

ELECTRICAL

WATT'S NEW FOR CONTRACTORS

Contracting Products

CONDUITS AND FITTINGS

Selecting the Right Conduit And Cable Fittings

Manufacturers develop new products and redesign existing fittings.

By Ken Kiely

In Brief

Material selection is key when selecting the right conduit and cable fittings.

Related Products:

Conduit and cable fittings, connectors.

Zinc die-cast fittings like those above right and below are accepted by the National Electric Code and federal specifications.



Conduit and cable fittings are available in a variety of materials such as malleable iron, steel and die-cast zinc. Material selection is usually a personal choice based on past experience or specification requirements. Regardless of the material, all fittings must pass the same mechanical and electrical performance tests at independent testing laboratories such as Underwriters Laboratories (UL) or Canadian Standards Association (CSA).

Many fitting manufacturers are developing new products or redesigning existing fittings that can be considered “labor savers.” These products will reduce the electrical contractor’s installation time. When purchasing fittings, contractors should expect consistent quality, performance and ease of use.

UL and CSA monitor electrical codes and revise their listing or certification specifications to comply with revisions or additions. Products that have been tested and listed by an independent testing facility will perform the same function as domestic manufactured products.

Listed or certified foreign-made fittings must pass the same functional requirements as nationally

produced fittings. UL and CSA provide follow-up inspection services for listed or certified fittings in many other countries such as India and China.



UL and CSA require that all application information and special instructions be printed on the smallest carton label. Types of conduit and/or cable will be noted on the label. With the advent of the Internet most fitting manufacturers have fitting application information available on the Web. If you want additional details, you should phone, fax or email your question to the manufacturer. Always resolve your question before you install the fitting because misapplication could result in an installation being rejected by local code enforcement.

Materials

There may be a perception that steel fittings will outperform zinc die-cast fittings, however, it is not true. The listing process at testing laboratories is the same for all fittings, regardless of material.

In addition to similar performance characteristics, zinc die-cast fittings are accepted by the *National Electrical Code* and federal specifications. Unlike steel, which can rust, zinc is inherently corrosion resistant and provides dimensional repeatability that cannot be found in steel. Many contractors find that because of consistency, zinc die-cast fittings are easier and faster to install. Zinc die-cast fittings feature a precise fit given the fitting by virtue of the casting manufacturing process.

After removing the locknut from the connector and positioning threads through the knockout hole, reassemble the locknut and hand tighten it against the box or enclosure. The locknut then should be further tightened an additional quarter-turn using an appropriate tool such as a wrench or hammer with screwdriver. Do not twist the body portion of the connector with the wrench or pliers because damage could result to the connector body.

Furthermore, armored cable *NEC* Article 320.40 requires that an insulating anti-short bushing (red head) or similar protection must be used between the conductors and the cable armor. Metal-Clad Cable *NEC* Article 330 does not contain a similar reference to use an insulating bushing. Use of the anti-short bushing is optional unless specified by the cable manufacturer.

Types of Fittings

Set screw-type connectors for aluminum sheath cables. There are numerous set screw-type connectors available for use with armored or metal clad cable. These connectors are usually a direct bearing or tangential type, meaning that the screw directly presses against the cable sheath or contacts and holds the cable between the cable convolutions. With softer sheath aluminum cable, these screws may penetrate the cable and possibly cause a short.

Listed armored and metal-clad cable connectors. *NEC* Article 300.15 specifies that fittings can only be used with wiring methods for which they are designed and listed. Most manufacturers have received dual usage listings for these types of connectors; however, you should not assume all fittings have the dual listing. Correct carton label information will include range of cable diameters, types, and material of cable sheath.

The newest type of MC Cable, MCAP, may require use of a special connector. Such fittings have been listed by UL; consult the manufacturer for proof of listing.

Concrete-tight fitting. Raceways systems such as EMT and rigid conduit are permitted by code to be embedded in concrete. Connectors and couplings listed for use with these raceways must be capable of preventing the entrance of concrete into the system.

Compression-type fittings are UL-listed and CSA-certified concrete-tight. Some set screw-style fittings are also listed concrete-tight. If 'concrete-tight' is not noted on the carton label, or if the label specifies "concrete-tight when taped," the contractor can complete the concrete-tight installation by taping the connection between the area around the entrance of conduit into the fitting and the connection

of connector and box.

Rain-tight fittings. In 2002, UL received field complaints that listed EMT compression split ring type rain-tight fittings as permitting the entrance of water into the conduit system. After checking the validity of these claims, UL made the decision to de-list all fitting manufacturers' compression-type rain-tight connectors and couplings. A revised test method was employed by UL to represent actual field applications and conditions.

Manufacturers developed UL-listed rain-tight fittings with configurations to pass UL test format. Some of these designs include internal plastic sealing devices or compression gland rings without a split and external sealing device on the locknut threads to prevent water entering the box.

Snap-in connectors versus locknut type connectors. Listing requirements are identical for both types of connectors. These listing requirements include assembly, bending, resistance, pull test, repeated resistance, and ground-fault current tests.

Snap-in type connectors are required by code to be capable of withstanding ground-fault current likely to be imposed on them and to offer equivalent grounding protection. Many snap-in products are used to reduce installation time or where tightening a locknut may be difficult.

Armored cable *NEC* Article 320.40 requires an insulating bushing (red head) or similar protection to be used between the conductors and the cable armor. ▸

Ken Kiely, engineering manager, Bridgeport Fittings Inc., can be reached at 203-377-5944; e-mail kenk@bptfittings.com.



Bridgeport Fittings, Inc.
705 Lordship Blvd.
Stratford, Ct 06615-7313
Ph: 203-377-5944
Fax: 203-381-3483
www.bptfittings.com