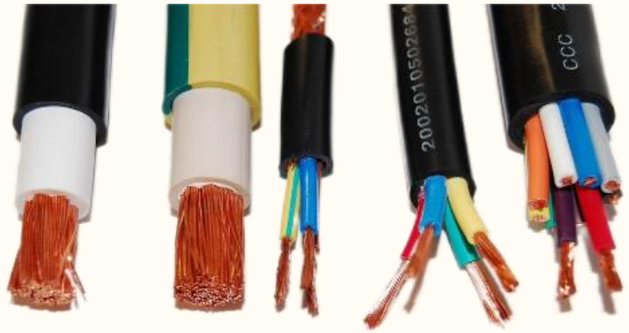
Key Factors in Selecting EV Charging Cables and Connectors



Cable Core and Cable Protection Materials

The outer jacket and insulation materials impact durability, flexibility, and safety.

Connector Conductive Terminal Materials

Terminal materials and plating affect conductivity, corrosion resistance, and lifespan.

Connector Housing Materials

Different materials have their own advantages and disadvantages in terms of wear resistance, aging resistance, flame retardancy, etc.

Charging Cables

Copper Wire

Excellent conductivity, suitable for various environments, but higher cost and heavier weight

Tin-plated Copper Wire

Excellent conductivity, corrosion-resistant, suitable for humid or marine environments, but higher cost

Aluminum Wire

Lower cost but poorer conductivity, suitable for various environments, lighter weight but lower mechanical strength

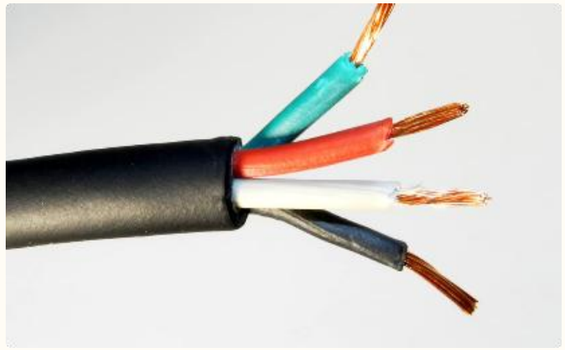
Aluminum-clad Copper Wire

Balanced performance, moderate cost, suitable for various environments

Silver-plated Copper Wire

Best conductivity, excellent corrosion resistance, suitable for high-frequency and high-temperature environments, but extremely high cost

Comparison of Commonly Used Cable out Jackets



TPU

TPU has high tensile strength and high tensile force, is very flexible, has excellent abrasion resistance, and is crush-resistant. TPU has excellent oil resistance, acid and alkali resistance, salt spray resistance, high and low temperature resistance, aging resistance, and UV resistance. It is an environmentally-friendly material that does not contain halogens. (High quality)

TPE

TPE is soft, has good elasticity, and has good abrasion resistance, but lower than TPU. TPE has high and low temperature resistance, but poor oil resistance, especially poor gasoline resistance. It has poor weathering resistance and is not aging-resistant. (Medium)

PVC

PVC has relatively poor flexibility, higher hardness, and general abrasion resistance, and is easily worn. PVC has high and low temperature resistance, good oil resistance, poor UV resistance, contains halogens, and releases harmful gases when burned. (Low)

