Test Procedure:

802.3at DC current Operating Limits

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OBJECTIVES

- Developments in the standardization and application of DC powering over structured cabling has stimulated the need to further investigate the DC characteristics.

- The objective of this test procedure is to determine the continuous DC current operating limits for 802.3at.

Testing

Cable

•The cable test evaluates the insertion loss, DC resistance, and temperature increases due to the application of a continuous DC current.

Connectors

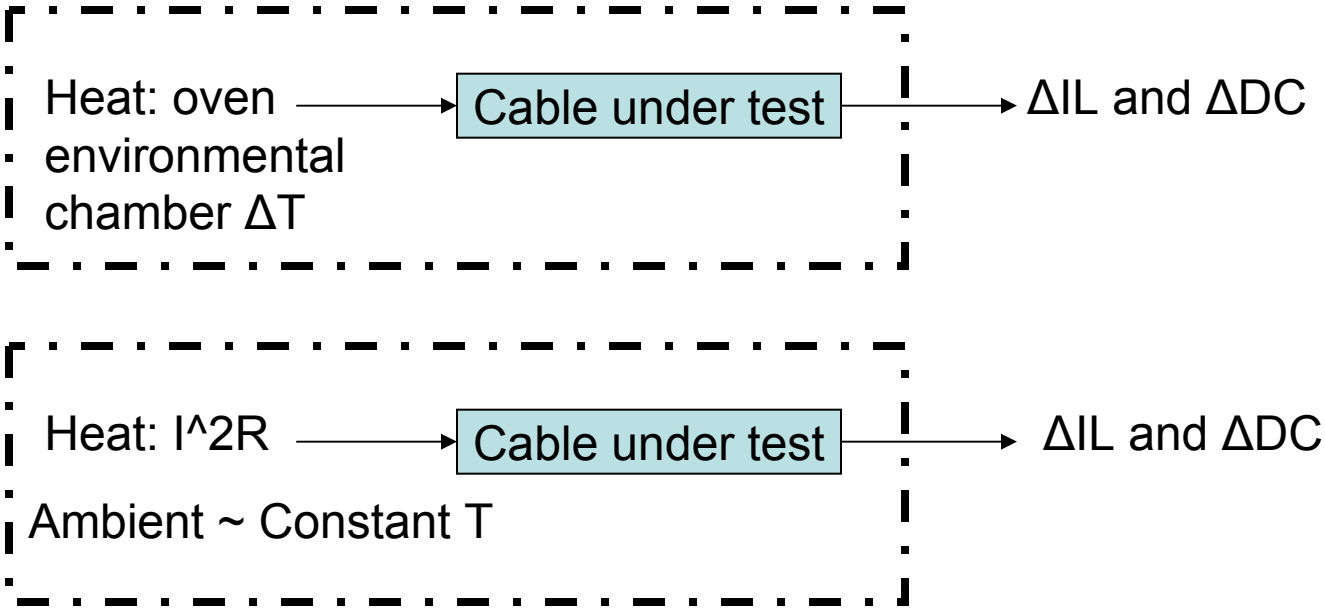
•The connector test evaluates the increase in low level contact resistance (LLCR) due to the mating and unmating cycles under specified current and load conditions.

Cable test configurations

- The cable test configurations are designed to enable “worse case” analysis.
- Configurations are representative of structured cabling environments and installation practices.

Bundled Cable Test Objectives

- **Measure and compare the changes of attenuation and DC resistances due to increases in external temperature to the changes in attenuation and DC resistances due to the application of a continuous DC current within a controlled environment where the ambient temperature is held constant.**



Bundled Cable Test

Step 1.

Measure the changes of attenuation and DC resistances due to increases in external temperature of the reference cable in an air-circulating oven or an environmental chamber and determine the temperature coefficient of attenuation increase per ANNEX A test procedure.

Step 1A:

Measure and record the changes in DC resistances and attenuation of the reference cable in an air conditioned room due to the application of a continuous DC current of 175 ma, 350 ma, 420 ma, and 500 ma utilizing the DC powering circuit illustrated in figure 1.

