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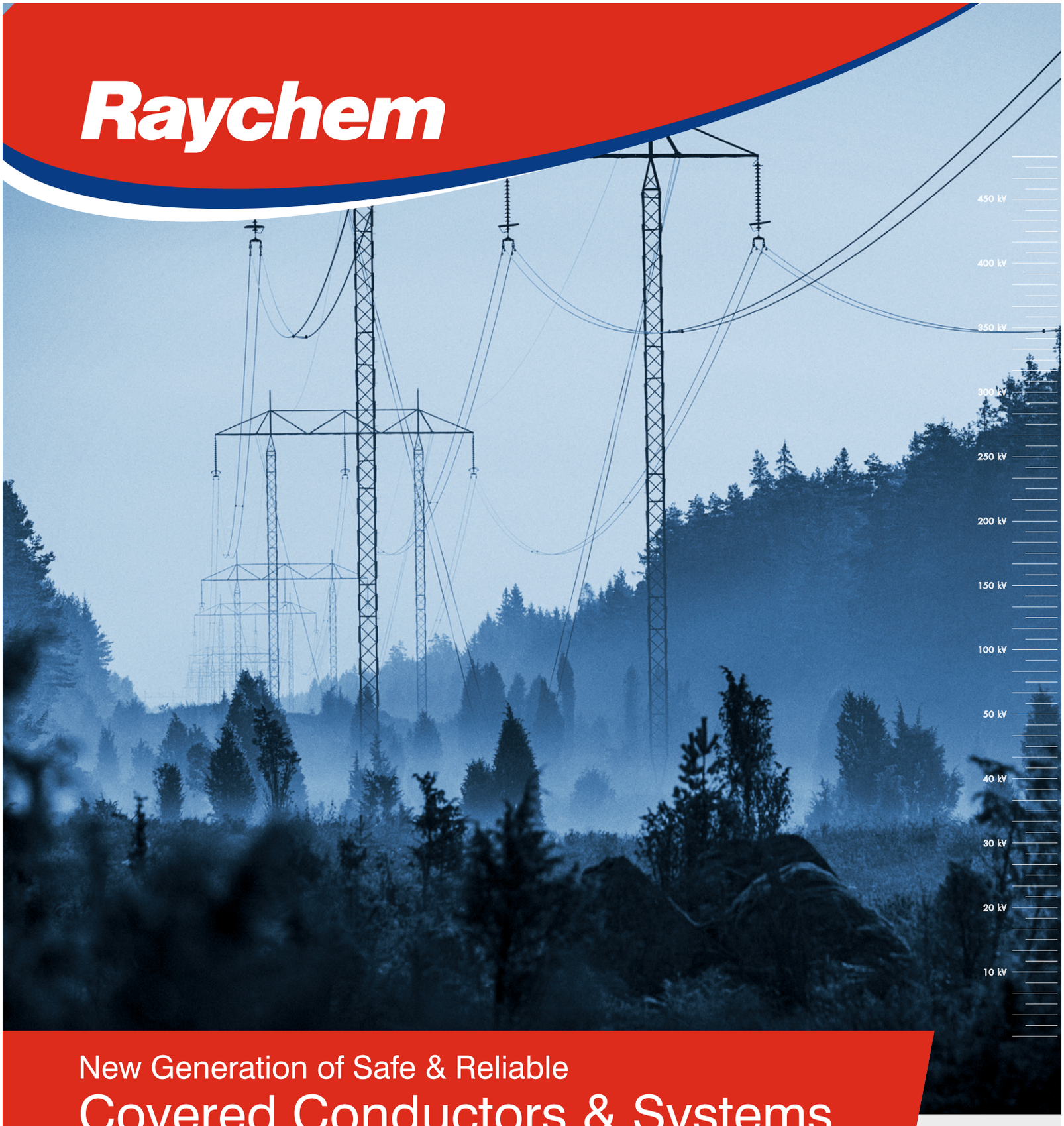

New Generation of Safe & Reliable

Covered Conductors & Systems

(A TE-Connectivity - RPG Enterprises JV)

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Is low reliability and outages in your overhead lines causing serious economic and societal losses

Sources of INTERRUPTIONS

Tree Faults

In India primarily bare aluminium conductor is used for power distribution. The use of bare conductor results in lot of outages especially in forested areas. The outgrown tree branches along the paths of the network poses a great challenge to ensuring constant supply of power to the customers within these operational areas.

Birdages

Birds and animals often interfere with overhead lines causing faults by bridging air clearances. Outages occur especially on distribution network where conductor spacing allow relatively small birds and animals to bridge phases.

Conductor Clashing

Distribution overhead lines is always vulnerable to having phases or phase to ground accidentally bridged resulting in outages and financial losses to the utilities.

