Arrester Cable: Provide a 12 inch length of 10/2 SOOW 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 arrester cable shall be integrally molded to a MOV waterproof surge arrester. **The red male plug shall make a submersible connection** when mated to the red female connector on the power cable. A separate 12 inch length of

4. It is grossly inconsistent to demand that any such "Alternate System" to what is on the Standard Plans, Index 715-001 have performance requirements that EXCEED that of what is acceptable under the 715-001 Index. The way this is written, this is exactly what FDOT is requiring. FDOT currently is listing as the "standard in 715-001 a miscellaneous group of parts and pieces from various manufacturers which not only do not deliver the performance levels required in the Alternate language... but have to be obtained separately from the respective part manufacturers and then properly assembled either in the field or by a company that is not a true cable distribution system manufacturer. If you understand the history of Pole Cable Distribution Systems in Florida you will recall that this rather detailed "Alternate System" was actually the standard and anything provided as an alternate must meet or exceed all of the details and performance outlined in what you now find in 992-2.8.1 (1-4). If the various performance requirements throughout the language for the Alternate (like: watertight and submersible, disconnect forces, non-flame supporting, flexible over certain temperature ranges) are important... the same should be required of the parts and pieces eventually assembled into the "KIT" that represents the current 715-001 Index. OR... for an acceptable Alternate... you at least remove any requirement that is not also a requirement of the PCDS shown on the 715-001 Index.

Response: Please see comment 1 response.

5. If your going to require the Alternate system to have waterTIGHT and submersible components, then the same MUST be required of the current items being used and assembled in

the current Index 715-001. AND.... there must be a clear statement as to what level of submersibility in term of depth below the water and length of time in the water.

Response: Please see comment 1 response.

6. Again... this shows up the the Alternate language because it was proper and the Alternate was the statewide minimum standard. NOW... the alternate is being required to have watertight and submersible components in the area that is BELOW grade within the in-ground junction box while the components in the 715-001 Standard Index do NOT have to meet the same requirement. AND... if you have ever opened a junction box across Florida, you will quickly learn that the internal PLUGS or FuseHolders MUST be more than water resistant... they must be submersible and to a depth of at least 4 or even 6 feet for at least 24 hours. This should be a requirement of ALL PCDS plugs and fuseholders whether it be the items shown on the 715=001 index or an Alternate system.

Response: Please see comment 1 response.

7. Again... submersible connection to the surge arrestor is being required in the Alternate PCDS but NOT in the version found in the current Standard Index 715-001

Response: Please see comment 1 response.

No. 10 THWN green ground wire shall be provided from the surge arrestor to attach to the ground system in the pull box.

3. 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 10A 500V fuses (13/32 inch by 1-1/2 inch) or equal. A solid copper slug-The fuse holder manufacturer's suggested slug (blank or dummy fuse) shall must be installed on the 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 section of 10/3 SOOW 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 1-1/4 inch PVC elbow and make a submersible connection when mated with the orange male plug on the luminaire cable. The section that feeds the surge arrestor cable shall be 12 inches in length of 10/2 SOOW cable with a red female connector on the end. The red female connector shall make a submersible connection when mated to the red male plug on the surge arrestor cable.

4. Luminaire Cable: This cable is Type XHHW-2 XLP-TC with three No. 10 AWG an orange male molded plug molded to match the orange female end of the power cable. The connector shall require 25 pounds of force to mate or disengage from the female end. When engaged the connection shall be watertight and submersible. The cable strain relief shall extend approximately 2 inches from the connector.

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 minus40°F to plus 190°F. Hardness of the molded rubber shall be 65 durometer.

8. The luminaire cable in the Alternate system which is installed by the 1,000s across Florida and exponentially more systems across the country is not nor has EVER been XHHW-2-XLP-TC

cable. FIRST, an understanding of the Alternate PCDS or spending a day at the actual manufacturing facility right here in Florida makes it clear that the various male-female plug sets are extreme duty molded rubber that is actually MOLDED to the respective cable. AND... you cannot MOLD rubber connectors to this XHHW type cable. Again, the type of cable is not as important as the actual performance features of the cable. A quick study will reveal that the luminaire cable which has been utilized in every PCDS since the 1990's across the U.S. has been SOOW cable... which is more than adequate for the application. The insertion of this XHHW type cable was an effort of the provider of the competing PCDS to unjustifiably make a requirement across all FDOT PCDS knowing that the long time proven PCDS, because of it's superior design molding cable to actual male-female plugs... would not be able to comply. Either this very specific type of cable should be REMOVED as a requirement anywhere in the FDOT specs (Alternate or Standard Index) or at least changed to call for XHHW or SOOW cable.

Response: Please see comment 1 response.

9. Again... #10 AWG cable size was what was needed by the KIT that someone submitted to replace the old standard which is now the Alternate. If you do the math or use any online wire size to voltage calculator, it is unquestionably clear that #10 is greatly overkill and the original #14 AWG used in what is now the Alternate PCDS, is more that sufficient considering the load of the respective light fixtures whether HID or LED. I challenge the review team to consider the actual light fixture loads being used across the state where PCDS is being used... and then provide the proof showing or explaining why #10AWG is required. It cannot be done. #14awg more than sufficient (at least in the Alternate version)based upon the actual fixture loading and thus should be allowed. At best, the spec for the Luminaire cable should read at least #14AWG or larger to satisfy all parties. But, there is no engineering reason to require #10awg for the luminaire cable of a PCDS based upon all of the past, current or future light fixtures used across Florida on a PCDS.

Response: Please see comment 1 response.

10. Again, if the connection point of the luminaire cable must be watertight and submersible in the Alternate... ALL of those fuseholder connection points found across the PCDS shown on the Index 715-001 must also be watertight and submersible... and submersible should be clearly stated as in up to 6ft of water over at least a 24 hour continuous period if you want to have optimum safety in these electrical systems on Florida's roadways.

Response: Please see comment 1 response.

11. If the material used in the distribution block and male-female plugs of the Alternate is required to be non-flame supporting and performing over a designated temp range... SO should the material used in the components of the current system shown and allowed by Index 715-001. And more detail should be provided explaining the expectation of non-flame supporting.

Response: Please see comment 1 response.
