

Types of Electrical Wire

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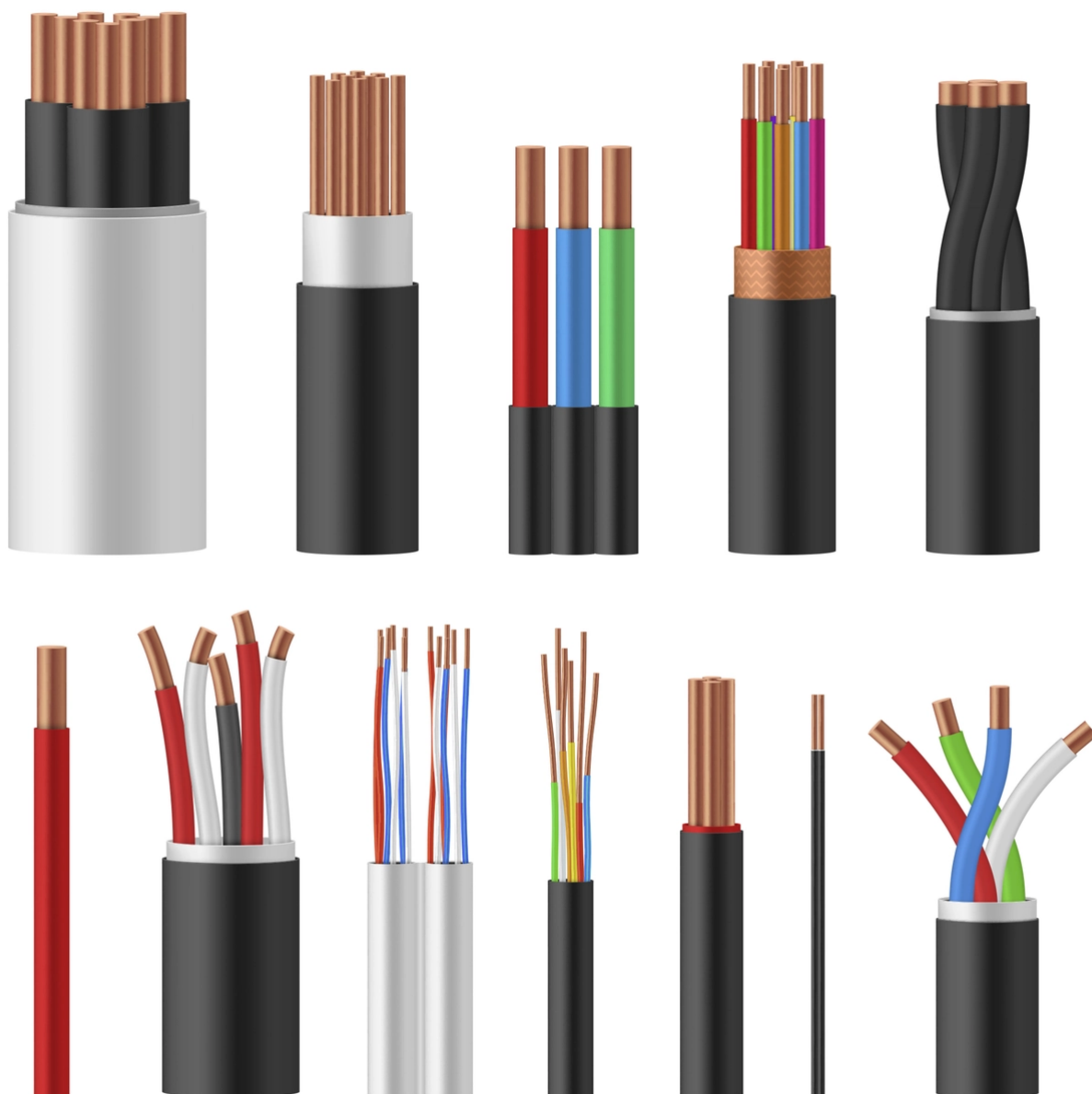


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Types of Electrical Wire – Copper or aluminum are the two most common materials used to make electrical wires, which are then insulated and used to distribute energy throughout your home.

The first step in installing new wiring is selecting the proper cable or wire. However, while inspecting the outdated wiring in your house, determining the type of wire may reveal a lot about the circuit to which the wiring belongs (for example, when opening a junction box and determining which wires go where). Modern homes have fairly standard wiring, and the majority of houses constructed after the middle of the 1960s have wiring of this kind. New wiring that complies with local building requirements is necessary for every new electrical installation.