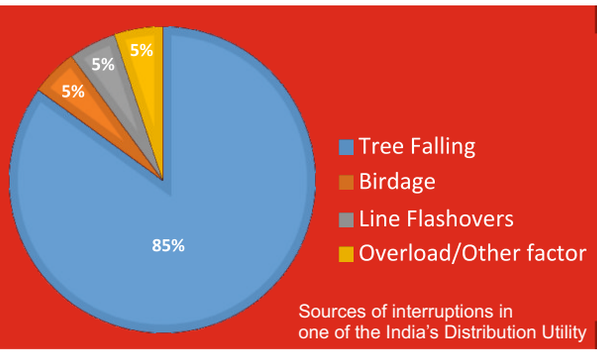
Right-of-Way

Right-of-Way issues are common in urban areas. Transmission lines are usually located adjacent to residential property and contain poles and allowances (clearances) for overhead bare lines, besides underground networks and transformers. The required electrical clearances are frequently found compromised due to the unplanned growth in Indian cities, thereby rendering the power network unsafe and unreliable.

Electrical Accidents

Human life especially line maintenance staff are highly vulnerable to unintentional contact to bare overhead conductor putting their life at great risk.

About 90-95% interruptions can be addressed with the help of Covered Conductors



Sources of interruptions in one of the India's Distribution Utility

We are your preferred partner for

Loss Reduction

Indian state utilities are striving hard to come out of the red and are now aggressively investing in upgrading and strengthening the medium voltage (MV) and low voltage (LV) distribution system.

At Raychem RPG, we have identified the need of profiling the electricity losses with each utility and taking a customised approach to reduce the same. Distribution losses are attributed to three major factors, technical, societal and commercial losses.

Raychem RPG has been instrumental in developing several innovative technologies to address the issues in the Indian distribution system to ***Reduce losses*** and ***Maximize Profits*** for Indian Distribution utilities.

In our yet another endeavour for the cause, Covered Conductors have been introduced for the first time in India by Raychem RPG for applications up to 132 kV in partnership with amokabel, a Scandinavian group company and leading producer of different types of Covered Conductors for varied applications.

Covered Conductors are longitudinally water blocked and covered with special grades of materials that provide insulation and ultra violet protection. These conductors provide safety against accidental contact and are a major help in significantly reducing outages.

Covered Conductors have been type tested up to 66kV in line with EN50397 at CPRI and also at International labs.

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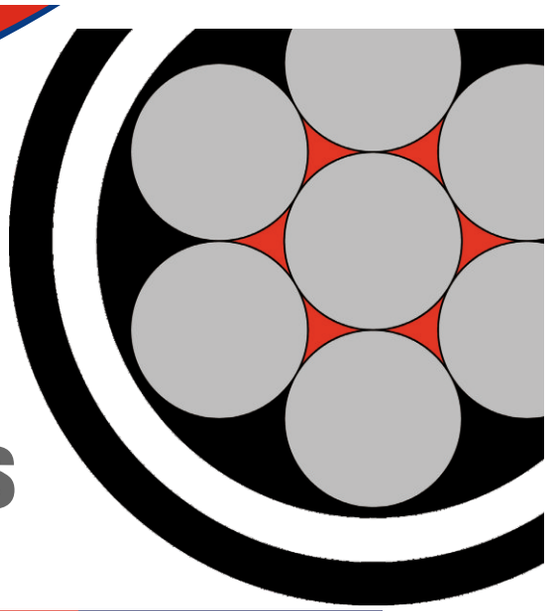

From idea to
Covered Conductors

In 1995 amokabel developed a new construction named CCSX, a product with improved water blocking layer and semi-conductive layer. Longitudinal water blocking made by compound make it possible to tension the conductor without removing the insulating covering.

CCSX

amokabel is the leading producer of CCSX in the world. Today amokabel manufacture CCSX alloyed and non-alloyed wires AAAC/ACSR, voltage range from 1 to 132 kV. amokabel can adapt voltage and cross-section according to customer's requirements and also create unique products after customer's special needs.

ABC-D

Double insulated ABC conductor is a unique product and is extensively used in Europe in the LV network. It is a 1kV touch proof cable for usage in the distribution network.

Benefits with Covered Conductors

- Protects the aluminum conductor from corrosion
- Reducing faults caused by tree contacts and enhance the reliability
- Reducing animal faults
- Upgrade the voltage/current without changing the phase distance
- Preventing bush fires
- Lower life cycle cost compared with bare conductor
- Reducing maintenance cost of tree trimming
- Reducing clearance between phases, can cope with direct contact between phases
- Less risk of sabotage
- Environmental advantages

Ideal applications for:

Forest Area

CCSX Covered Conductor is extensively used in voltage upgradation projects like from 11kV to 33kV, 66kV to 132kV etc. The CCSX Covered Conductor requires less phase-to-phase clearance, and can be installed even on the existing poles and cross arms by just changing the insulators and the surge arresters. This helps to reduce the cost of vegetation management and adverse environmental impact.

High temperature & UV

CCSX Covered Conductors can function smoothly with conductor temperature up to 80 deg C and in corrosive & highly polluted areas. The outer jacket of the Covered Conductor being UV resistant, it can be used in high UV radiation areas.

Cold Environments

Our CCSX conductors fulfill the demands in extreme cold environment with heavy snow and ice load.

Safety

With the triple extrusion layers, Covered Conductor ensures utmost safety from unintentional human contact. Even at 66kV voltage, the leakage current on the surface of the Covered Conductor is as low as 0.8 Milli amps, the fatality level being 10 to 20 Milli amps.

