BELDEN
SENDING ALL THE RIGHT SIGNALS

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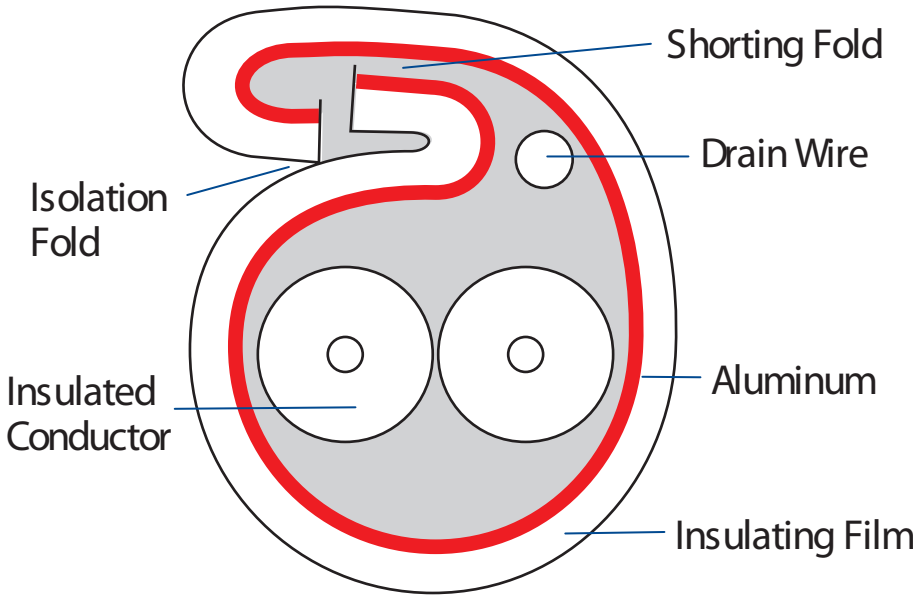
Belden's patented Beldfoil and special fold options provide a premium product that allows for maximum electrical capability. The Beldfoil provides 100 percent shield coverage for improved protection against radiated emissions and ingress at audio and radio frequencies.



Beldfoil® Multiple Pair Individually Shielded Cables

The Beldfoil Z-Fold Shield

Belden pioneered the development of an aluminum/polyester foil for use as a cable shield and was awarded a patent for the Beldfoil design. Beldfoil is a laminated tape of aluminum foil bonded to polyester film. The aluminum foil provides electrostatic shielding, while the polyester film adds strength and extra insulation. Since a Beldfoil shield is lightweight, strong, flexible and thin, yet extremely effective, it is ideally suited for multiple pair individually shielded audio, communication, and data cables. It provides 100 percent shield coverage for improved protection against radiated emissions and ingress at audio and radio frequencies.

Z-Fold shields are a Belden shielding innovation that employs both a shorting fold and an isolation fold. The shorting fold provides metal-to-metal contact, while the isolation fold prevents adjacent shields from shorting to one another. Z-Folds can be applied in different ways to meet the requirements of specific applications.

By folding the edges, the unique Z-Fold shield forms an electrically continuous aluminum tube around the conductors; the Z-Fold shield not only protects the desired signal from external interference, it also minimizes signal radiation problems. The Z-Fold also improves voltage break- down characteristics when compared to ordinary shorting folds. It is specified for many critical applications, including instrumentation systems, tracking station equipment, computer and data processing systems.

Advantages Associated With Beldfoil

- Beldfoil foil provides 100 percent physical shield coverage. Other shield types (e.g., wire braid and wire serve) do not afford complete coverage without costly, bulky, heavy, inflexible double layers.
- A Beldfoil shield includes bonus insulation. The layer of polyester film makes it possible to achieve isolation between

shields in multiple pair cables since it provides its own separate jackets over the individual pairs. Therefore, Beldfoil foil makes it possible to reduce a cable's overall diameter or to include a greater number of conductors in a given area.

- Beldfoil shields are flexible. Even after repeated flexing, Beldfoil foil maintains greater shield coverage and shield effectiveness than braided or served shields.

- Cross-talk is minimized. Because each pair is individually shielded, cross-talk between pairs and interference from outside sources are significantly reduced.

- Individual pairs are isolated. The nominal voltage breakdown between adjacent pair shields is 1500 volts.

- Shields on adjacent pairs can be utilized with differences in potential up to 50 volts (rated working voltage).

