



TIPS FOR minimizing cable temperature rise IN POE INSTALLATIONS

When twisted-pair cabling is used for PoE (Power over Ethernet), the majority of the power entering the cable is successfully delivered to the device being powered. However, a small percentage is dissipated in the cabling. This can cause the cable's temperature to increase above the temperature of its surroundings. It is important to keep cable temperatures at reasonable levels and below the maximum operating temperature. This will:

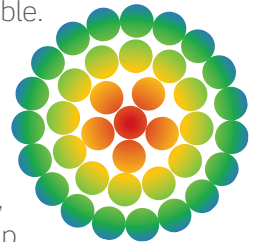
- Prevent transmission impairment due to structural compromise
- Reduce long term cable degradation
- Minimize the negative effect of heating on transmission performance
- Reduce the amount of heat added to the surrounding environment



It is only when higher levels of PoE are deployed — such as 60 and 100 watts — that cable heating can become a potential issue.

The maximum temperature to which a cable will increase depends on a number of factors, including the amount of power being applied to the cable, the cable's resistance, the cable's construction, ambient temperature, and the amount of heat allowed to radiate out of the cable.

If cables are bundled or closely grouped, the cables near the center of the bundle have difficulty radiating heat out into the environment. Therefore, the cables in the middle heat up more than those toward the outer surface of the bundle. The larger the bundle size, the more the cables will heat up.



Industry-standard cables carrying PoE at low power levels like 15 and 30 watts are unlikely to overheat, unless extreme conditions exist such as huge bundle sizes or extreme ambient temperatures. It is only when high levels of PoE are deployed — like 60 and 100 watts — that heating can become a potential issue.

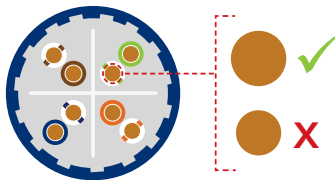
PRACTICE THE FOLLOWING TIPS TO BETTER MANAGE CABLE TEMPS 



The following list of general installation practices will help minimize heating in cables carrying any level of PoE.



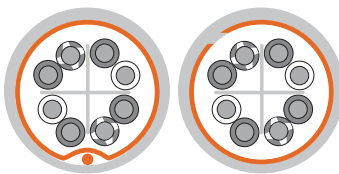
- ❑ Use Category 6A in all new cabling installations for PoE, unless mandated otherwise. Category 6A for new installs is recommended by the Telecommunications Industry Association (TIA).



- ❑ Use horizontal cables and patch cords that have larger copper conductors (i.e., lower wire gage numbers). These larger conductors will heat up less and perform better than smaller conductors.



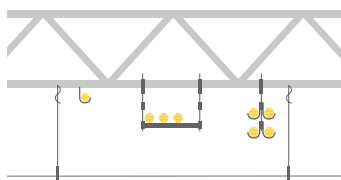
- ❑ Consider using cables with higher temperature ratings such as 60, 70, 75 or 90 °C rated cable, but always try to keep the maximum ambient temperature at reasonable levels. A good target is 45 °C, which allows for a 15 °C temperature rise due to PoE. For higher maximum ambient temperatures, seek professional design assistance.



- ❑ Consider using a shielded cabling system, or unshielded cables with a segmented metallic isolation wrap. These cables radiate heat better than traditional UTP cable, minimizing the cables' temperature rise.

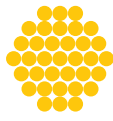
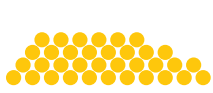


- ❑ Plan for cable management and trays to use minimal fill rates to allow for expansion — less than 50 percent is ideal.



- ❑ Use wire cable trays or similar cable management that allows for largely unrestricted airflow around the cables or cable bundles.

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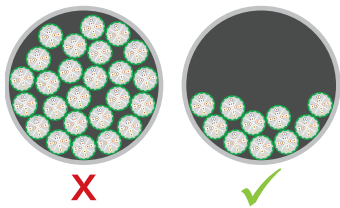
Loosely group cables when possible, rather than bundling. If bundling is required, loosely bundle cables in the smallest bundle size that suits the needs of the installation.



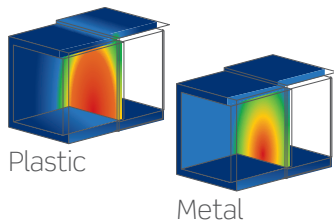
Evenly distribute cables or cable bundles within the available area.



Minimize the number of cable ties used to secure the cables. Apply with minimal tension. Consider VELCRO® Brand fasteners, which are less likely to crush or damage cables.



Avoid cramming or “necking down” cables into small areas. Provide as large an area possible for this transition. If the available area is limited, loosely arrange cables (birdcage them) on either side of this area to help dissipate heat.

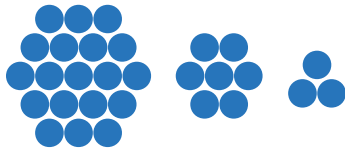


Use connectors with an all-metal-body construction, instead of plastic. Leviton PoE tests of connector bodies found that metal bodies create a 53 percent improvement in heat dissipation.

Adhere to **MAX** bundle size limits

Adhere to the limits for maximum bundle sizes given in applicable codes and/or specifications.

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- Use very minimal bundles sizes for long cable runs carrying high-wattage PoE (70 meters and longer). This minimizes the temperature rise — and resulting increases in attenuation — enabling you to avoid having to substantially derate (shorten) cables as dictated by ANSI/TIA-568-C.2 Annex G.

Seek advice from
**INDUSTRY
EXPERTS**

- Seek advice from industry experts, including those at Leviton. Call our technical staff at 800-824-3005, or learn more about cabling and connectivity for PoE at Leviton.com/PoE

These tips are not intended to supersede or take place of any governing standards. Cabling intended to carry PoE should be installed in accordance with all building codes applicable to the given locality including the National Electric Code. TIA's TSB-184-A and ISO/IEC TR 29125 can also provide additional information for facilitating installation.

Leviton offers structured cabling systems that meet the need for higher bandwidth and power, while limiting the temperature rise in large cable bundles. They are designed and tested to be compliant with all current IEEE PoE standards, Power over HDBaseT, and IEC 60512-99-001. And Leviton Altas-X1™ Cat 6A connectivity has been tested to deliver 100-watt PoE, as defined in the draft IEEE 802.3bt (Type 4) standard.

**Learn more about Leviton systems
that support PoE at Leviton.com/PoE**