You may pick the best option for precisely and securely performing electrical work by learning about the many types of house electrical lines in this page.

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What is Electrical Wire?

Understanding a few of the fundamental words used to explain wiring is helpful. A form of conductor, or substance that moves electricity, is an electrical wire. In the case of domestic wiring, the conductor is often made of solid metal conductors or stranded wire and is made of copper, aluminum, or copper-sheathed aluminum.

The majority of wires in a house are insulated, which means they are covered with a non-conductive material. Ground wires are one prominent exception, which are normally made of solid copper and are either uninsulated or have green sheathing to insulate them (bare).

Electrical Wire vs. Electrical Cable

Although there is a noticeable distinction, both electricians and homeowners frequently use the phrases "wire" and "cable" interchangeably.

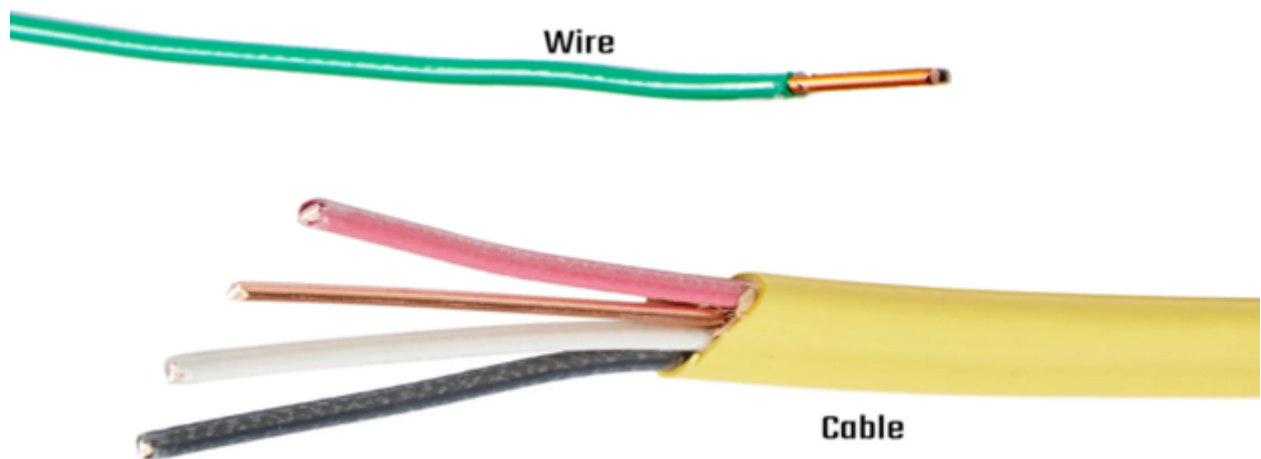
Wires are technically referred to as "conductors" in the electrical code, but for simplicity's sake, let's simply call them wires. When connecting and grounding electrical equipment and circuits, for example, wires might be left bare. Or they might be coated with a substance that does not technically count as electrical insulation but just protects against corrosion.

The bright wires enclosed in the code-recognized plastic insulation are undoubtedly recognizable to the majority of you. In the early days of electrical wiring, black rubber was used to insulate the wires. Today,

they are protected by a variety of high-tech materials that can survive challenging circumstances. These may be buried, submerged in water, or subjected to ultraviolet rays, vibration, chemicals, or extreme heat.

Typically, individual electrical wires must be put in metal or plastic conduit. A full wiring system is produced by combining wires and conduits.

On the other hand, a cable is a factory-made assembly of two or more bare, covered, or insulated wires that are physically protected by a nonmetallic or metallic sheath. Cables are a stand-alone wiring system, unlike individual wires, and are typically not required to be put in conduit.



Electrical wire vs. electrical cable (Reference: pennaelectric.com)

Various Types of Electrical Wires Based on Voltage

In what follows, various types of electrical wires are described based on their use in detail.

Low Voltage Cables

Cables for Electric Panels

Employing flexible wires to wire electric cabinets. The inner wiring of electrical cabinets, switch boxes, and small electrical equipment, as well as home use, installation in public areas, and residential use, are the finest applications for these electrical cables.