Bundled Cable Test - 6-around-1

Step 3:

−Organize cables in a 6-around-1 configuration where the reference cable is the central cable and adjacent to all of the other cables.

−Power the reference cable. Repeat Step 1A.

−Power the remaining 6 cables in the bundle. Repeat Step 1A

Step 3
6-around-1

Bundled Cable Test - 18-around-1

Step 4:

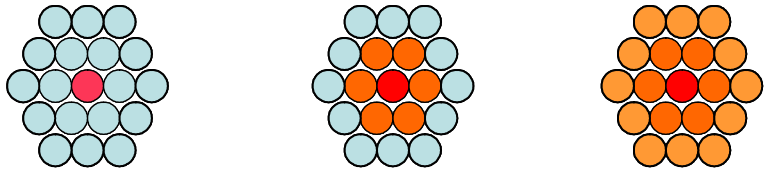
- Organize cables in an 18-around-1 configuration by adding cables to the 6-around-1 configuration.

- Power the reference cable. Repeat Step 1A.

- Power the 6 cables in the bundle (step 3). Repeat Step 1A

- Power the remaining 12 cables in the bundle. Repeat Step 1A

Step 4
18-around-1

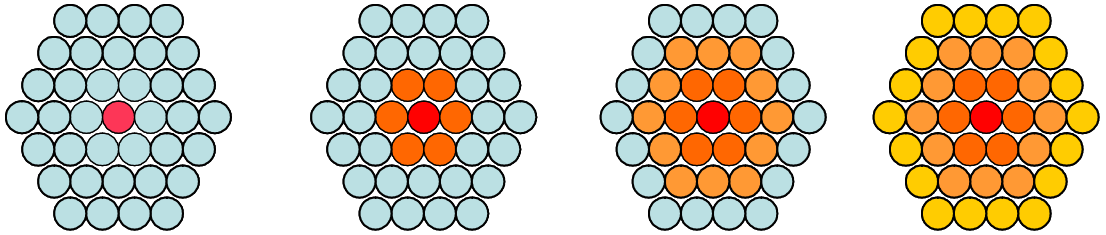


Bundled Cable Test - 18-around-1

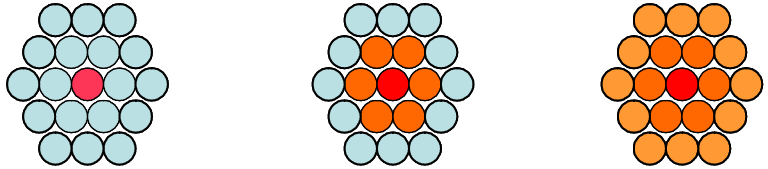
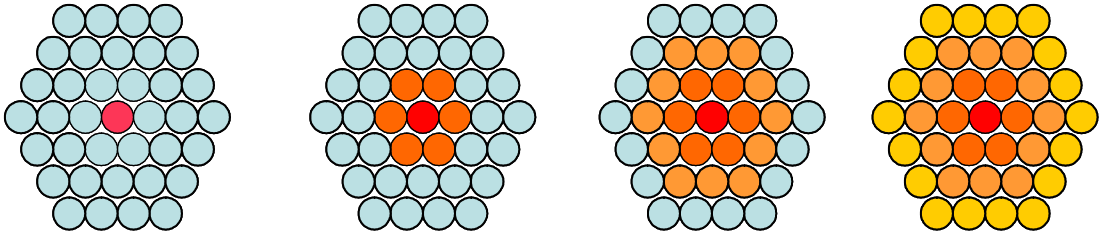
Step 5:

- Organize cables in an 36-around-1 configuration by adding cables to the 18-around-1 configuration.
- Power the reference cable. Repeat Step 1A.
- Power the 6 cables (step 3) in the bundle. Repeat Step 1A.
- Power the 12 cables (step 4) in the bundle. Repeat Step 1A.
- Power the remaining 18 cables in the bundle. Repeat Step 1A.