- Beldfoil shields are easy to terminate. To simplify termination, each individual shield has its own uninsulated tinned drain wire (ground wire). The drain wire is in intimate contact with the Beldfoil shield throughout its length.

- Beldfoil shields are color coded. The colored shields give each pair of conductors a color coding. This is in addition to the coding provided by the colors of the singles which are twisted into pairs.

Color Coding of Beldfoil® Multiple Pair Individually Shielded Cables

All Belden multiple pair individually shielded cables contain one red-shielded pair and one green-shielded pair, per layer. All the other pairs in each layer are blue-shielded. For example, Belden 8768, a six pair cable, has one red-shielded pair, one green-shielded pair, and four blue-shielded pairs (blue-1, blue-2, blue-3, and blue-4) all cabled in a single layer. A specific blue-shielded pair can be located by its relative position in the cable, because the relative position of any pair remains the same throughout the length of the cable. Since the red-shielded pair and the green-shielded pair are next to each other throughout the length of the cable, the green-shielded pair can be used as a reference.

As a further example, consider Beldfoil multiple pair individually shielded cable such as Belden 8773, depicted in Figure 2. In a given layer, start counting from the green pair in the direction of the first blue (blue-1). (Remember, there is only one blue next to the green because the red-shielded pair is on the other side of the green). This system cannot be read backward. Continue counting in the same direction (from green to blue to blue), and the second blue shielded pair is blue-2, the third blue-3, and the fourth blue-4. To locate blue-3 anywhere along the length of the cable, just strip away the jacket at the desired location, start from the green shielded pair and count blue-1, blue-2, and finally, blue-3.

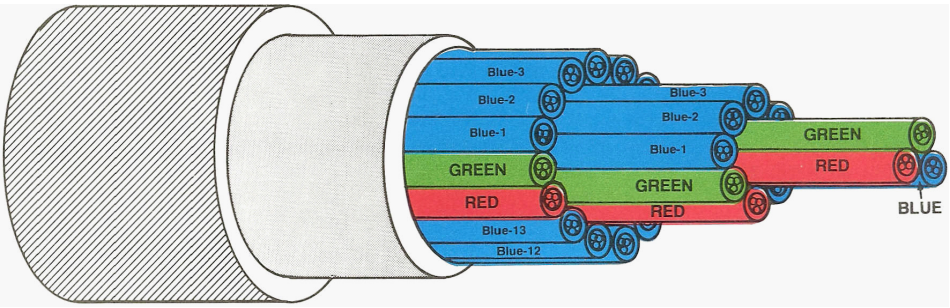


Figure 2: Belden 8773, a 27 pair cable. The outer layer has 15 individually shielded pairs.

As depicted in Figure 2, each layer always has one red shielded pair and one green shielded pair next to it. The other pairs are blue-shielded and are numbered consecutively from the green-shielded pair. For example, the outer layer of Belden 8773, a 27 pair cable, contains 15 individually shielded pairs as follows:

- One red-shielded pair.

- One green-shielded pair located next to the red shielded pair.

- Thirteen blue-shielded pairs, numbered consecutively (from the green-shielded pair) from blue-1 to blue-13.

Belden 8772 also contains an inner layer with nine pairs-one red pair, one green pair, and seven blue pairs. To locate a pair such as blue-4 in this inner layer, first remove a short length of the jacket, the paper tape and any binders. Gently twist the cable in the opposite direction of the twist. This will loosen the pairs and allow those in the inner layer to be counted. Now locate the green-shielded pair in the inner layer and count away from it until you reach blue-4. Pull out blue-4, and you have located the pair you want without disturbing any other pairs in either layer.

In addition to the Beldfoil shield color code, each pair is color coded by the insulation on the individual conductors. Suppose you were working with Belden 8773 cable, and started your operation by randomly removing a pair, stripping the Beldfoil shield, stripping the insulation around each conductor and terminating both conductors. Now you want to remove the same pair from another place in the cable length for a take-out termination, •without disturbing or terminating any other pairs at that point.

First, determine the color code of the randomly selected pair by looking at its color insulation. Suppose it is the blue-brown pair. Now refer to the color code chart for Belden 8773 (Table 3, Tech Info Section), and find the blue-brown pair. It is in the outer layer and its Beldfoil shield color code is blue-10. Now remove the jacket where you want to terminate the pair, find the green-shielded pair in the outer layer, and count away from it until you reach blue-10. Pull out blue-10, and you have the correct pair to terminate.

For more information about Beldfoil and the Belden Z-Fold, contact Belden Technical Support at 1-800-BELDEN-1.