

# Electrical Wiring and Cable ....

**BX Wiring** ... BX wiring, or armored cable, is a type of wiring that is installed in a house. This type of wiring is enclosed in a metallic sheathing and is more resistant to damage than Romex wiring.

**Romex Wiring** ... Romex wiring, or nonmetallic sheathed wiring, is a type of wiring that is installed in a house. This type of wiring is widely utilized but is less resistant to damage than BX wiring.

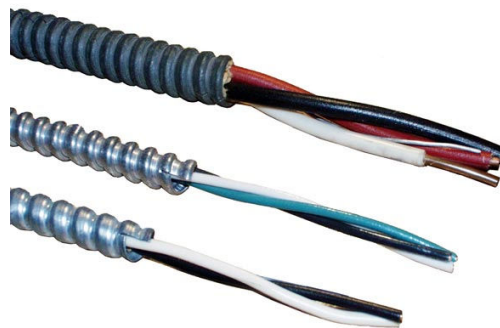
**Type UF** is covered by heavy plastic sheathing. The cable is designed for placement in the ground without being encased in protective metal conduit.

**Type TW wire** has a thin thermoplastic insulation that provides the wire with some measure of moisture resistance. However, for maximum protection, the wire has to be encased in conduit.

In damp places (eg: buried wiring to outdoor lighting) you will need special wire (eg: CEC NMW90, NEC UF). NMW90 looks like very heavy-duty NMD90. You will usually need short lengths of conduit where the wire enters/exits the ground. [See underground wiring section.] Thermoplastic sheath wire (such as NM, NMW etc.) should not be exposed to direct sunlight unless explicitly approved for that purpose.

Romex is a brand name for a type of plastic insulated wire ... sometimes called non-metallic sheath. Formal name is NM. wire is suitable for use in dry, protected areas (ie: inside stud walls, on the sides of joists etc.), that are not subject to mechanical damage or excessive heat. Most newer homes are wired almost exclusively with NM wire. There are several different categories of NM cable.

BX cable -- technically known as armored cable or "AC" has a flexible aluminum or steel sheath over the conductors and is fairly resistant to damage.



TECK cable is AC with an additional external thermoplastic sheath. Protection for cable in concealed locations: where NM or AC cable is run through studs, joists or similar wooden members, the outer surface of the cable must be kept at least 32mm/1.25" (CEC & NEC) from the edges of the wooden members, or the cable should be protected from mechanical injury. This latter protection can take the form of metal plates (such as spare outlet box ends) or conduit.

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**Romex wire ...non-metallic sheathed cable**

## **I've heard electricians mention "romex." What is it?**

It's often used in a generic sense to refer to any type of non-metallic sheathed electrical cable. More to the point, it's electrical wiring sheathed in a plastic coating.

## **Then why is it called "romex"?**

It comes from the Rome Wire Company, which originally produced the wire. Now the Romex brand is owned by Southwire and is an actual trademarked brand.

## **Does this mean the electrician will use only Romex brand?**

Since the word "Romex" refers to any plastic-sheathed wiring (and there are plenty of choices out there), the electrician could end up using any brand of wire.

## **So then what's "NM" mean?**

It means "non-metallic" and refers not to the wiring inside but the outer sheathing.

## **Why even specify that it's "NM"?**

Because metallic sheathed wiring is also available.

# Copper wire characteristics table

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These are taken from the Amateur Radio Relay Handbook, 1985.

AWG	dia mils	circ mils	open air A	cable Amp	ft/lb bare	ohms/ 1000'
10	101.9	10380	55	33	31.82	1.018
12	80.8	6530	41	23	50.59	1.619
14	64.1	4107	32	17	80.44	2.575

We don't show specs for 8ga or larger because they're usually stranded.

Mils are .001". "open air A" is a continuous rating for a single conductor with insulation in open air. "cable amp" is for in multiple conductor cables. Disregard the amperage ratings for household use.

To calculate voltage drop, plug in the values:

$$V = DIR/1000'$$

Where I is the amperage, R is from the ohms/1000' column above, and D is the total distance the current travels (don't forget to add the length of the neutral and hot together - ie: usually double cable length). Design rules in the CEC call for a maximum voltage drop of 6% (7V on 120V circuit)

**Suggested Gauge vs. Breaker Amp**  
**For Copper branch circuits and feeders.**

<i>Gauge</i>	<i>Breaker Amps</i>
14	15
12	20
10	30
8	40
6	55
4	70
2	95
1/0	150
2/0	175
3/0	200

**Common Usage - Breaker / Fuse size:**

<i>Appliance</i>	<i>Amps</i>
Lighting circuits	15
Outlets	20
Stove / Oven	30
Water Heater	30
Clothes Dryer	30
Air Conditioning	40
Heat Pump	40
Electric Furnace	60
Hot Tub	50