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# Medium Voltage Covered Conductors- Shakun's Offering

## Introduction to MVCC

Medium Voltage Power Transmission employ various methods including Overhead Bare Conductors, Overhead Covered Conductors and Underground Power Cables.

While Overhead conductors are cost-effective and easy to maintain, they pose risks such as environmental susceptibility, accidental contact dangers, and theft. Covered Conductors provide a middle ground between overhead and underground options, featuring insulating material protection to prevent accidental contact.

Specifically designed for AC voltages ranging from 1kV to 36kV, Medium Voltage Covered Conductors adhere to BS EN 50397-1 standards, typically composed of layers like Inner Semi-conducting, XLPE Insulation, and Anti-tracking grade HDPE Sheath.



## Benefits of Over-Head MV Covered Conductors

- Safety:** Covered Conductors significantly reduce the probability of contact between live conductors and surrounding materials, providing an added layer of safety in power transmission.
- Theft and Loss:** These conductors minimize technical losses caused by direct hooking, theft, resulting in a more efficient power distribution system.
- Lower Operation and Maintenance Cost.**
- Reliability under adverse weather conditions** such as heavy storm, rain, snow etc.
- Increased reliability in Forest Areas:** The insulation provided by Covered Conductors protects from harm and power outage due accidental contact by birds, wildlife and trees.
- Low leakage current:** Covered Conductors exhibit negligible leakage current on their surfaces, ensuring a more secure and reliable power distribution network.

# Construction

## 'SP-PESC-11' or 'SP-PESC-44'

Conductor Shield – Semiconducting Polymer. Specially formulated to reduce stress concentration from individual conductor strands to make it even around the conductor. Correctly chosen conductor shield material will help increase the useful service life of Covered conductor by protecting the integrity of Insulation from uneven stress.

## Conductor

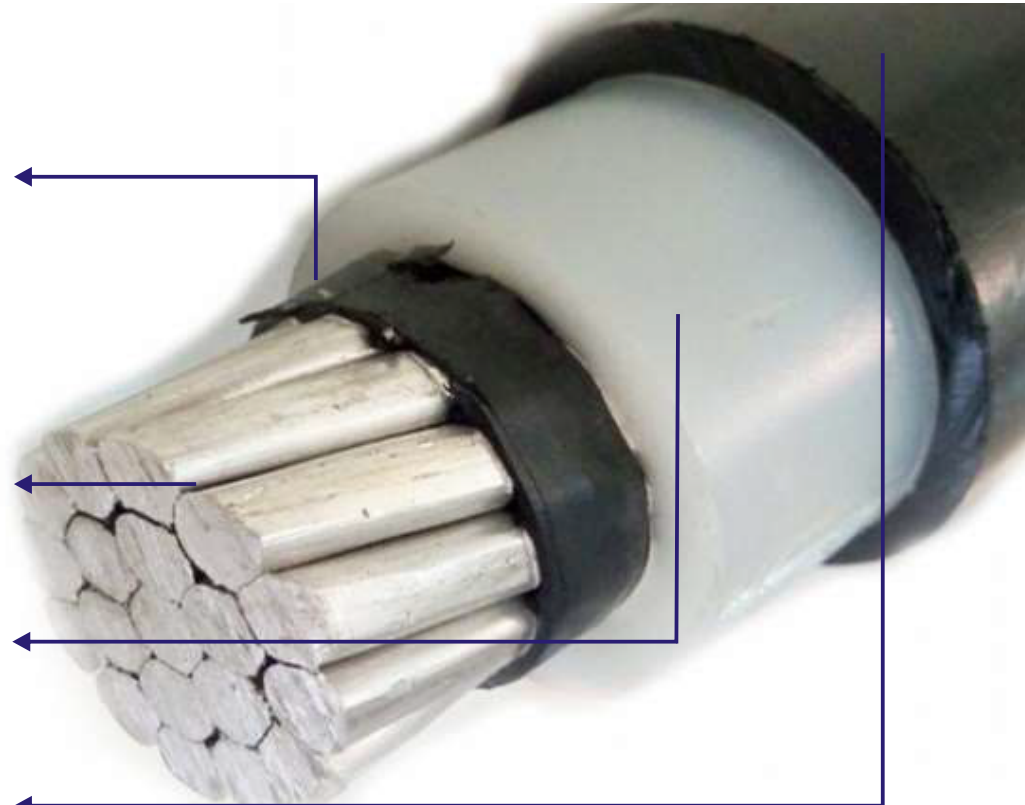
Al-Alloy (AAAC) or Al-Alloy Steel Reinforced (ACSR) or HD Cu (Water-blocked or non-Water-blocked)

## Inner XLPE Layer

Provide protection against phase to phase and phase to ground contacts. Prevent deformation due to heat.

## 'HTP-HDS-35'

Track Resistant HDPE Sheath – Protect against abrasion and impact, Environmental stress crack, Erosion/ Track, UV rays. It is important to select the right material to ensure highest integrity and service life of MVCC.



## Shakun's offering for MVCC

### Track Resistant Material for MVCC 'HTP-HDS-35'

Shakun's HTP-HDS-35, a High-Density Polyethylene Track Resistant Compound tailored for jacketing Medium Voltage Covered Cables. This specially developed material is formulated with anti-tracking compound provides excellent track resistance as per EN 50397-1 standards. HTP-HDS-35 excels in mechanical properties, environmental stress crack resistance (ESCR), and dielectric strength. Processable at temperatures ranging from 140°C to 200°C, it ensures ease of extrusion, making it an ideal choice for enhancing the reliability of MVCC.

- Excellent Anti-tracking ability, 3.5kV for 6 hours.
- UV resistant.
- Environment Stress Crack Resistant (ESCR).
- Outstanding weathering resistance.
- Good processability, tested in wide range of extruders.

### Thermoplastic Semi-Conducting Shielding Compounds for MVCC 'SP-PESC-11 and SP-PESC-44'

Shakun offers range of semi-conducting shielding compounds designed for smooth layering on conductor surface for Medium Voltage Covered Conductors (MVCC). SP-PESC-11 and SP-PESC-44 grades offer good voltage stress distribution around conductor, also when extruded correctly provides smooth separation from conductor. Shakun's semiconductive compounds exhibit exceptional heat deformation resistance and thermal stress crack resistance. Meeting stringent international standards such as ICEA S-66-524/NEMA WC7, BS 6622, and IEC 60502, SP-PESC-11 and SP-PESC-44 ensure reliable and efficient operation of medium voltage cables.

- Good mechanical properties.
- Remarkable heat resistant characteristics.
- Excellent thermal stress crack resistance.
- Good toughness.
- Easy to process.
- Low volume resistivity.

### Terminology & Definitions (ASTM D3638 – 07)

**Track** - a partially conducting path of localized deterioration on the surface of an insulating material.

**Tracking** - the process that produces tracks as a result of the action of electric discharges on or close to an insulation surface.

**Tracking Resistance** - the quantitative expression of the voltage and the time required to develop a track under the specified conditions.

**Electrical Erosion** - The progressive wearing-away of electrical insulation by the action of electrical discharges.

**Environmental Stress-Cracking** - is the development of cracks in the material due to low tensile stress and environmental conditions. Under certain conditions of stress with the presence of contaminants like soaps, wetting agents, oils, and detergents, ethylene material may exhibit mechanical failure by cracking.