Power Cables

Energy cables for industrial and commercial structures. Power cables are widely employed in industrial settings, variable frequency drives, and many more sorts of low voltage connections (VFD).

Armored Cables

Cables with steel or aluminum reinforcement are recommended for places where there is a possibility of mechanical assault. In installations in buildings where there is a risk of fire and explosion, as well as in areas where rats are present, armored cables are regularly used (ATEX).

Rubber Cables

Rubber wires that are extra flexible have several uses. Both fixed industrial facilities and mobile services employ rubber cables. To transmit strong currents between the welding generator and the electrode, rubber wrapping is advised for welding cables.

Halogen-Free Cables

High Security Halogen Free (LSZH) Cables can be used for mobile services, individual derivations, emergency circuits, public distribution networks, and installations of all sorts in public spaces. They are also appropriate for wiring electrical panels and public locations. In the case of a fire, they don't produce much smoke or gas that is damaging.

Fire Resistant Cables

These cables are specially designed to transmit electrical energy in the challenging conditions that develop during a protracted fire, ensuring the provision of emergency equipment like signals, smoke extractors, audio alarms, water pumps, etc. In regions where the general population is supportive, using them in emergency circuits is suggested.

Control Cables

Control cables for fixed or mobile facilities should be extremely flexible because they are primarily intended for small home appliances, the connection of manufacturing machine parts, signaling and control systems, the connection of motors or frequency converters, signal transmission where the voltage induced by an external electromagnetic field may affect the transmitted signal, or power supply connections to prevent electromagnetism.

Instrumentation Cables

Signals are sent between equipment in industrial facilities using these flexible, insulated wires. Especially well-suited for optimal data transport in regions with high electromagnetic interference.

Solar Cables

These cables can be used to connect photovoltaic panels as well as the connectors that join them to a DC to AC inverter. Due to the design of their components and their cover, which is especially resistant to UV rays and extreme temperatures, they may be set up outside with perfect confidence.

Special Cables

Electric cables are available in a wide range of styles and can be used for a variety of specialized installations, such as temporary light garland installations at trade shows, connections for overhead cranes, hoists, and lifts, uses in submerged pumps, and lighting, purification, and cleaning systems in swimming pools and other drinking water areas like aquariums and water fountains.

Aluminum Cables

Permanent installations of aluminum electrical cables can be made anywhere, whether underground or outside.

Medium Voltage Cables

RHZ1

Halogen-free, XLPE-insulated, type RHZ1 medium voltage cable that doesn't spread fire or flames. They are the perfect cables for power distribution and transmission in medium-voltage networks.

HEPRZ1

Medium voltage cable with HEPR insulation that is halogen-free and does not spread fire or flames. Perfect for medium-voltage network distribution and transportation of power.

MV-90

XLPE insulation on medium voltage cable that meets American standards. For the transmission and distribution of electricity in medium-voltage networks.

RHVhMVh

Copper and aluminum medium voltage cables are used in special applications. Indicated particularly for installations where the presence of hydrocarbon-type substances, oils, or their compounds is a problem.



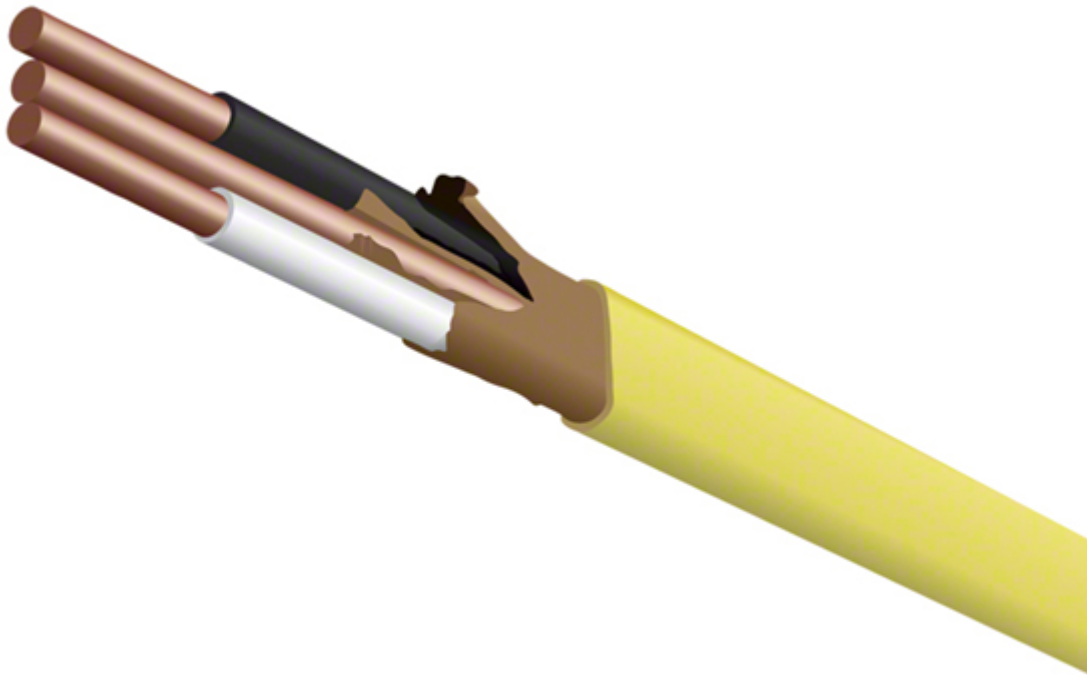
Various types of electrical wires (Reference: zwcables.com)

