

# Black Jackets in the Outside Plant

## AEN 84, Revision 3

Outdoor cables are subjected to the harsh conditions of the outside plant environment. As such, design considerations must be made for the various forces expected to act upon such cables during installation and throughout their service life to ensure their long-term survivability. The first, and sometimes last, line of defense for any cable against the environment is the cable jacket. Perhaps the most severe condition a cable jacket will face is exposure to the sun.

Because of its superior balance of characteristics such as toughness, flexibility, chemical resistance, and cost, polyethylene (PE) is the material of choice for use as an outside plant cable jacket. However, the performance of raw PE can degrade rapidly through exposure to sunlight. The reason being the energy of the ultraviolet (UV) component of solar radiation is about the same as that of the covalent bonds of the PE polymer. This has the effect of increasing the potential for interactions between the UV light and the electrons in the covalent bonds. When the two interact, the bonds are broken and the physical properties of the PE begin to degrade. To prevent this, UV stabilizers are added to the PE compound.

Of the UV stabilizers used in plastics today, carbon black exhibits the best combination of cost and performance. Carbon black works by preferentially absorbing the UV light and subsequently dissipating this energy as harmless heat, thereby protecting the jacket material from UV light induced degradation. This significantly increases the service life of the cable. As a result of its exceptional UV performance, PE, with carbon black additives, has become an approved standard for outside plant cables. Therefore, outside plant cables are almost exclusively black.

Sometimes, jacket colors other than black are desired, primarily for reasons of enhancing identification. Although other color jackets are possible, in these instances, Corning Optical Communications recommends the use of colored PE stripes, special print, or some combination of the two, in concert with a black outer jacket. Colored stripes are a thin layer, comprising only a fraction of the overall jacket thickness. Corning Optical Communications has a variety of indoor/outdoor cables with a flame retardant PVC, PVDF, or flame retardant PE (FRPE) jacket. These indoor outdoor cables are available with colored, UV-stabilized jackets which make them acceptable for outside plant use. These specialty compounds have been tested to withstand the weathering conditions required by industry standards. Please see Applications Engineering Note 138 for details.

## Reference

ICEA S-104-696-2001, "ICEA Standard for Indoor-Outdoor Optical Fiber Cable"

Corning Optical Communications Applications Engineering Note 138, "Colored Jackets for Indoor/Outdoor Cable"