Comparison of Commonly Used Cable Insulation Materials

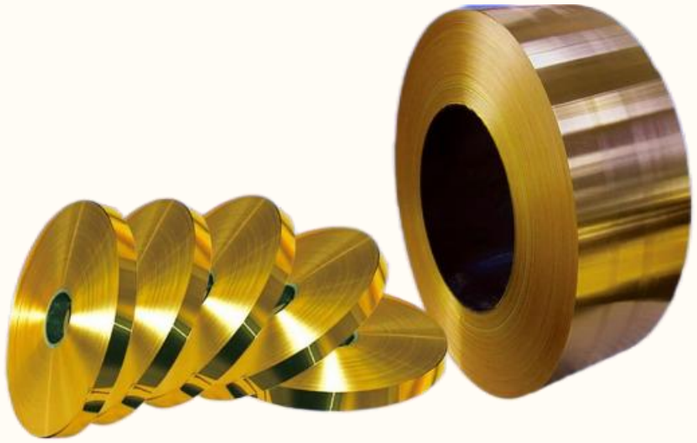
XLPE

XLPE has high electrical insulation properties, good resistance to high and low temperatures, excellent wear resistance, superior oil resistance, good weatherability, and strong UV resistance. XLPE is an environmentally friendly material that does not contain halogens and has good flame retardancy. XLPE is suitable for high-requirement electrical insulation scenarios, such as high-voltage cables.

PVC

PVC has good insulation performance, but lower than XLPE. It has resistance to high and low temperatures, general wear resistance, moderate oil resistance, average weatherability, and is prone to aging. PVC contains halogens and releases harmful gases when burned, but has good flame retardancy. PVC is suitable for general cables and low-cost application scenarios.

Conductive Terminal Materials

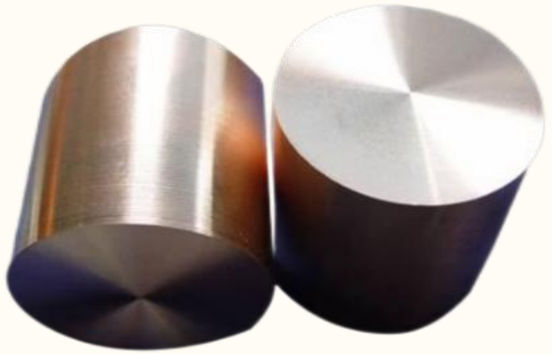


H62 Brass

Relatively high electrical conductivity, moderate hardness, good wear resistance, but general corrosion resistance. Low cost and easy to process.

T2 Pure Copper

Extremely high electrical conductivity, but lower hardness, general wear resistance, and poor corrosion resistance. Difficult to process, higher cost.



Phosphor Bronze

High electrical conductivity, excellent hardness and wear resistance, also very good corrosion resistance. Difficult to process, higher cost.

Plating methods for conductive terminals

1 Tin plating

Tin plating is a common plating method, with relatively low cost. The tin plating layer can provide a certain degree of corrosion resistance and conductivity, but the wear resistance is relatively poor.

2 Nickel plating

The nickel plating layer can provide good corrosion resistance and better adhesion, and can also improve the overall conductivity and wear resistance.

3 Silver plating

The silver plating layer has excellent conductivity and corrosion resistance, but the cost is relatively high.

4 Nickel plating + Silver plating

Nickel plating + silver plating is currently the most commonly used plating method, which combines the advantages of nickel plating and silver plating, and has the best performance.

Plating Thickness

Plating thickness directly affects the service life and stability.

Common thickness range is 2um—5um or **80—200uin**.

1 micrometer (μm) = 39.37 microinches (μin).

Characteristics of Charging Equipment Materials

Electric vehicle charging equipment needs to be rigorously tested to ensure long-term safety and reliability.

Testing includes mechanical performance such as insertion/removal force, vehicle overriding, as well as temperature performance such as heat aging.

Materials must also meet flammability standards and electrical performance indicators to ensure safety.

Only after comprehensive testing can materials ensure the stability and safety of the charging equipment.

PC/PBT

Combines the good mechanical properties of PC and the chemical resistance of PBT. Has good heat resistance, impact resistance, wear resistance, and flame retardancy. Can meet the basic performance requirements of charging guns/sockets, but slightly lower strength and high-temperature resistance than other materials.

PA66 CF25

A high-end material with excellent mechanical strength, heat resistance, impact resistance, wear resistance, and chemical resistance, as well as good flame retardancy. Has better strength and high-temperature resistance than PC/PBT, making it the preferred choice for high-end charging guns/sockets. However, PA66 is more expensive.

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