Outages

Covered Conductor eliminate the outages in the power system caused by temporary faults and conductor clashing.

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Right-of-Way (ROW)

With many construction and Infrastructure projects coming up below or adjacent to power networks, ROW has become major issue not only in medium voltage network but also in higher voltages like 132kV or 220kV. With reduced phase-to-phase clearance, Covered Conductors can be very useful in resolving ROW issues and ensuring the safety and reliability of the power system and human habitat.

How can you minimise losses and strengthen your bottom line with Covered Conductors?

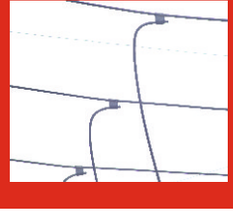
1. Direct tapping as in the case of bare conductor is not possible. All tap offs are taken through Insulation Piercing Connectors (IPC's) only, hence eliminating the source of power theft.

2. All tappings to the transformer can be done through Covered Conductor ensuring there is no outages because of bird faults or human contact.

3. The Covered Conductors are installed using tension & suspension clamps in higher voltages and using tension clamp and pin insulators in lower voltages. The conductor runs continuously from end-to-end without stripping of the insulation. This ensures no corrosion and subsequent slashing of the conductor.

4. In a transmission / distribution network, when a tension pole is introduced, we need a jumper connection. Depending on the usage mostly 2 or 4 bolted connectors are required that are used in these jumpers. By eliminating the use of jumpers and running the Covered Conductor with insulation throughout, the resistance losses of these four connectors is zeroed.

5. Ampact Wedge connectors with very low resistance are being used to connect the Covered Conductors to normal bare conductors adding to the reduced losses.



CCSX Covered Conductor comes with extensive international usage and experience. Large quantities of these have already been installed and are in-service in countries like Europe where they undergo extreme climate. They are also successful in gulf countries like Oman where they are subjected to very high temperature.

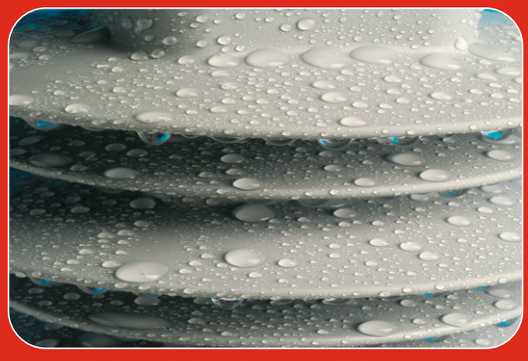
In India more than 1000 Kms of Covered Conductors are successfully commissioned in a place like Vizag with saline air, Kerala where it passes through dense forest & vegetation and in Bangalore city passing through populated and narrow corridors.

Raychem RPG provides complete consultancy including survey, arrangement at optimum BOM, supply and installation of the Covered Conductors as per the customer's requirement.

Selection Chart

Sl No	Description / Designation	Rating available					Type		Area in Sq mm
		11kV	33kV	66kV	110kV	132kV	AAAC	ACSR	
1	CCSX 50	Yes	Yes				Yes		50
2	CCSX 70	Yes	Yes				Yes		70
3	CCSX 99	Yes	Yes	Yes	Yes	Yes	Yes	Yes	99
4	CCSX 120	Yes	Yes	Yes	Yes	Yes	Yes	Yes	120
5	CCSX 157	Yes	Yes	Yes	Yes	Yes	Yes	Yes	157
6	CCSX 241	Yes	Yes	Yes	Yes	Yes	Yes	Yes	241

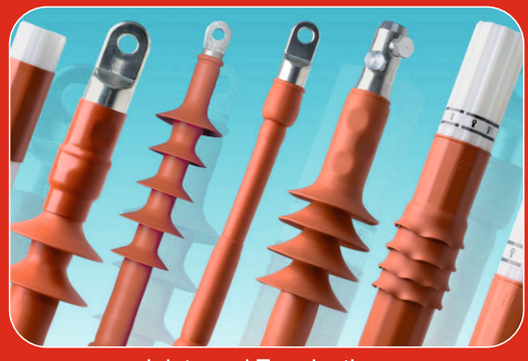
Accessories for Covered Conductors:



Polymeric Insulators and Arresters

Cable Ties

Insulation Piercing Connectors



Joints and Terminations

String Hardware

OUR COVERED CONDUCTORS ARE INSTALLED

WORLD WIDE

Our Covered Conductor can be used in many different environments. It meets the demands for both hot and cold climates, as well as for urban, rural, coastal and forest areas. Thus, making our Covered Conductor a good solution world wide.

Raychem RPG

Regional Office:

Bengaluru + 91 80 46676900
Chennai + 91 44 65718438
Delhi + 91 11 45753700
Kolkata + 91 33 40044081
Mumbai + 91 22 61847300

Customer Care Centre:

Toll Free No. **1800 209 9769**
e-mail your queries to:
energy@raychemrpg.com

www.raychemrpg.com

Corporate Identity Number - U74999MH1984PTC033786

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