Step 5
36-around-1



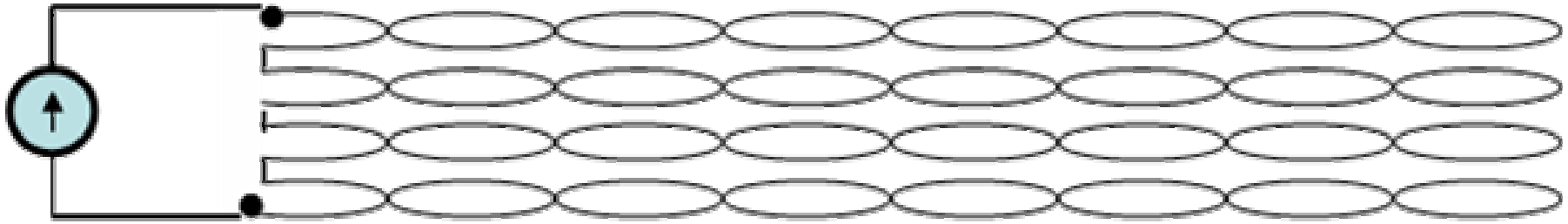
Bundled Cable Test Configurations

Step 1 and 2 **Reference Cable**	
Step 3 **6-around-1**	
Step 4 **18-around-1**	
Step 5 **36-around-1**	

DC powering circuit for each cable

Figure 1.

- **Application of a constant DC current source within a controlled environment where the ambient temperature is held ~constant.**



Ambient ~ Constant T: Air Conditioned Room

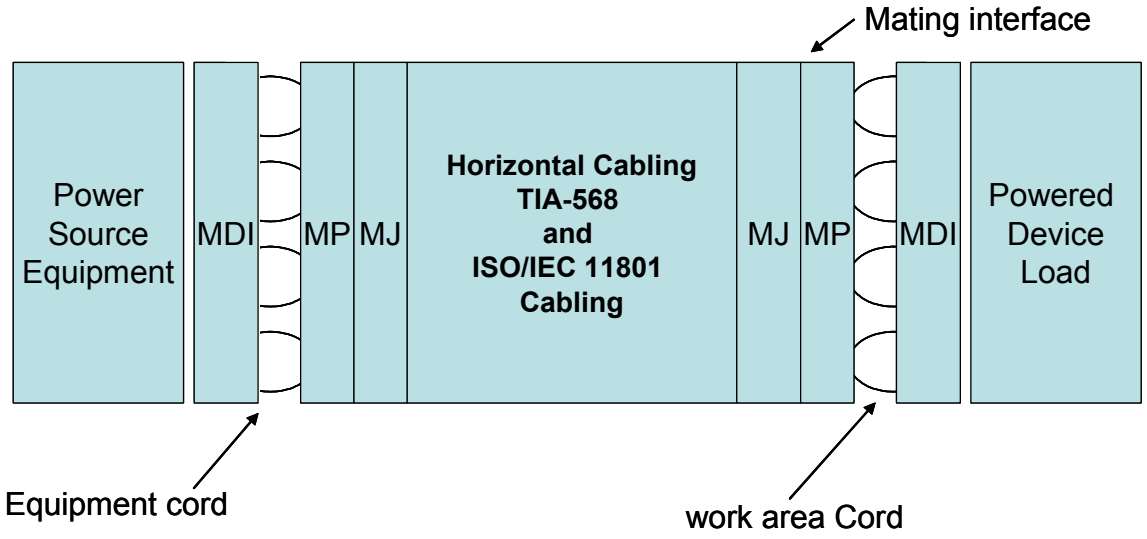
Note: A single source may be used to drive multiple cables.