Various Types of Electrical Wire Based on The Application

Non-Metallic Sheathed Cable

These cables are also referred to as NM cables or non-metallic building wires. They have two to four wires inside a flexible plastic jacket (TECK cables have thermoplastic insulation on them), along with a

bare wire for grounding. However, NM-B and NM-C non-metallic sheathed cables are the most used type of interior residential cabling. Special types of this cable are utilized for subterranean or outdoor use.



Non-Metallic Sheathed Cable (Reference: cmewire.com)

Underground Feeder Cable

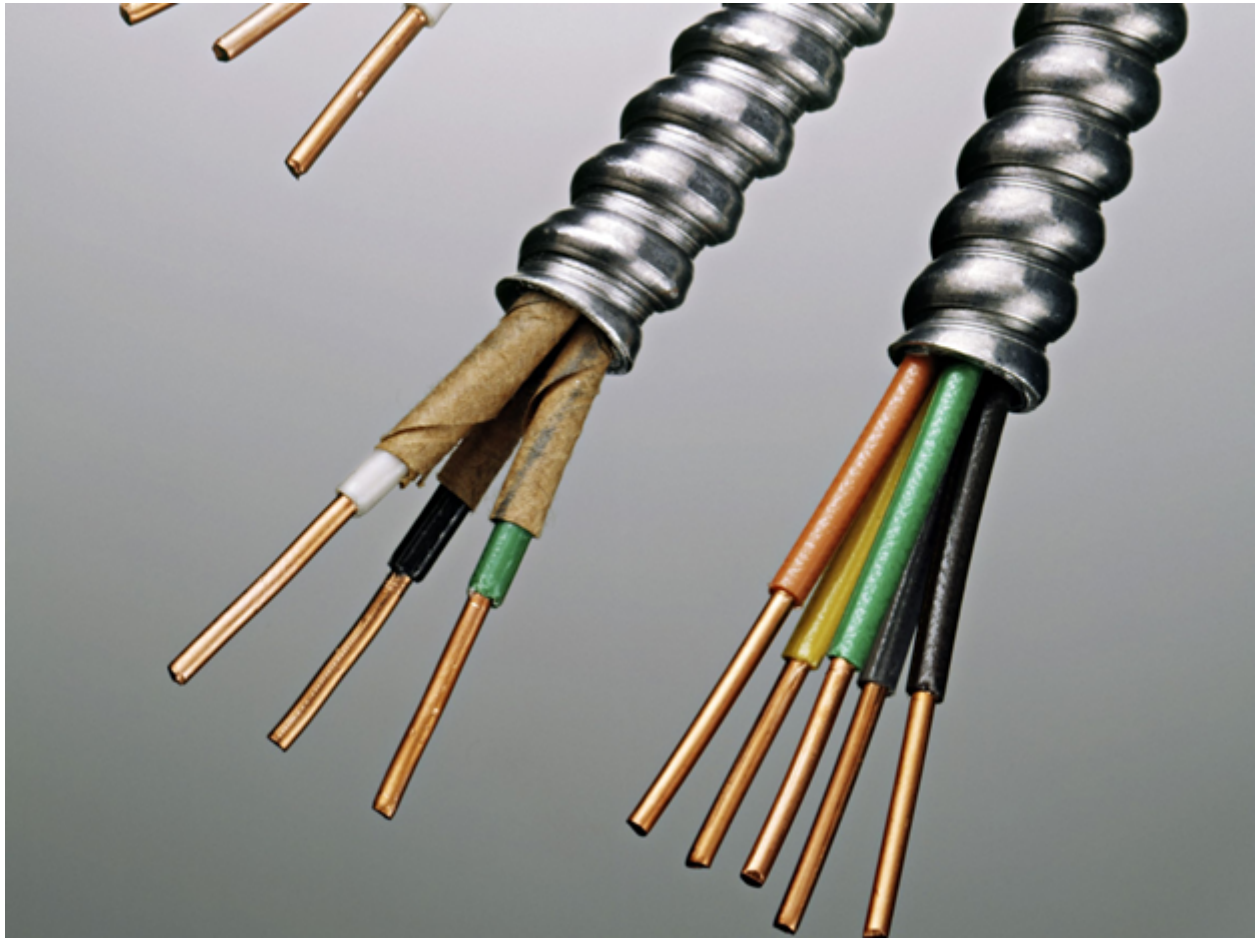
The wires in these cables are clustered together and incorporated in the flexible material, whereas with NM cables, each wire is separately wrapped in thermoplastic. UF cables, which come in a range of gauge diameters, are frequently utilized for underground and outdoor lighting applications. They are excellent for open-air lighting, pumps, and other wet places like gardens because of their strong water resistance.



