How to Choose the Right Industrial Cables for Factories and Manufacturing Units



Industrial electrical systems need cables that can support equipment, maintain reliable power distribution and operate safely under demanding conditions. From small workshops to large manufacturing facilities, choosing the right industrial cable is an important part of planning an electrical installation.

However, not every cable is suitable for every industrial application. Factors such as electrical load, conductor material, cable size, insulation, voltage rating and installation conditions must be considered before making a selection.

This guide explains the important factors to consider when choosing industrial cables for different applications.

What Are Industrial Cables?

Industrial cables are electrical conductors designed for use in factories, manufacturing units, commercial facilities and other industrial environments. They carry electrical power between distribution systems, control panels, machinery and equipment.

Depending on their construction, industrial cables may be used for fixed wiring, power distribution, motor connections and other electrical applications.

Their suitability depends on the cable's technical specifications and the requirements of the installation.

Common Applications of Industrial Cables

Industrial cables are used across different sectors because electrical power is essential for operating machinery and equipment.

Some common applications include:

1. Manufacturing Units

Factories use electrical cables to connect machinery, production equipment and power distribution systems. The selected cable must match the equipment's electrical requirements.

2. Motor and Pump Connections

Motors and pumps require suitable electrical connections to operate reliably. Cable selection should consider starting current, operating load, installation distance and environmental conditions.

3. Electrical Panels

Industrial control and distribution panels use electrical conductors to connect components and distribute power. The cable construction and conductor size must match the panel design.

4. Commercial and Infrastructure Projects

Large buildings, workshops and infrastructure facilities require dependable electrical wiring for lighting, equipment and power distribution.

Important Factors to Consider When Selecting Industrial Cables

Choosing an industrial cable involves more than comparing prices. The following factors help engineers, contractors and buyers identify a suitable product.

1. Conductor Material

Copper and aluminium are commonly used conductor materials.

Copper offers higher electrical conductivity and is widely used in industrial wiring where its electrical and mechanical properties are suitable. Aluminium is lighter and may be considered for installations where weight and project cost are important.

The final choice should depend on the electrical design, installation requirements and applicable standards.

2. Cable Size and Electrical Load

Cable size is generally specified in square millimetres (sq mm). It determines the conductor's cross-sectional area and is an important factor in its current-carrying capacity.

An undersized cable can overheat when operated beyond its permitted capacity. An appropriately sized cable helps maintain safe operating temperatures and reduces excessive voltage drop.

Before selecting a size, consider:

- Equipment power rating
- Operating and starting current
- Cable installation length
- Ambient temperature
- Cable grouping and installation method
- Permitted voltage drop

A qualified electrical engineer should verify the final cable size rather than relying on a general size chart.

3. Insulation Quality

Cable insulation prevents direct contact with the conductor and helps protect the electrical system from leakage and short circuits.

PVC is commonly used in electrical cable insulation. Its suitability depends on the cable's rated voltage, operating temperature and intended application.

Buyers should check the insulation type and technical specifications instead of assuming that all industrial cables offer the same protection.

4. Voltage Rating

Every cable is designed for a particular voltage rating. Selecting a cable with an unsuitable voltage rating can create serious electrical risks.

Check the system voltage and ensure that the cable rating is appropriate for the installation. The cable's product datasheet and applicable electrical standards should guide this decision.

5. Installation Environment

Industrial cables may be installed inside panels, cable trays, conduits or other designated wiring systems.

The surrounding environment also matters. Temperature, moisture, exposure to chemicals, vibration and mechanical damage can influence cable selection.

A cable intended for fixed indoor wiring should not automatically be assumed suitable for outdoor, underground or continuously moving applications.

Single-Core and Multi-Core Industrial Cables

Cable construction is another important consideration.

Feature	Single-Core Cable	Multi-Core Cable
Construction	One insulated conductor	Multiple insulated conductors
Common applications	Individual power connections and fixed wiring	Combined power or control connections
Installation	Separate conductors may be required	Multiple conductors are grouped together
Selection	Depends on circuit design	Depends on core configuration and load

The right construction depends on the number of conductors required, installation layout and electrical design.

Why Copper Quality Matters in Industrial Wiring

The conductor plays a major role in electrical performance. Copper is widely used because of its high conductivity, durability and suitability for different cable constructions.

However, conductor quality should not be judged by material name alone. Buyers should also check:

- Copper purity and conductor construction
- Conductor cross-sectional area
- Solid or stranded conductor type
- Insulation material and thickness
- Applicable product standards
- Manufacturer test documentation

These details help buyers compare products based on technical suitability rather than price alone.

Electrical Standards and Safety Checks

Industrial cable selection should follow the relevant Indian Standards and project specifications.

For example, IS 694 covers PVC insulated cables for working voltages up to and including 1,100 V. Other cable categories may require different standards depending on their construction and voltage application.

Before purchasing, check the standard mentioned on the product, its certification details and whether the certification applies to the exact cable being supplied.

It is also important to inspect the cable marking, size, voltage grade, manufacturer details and batch information.

Common Mistakes to Avoid When Buying Industrial Cables

Even a good-quality cable can create problems if it is selected or installed incorrectly.

Avoid these common mistakes:

- Choosing cable size based only on price.
- Ignoring the equipment's starting current.
- Selecting a cable without checking its voltage rating.
- Using cables in environments they were not designed for.
- Assuming every copper cable has the same conductor quality.
- Ignoring installation conditions and voltage drop.
- Purchasing products without checking their technical documentation.

Working with a qualified electrical professional can help prevent these issues.

Industrial Cable Solutions from Kundan Cab

Kundan Cab offers industrial cable options for different fixed-wiring requirements. Its industrial cable range includes Copper-CTS 4-X Single Core and Copper-VIR Single Core.

The Copper-CTS 4-X Single Core features an electrolytic-grade annealed bare copper conductor, PVC insulation, 99.97% copper purity and a 1,100 V voltage grade. Its listed conductor sizes are 2.5 sq mm and 4.0 sq mm.

The Copper-VIR Single Core range is listed with solid or stranded electrolytic-grade annealed copper conductors and sizes ranging from 1.0 sq mm to 120 sq mm. Buyers should check the individual product specifications before choosing a cable for a particular installation.

Explore the Kundan Cab industrial cables range to understand the available products and their technical features.

Final Thoughts

Selecting the right industrial cable is essential for maintaining electrical safety and dependable equipment operation. Conductor material, cable size, insulation, voltage rating and installation conditions should all be considered before making a purchase.

Instead of choosing a cable based only on its appearance or price, compare its technical specifications with the actual requirements of your electrical project. This approach helps create a more reliable electrical installation and reduces the risk of avoidable wiring problems.