Connector Testing

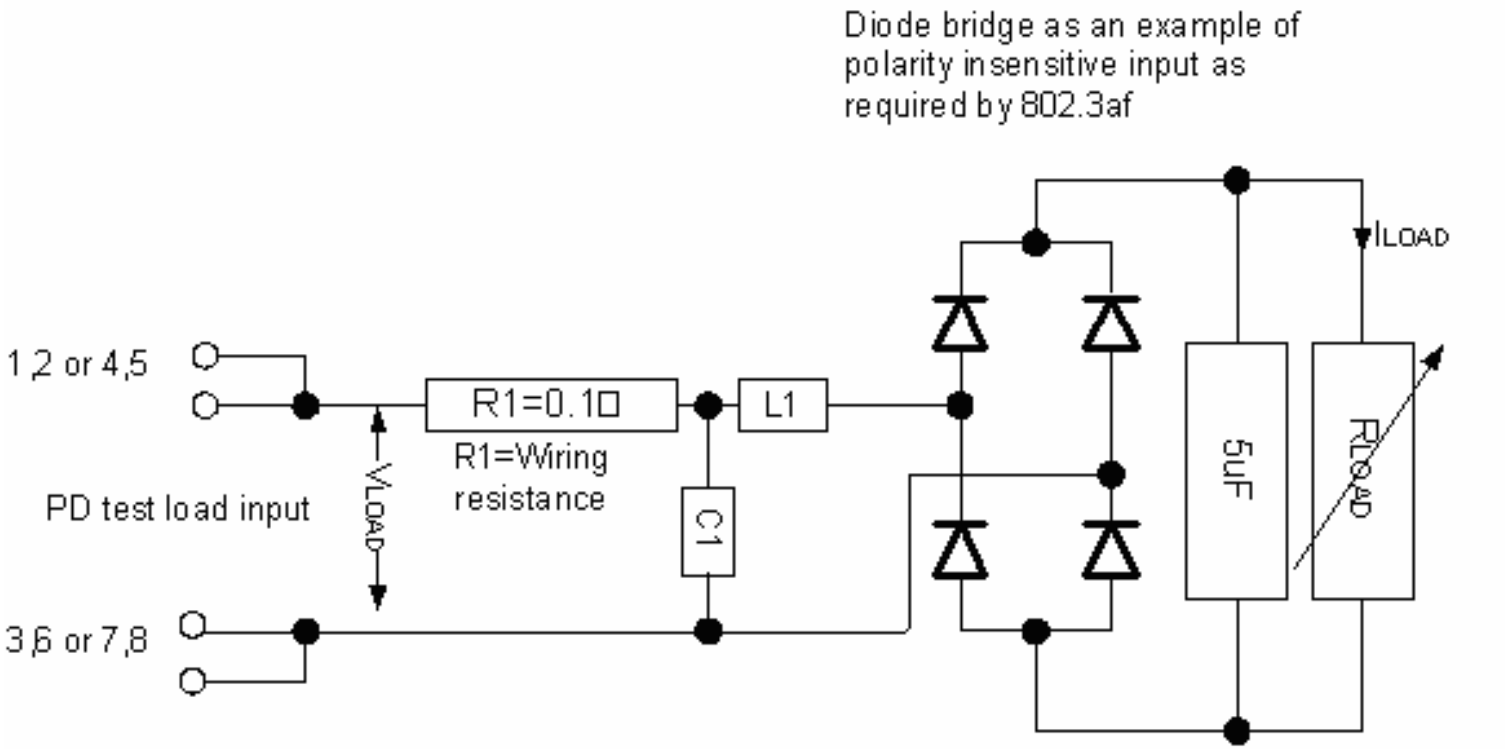
Mating and unmating under load for 802.3af applications

- The connector must withstand TBD cycles of mating and unmating with ≤ 20-milliohm increase in low level contact resistance (LLCR).

- For 802.3af, the power sourcing equipment turns power on (≤ 400 ms) after a valid powered device has been detected i.e., the power is applied "after" mating. Therefore, the mating half of the cycle is not tested with voltage applied.



Circuit to set variable current and mating cycle load



Notes: L1 and C1 forms possible EMI filter components in the PD.
L1max=100 uH, C1 (typical)=0.1 uF.
Rload is a variable load that is used to set the load currents in subclause 3.2 steps 2-5.