

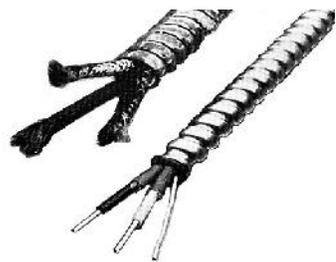
# Home Owners Guide to A/C BX Cable



## What is A/C BX Cable?

Prevalent misconceptions about the present-day armored cable more than likely originate from imperfections intrinsic in the original BX. Improvements made in the product are readily evident when today's armored cable is shown side-by-side with the old BX.

Today's armored cable, traditionally known as BX and more correctly as Type AC, has



proved to be a safe, reliable, and economical wiring method. Though, there continues to be restrictions, and sometimes exclusions, on its use in many areas. What is behind such restrictions and are they necessary?

These restrictions on the use of armored cable, for the most part, are the result of years of misconceptions.

Today, many electrical inspectors are reassessing their position on armored cable because of its long safety record, NEC acknowledgment, and improvements made since its introduction.

For example, the Type R rubber insulation used was subject to thermal-aging and cracking. The cotton-braided covering on conductors and overall braided or paper covering did little to prevent moisture damage to the insulation. When the bonding wire was finally added, it was flat and subject to breakage. In addition, it (and even the armor itself) was often mistakenly used as the neutral conductor.

As a consequence of these past flaws, the excellent safety record of armored cable substantiated by decades of NEC acknowledgment has been ignored. Improvements including newer, safer materials and expanded, application-oriented products, too often have gone unnoticed. The progress in the performance of armored cable is a direct result of changes made in its construction and installation techniques.

**Insulation:** The early rubber insulation has been replaced by thermoplastic insulation with exceptional aging properties, thermal features, and dielectric strength.

**Wraps:** Cotton braiding has been replaced with infused paper material that has good dielectric qualities and is moisture-resistant.

**Anti-short bushings:** Rubbery material used in early bushings has been replaced by thermoplastics that allow easy sliding and eradicate ripping, tearing, and deterioration.

**Bonding wire:** Easily breakable, flat bonding wire has been excluded and replaced with a bonding wire that is in constant contact with the armor throughout the cable length.

**Galvanizing:** The early procedure of galvanizing the sheet steel first, then cutting it into strips, left the cut edges unprotected and allowed them to rust. This technique has been dropped in favor of galvanizing the steel after cutting.



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In addition to these changes, armored cable is available now in various sizes and with multiple conductors for a variety of specialized applications, including modular wiring and fire-alarm circuitry.

Armored cable, today, is a verified and



tested product with an exceptional safety record, fittingly acknowledged by the NEC and listed by independent testing laboratories. It's an option that electrical contractors find has many benefits.

## Why is Older A/C BX Hazardous

BX or type AC is one of the earliest types of

electrical cable developed for both residential and commercial uses in the early part of the 20th century (1920's-1930's). Early forms of BX can still be found by homeowners renovating their homes. "BX" is the older term for this type of cable.

The older BX is not considered an acceptable grounding path when people replace 2 wire receptacles with 3 wire receptacles. No internal bonding strip within the cable will cause the metal jacket to glow red hot in a fault condition. Furthermore, the conductor insulation falls apart when handled to change out lighting fixture or outlet devices to create a short circuit hazard.

With the older A/C BX, you have to consider that the effective conductor length of the jacket is around 2 or 3 times the length of the cable. The NEC doesn't consider the contact between one spiral and the next sufficient to be a grounding path. The cross-sectional area of the jacket when you unwind the spiral it is about 1/3 that of 1/2" conduit. The resistance of steel is higher than that of copper. Combine all these factors, and you might find that your "ground" in a 12/2 BX cable is equivalent to a 16 or 18 gauge wire insufficient for a proper ground.

## Benefits of Modern A/C BX Cable

A/C BX has the added benefit of shielding Electric Fields (EF). The metal sheathing absorbs the electric fields emitted by the wires and shunts it to ground .

It resists puncture by nails and screws, and is resistant to being chewed through by rodents and other pests.

Instead of running rigid metal pipe that has to be screwed together in twisting or tight locations, it is often easier just to thread flexible armored cable into place. Armored cable comes rolled in spools like regular cable, and is typically available with two, three, or four individually insulated conductors in a variety of sizes.

It can be run in places that ordinary conduit cannot.

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