

Grounding and Bonding of Optical Fiber Cable in Aerial Applications

AEN 44, Revision 2

Optical fiber cables that contain metallic components are susceptible to an induced voltage when installed in aerial applications near one or more power lines. The grounding and bonding of the metallic components in an optical fiber cable and the supporting metallic messenger is essential to ensure the safety of workers and equipment. The frequency at which the grounding and bonding is performed on the cable plant should comply with documents approved by the American National Standard Institute (ANSI).

The National Electrical Code® (NEC®) and the National Electrical Safety Code® (NESC®) are each recognized as ANSI documents and define the grounding and bonding frequency of the optical fiber cable plant. The NEC recommends in Article 770 that non-current carrying metallic members (armor shield, metallic central member, and metallic strength member) of optical fiber cables be bonded and grounded at the point of entrance into a building or residence. Note that the NEC recommends that the grounding wire on the outside plant cable at the building entrance should be bonded together with all the building grounding electrodes. This grounding scheme limits the potential differences between the outside cable plant and the building wiring system.

The NESC recommends, in Section 9, that the messenger wire employed to support aerial optical fiber cables be grounded at four connections in each installed mile. In addition, Section 9 of the NESC recommends that the messenger wires be grounded at common crossing structures.

Note that many local and state regulations supersede NEC and NESC recommendations. System designers should contact state and local regulatory agencies to determine if regional regulations exist that differ from the NEC and NESC recommendations.

As a minimum, Corning Cable Systems recommends that the metallic components of the optical fiber cable be bonded and grounded at each building and cable entry point. The system designers should assess the installation environment to determine the potential of induced voltage from power lines or lightning, or both. The system designer should evaluate the estimated value of the induced voltage to determine if bonding and grounding should be performed at defined frequencies that vary from the NEC, the NESC or state and local regulatory agencies.

For additional information on the use of Corning Cable Systems optical fiber cable near power lines please see:

Corning Cable Systems Applications Note 32, "Optical Fiber Cables Near High Voltage Circuits."

References

- 1) ANSI/NFPA 770, National Electrical Code 1999 Edition.
- 2) ANSI C2-1997, National Electrical Safety Code.