

CHOOSING THE RIGHT SHIELDING

Industrial applications are typically electrically noisy environments. Electrical noise, either radiated or conducted as electromagnetic interference (EMI), can seriously disrupt the proper operation of other equipment.

Insulation protects a cable mechanically from abrasion, moisture, and chemicals, but insulation offers no EMI protection. Because of this, shielding is required to reduce electromagnetic interference. Cables can both be affected by EMI, and the source of EMI.

As a source, the cable either acts as a conductor for noise, or radiates noise by acting like an antenna. The cable can also pick up radiated electromagnetic interference from other sources. A shield works to combat both.

Cables are available with various degrees of shielding and offer varying degrees of shielding effectiveness. The type of shielding required depends on several factors, including the electrical environment, the level of protection that is required, and physical considerations like cable diameter, weight, and flexibility.

Practical Guidelines for Effective Shielding

- 1** If your application is at all noisy, make sure that you select a cable with the appropriate level of shielding. In environments with moderate noise, a foil shield may be sufficient. If the environment is noisier, consider a braid shield or a combination foil-braid shield.
- 2** Make sure that you choose a cable that is appropriate for your application. If the cable will be subjected to repeated flexing, be sure to use a cable with a spiral wrapped shield rather than a braid. Since continuous flexing can tear foil, avoid foil-only shielding in this use case.
- 3** Noise elimination depends on a low resistance path to the ground, so you should make sure that the equipment which the cable is connected to is properly grounded.
- 4** When using connectors, make sure the connector offers shielding effectiveness equal or greater to the cable's shielding effectiveness. This will ensure that you neither under or over specify your connector selection, in turn saving you money. Most connectors allow for 360 degree termination of the shield.
- 5** Avoid using low quality connectors with high-quality cables and vice versa - a shielding system is only as good as its weakest point. Sticking to this rule will ensure your equipment works at peak performance and you don't waste money on products with mismatched shielding effectiveness.

Shielding Options for Cable

UNSHIELDED CABLE



Cable that has no shield protection. Provides the smallest cable diameter for use in low-noise controlled environments such as inside a metal cabinet or a conduit, where it is protected from ambient EMI.

FOIL SHIELDED CABLE



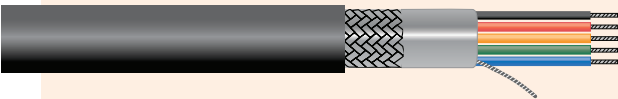
Thin film of metal (typically aluminum) attached to a laminate material (e.g. polyester) for moderate EMI protection, especially at lower frequencies. Foil shields allow for lighter weights and smaller cables.

BRAID SHIELDED CABLE



Interwoven metal conductors in a criss-crossed pattern. Good strength and flexibility. Effective in lower frequency noise ranges. Up to 95% coverage provides good protection against higher frequency EMI.

FOIL/BRAID SHIELDED CABLE



Combination of foil and braided shield. One of the most effective and superior shielding options for cable. Provides strength, high coverage, and great flexibility where noise rejection is critical.

SPIRAL SHIELDED CABLE



Similar to a braid shield, but has single copper strands wrapped in a spiral around a conductor or a cable core. More flexible and easier to terminate than a woven braid. Coverage is generally between 95% and 98%