Underground Feeder Cable (Reference: amazon.com)

Metallic Sheathed Cable

Metal-sheathed cables, sometimes referred to as armored or BX cables, are frequently used to deliver main energy or for big equipment. They have three simple stranded copper wires—one for the current, one for grounding, and one for neutral—that are covered in a black PVC sheathing and insulated with cross-linked polyethylene. For outdoor applications and high-stress installations, BX cables with steel wire sheathing are frequently utilized.



Metallic Sheathed Cable (Reference: thespruce.com)

Multi-Conductor Cable

Due to its ease of use and excellent insulation, this cable type is frequently used in residences. Multi-conductor (MC) cables have many conductors, each of which is independently insulated. For increased security, an exterior insulating layer is applied. Industries employ a variety of products, such as the audio multicore “snake cable” used in the music sector.

Coaxial Cable

A coaxial cable (also known as heliax) has an outer sheath for further insulation and a tubular insulating layer to protect the inner conductor, which is further encircled by a tubular conducting shield. These cables are typically used to transmit television signals and link electronic video equipment. They are known as “coaxial” cables because the two inner shields have the same geometric axis.

Unshielded Twisted Pair Cable

This kind has two wires that have been twisted together, as the name would imply. The fact that the individual wires are not shielded makes this cable ideal for video and signal transmission applications. UTP cables are frequently used in telephones, surveillance cameras, and data networks because they are less expensive than coaxial or optical fiber lines. UTP cables with copper wires or solid copper cores are a common option for interior applications since they are adaptable and simple to bend for in-wall installation.

Ribbon Cable

Various conducting wires in ribbon cables, which are frequently used in computers and peripherals, run parallel to one another on a flat plane, giving them the appearance of flat ribbons. Only low voltage applications may be handled by these rather flexible wires.

Direct-Buried Cable

These cables, also known as DBCs, are specifically constructed coaxial or bundled fiber-optic cables that may be buried underground without the need for additional sheathing, insulation, or plumbing. A hefty metal core, several layers of banded metal sheathing, thick rubber coatings, shock-absorbing gel, and waterproof wrapped thread-fortified tape are all features of these products. They are a well-liked option for transmission or communication requirements because of their high resilience to temperature fluctuations, moisture, and other environmental conditions.

Twin-Lead Cable

These flat two-wire cables are used for radio and television antenna-to-receiver transmission.



Twin-Lead Cable (Reference: aquatuning.nl)

Twinaxial Cable

This type of coaxial cable is used for very short-range, high-speed transmissions because it has two inner conductors rather than one.

Paired Cable

This cable has two separately insulated conductors and is typically utilized in DC or low-frequency AC applications.

Twisted Pair

This cable resembles paired cables, except it has twisted or entangled inner insulated wires.

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