Raychem RPG

ENGINEERING GROWTH . PIONEERING EXCELLENCE

ENERGY PRODUCTS DIVISION - SAFETY

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IDENTITY OF SAFETY

TE connectivity

RPG

Raychem RPG

ENGINEERING GROWTH . PIONEERING EXCELLENCE

ENERGY PRODUCTS DIVISION - SAFETY

Raychem RPG is involved in engineering products and services catering to the infrastructure segments of the economy which are:

- Power
- Oil & Gas
- Telecommunication
- Hydrocarbon

The company supplies products and services to all the above mentioned segments and has been growing at over 30% per annum for the last several years.

Elecsafe is a brand of Raychem RPG, a joint venture between TE Connectivity, USA and RPG Enterprises, India. TE Connectivity is a US $ 13 billion global provider of engineered electronic components. RPG Enterprises is one of India's fastest growing business group with FY 2011 turnover touching US $ 3.6 billion.

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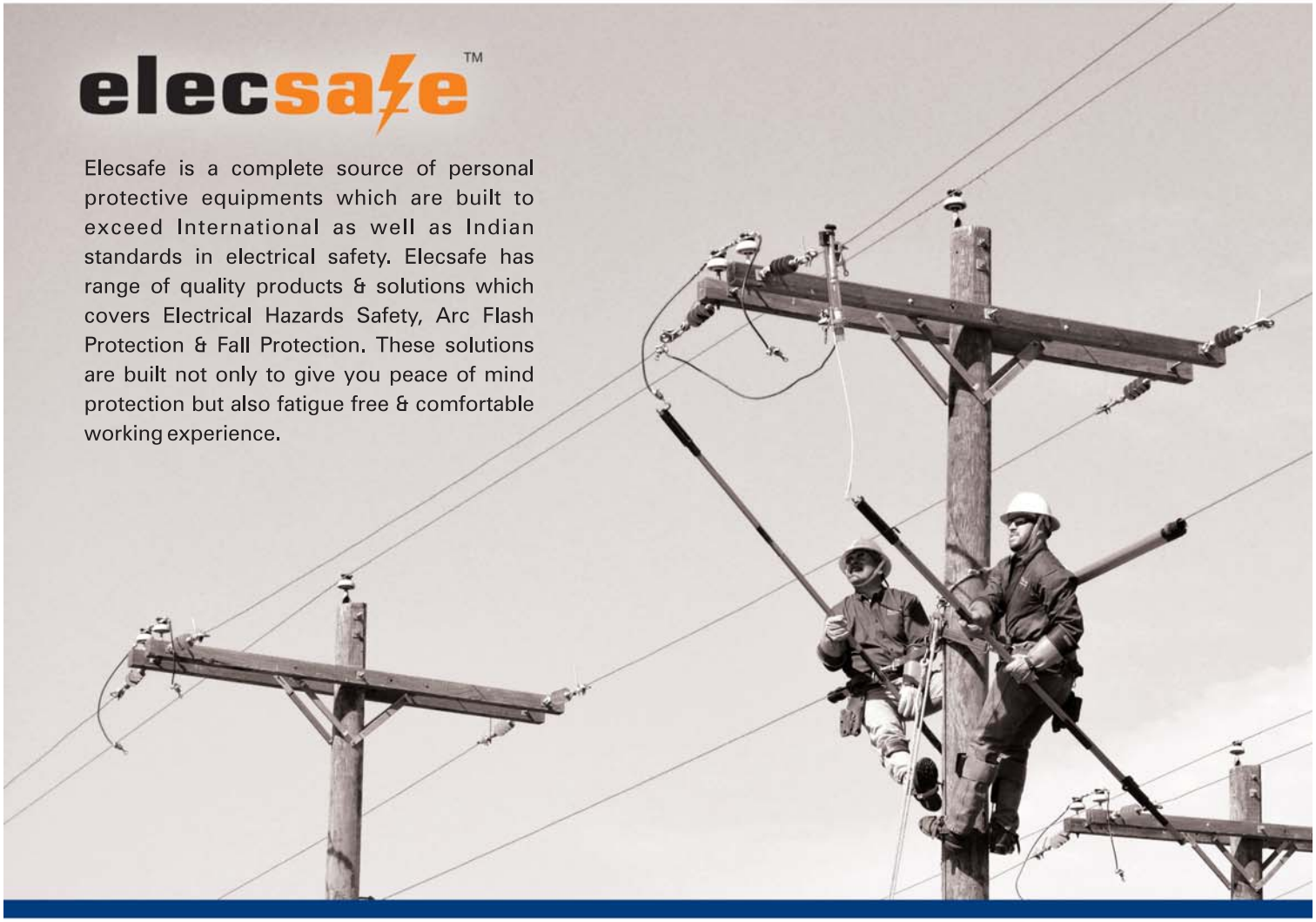
Elecsafe is a complete source of personal protective equipments which are built to exceed International as well as Indian standards in electrical safety. Elecsafe has range of quality products & solutions which covers Electrical Hazards Safety, Arc Flash Protection & Fall Protection. These solutions are built not only to give you peace of mind protection but also fatigue free & comfortable working experience.



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Electrical Hazards Protection

Dielectric Shoes

Introduction

Elecsafe dielectric shoes are completely electrically insulated footwear designed to give added protection who are at risk due to electrical shocks during operations. Dielectric shoes offers unique protection when compared to the usual industrial safety shoes like:

- Insulating properties for complete footwear & not just for soles.
- 100% waterproof

Elecsafe Advantage

Elecsafe range of dielectric shoes meets international standards as per EN 50321 ASTM standard F2413 05, ASTM F1116 F1117-08 & PPE ISO 20345-1 with DIR 89/686/EEC TOE CAP 200

- It is made with epoxy coated steel toe which can withstand 200 joules.
- Specially designed rubber cleated out sole for maximum grip & slip resistance.
- Oil Resistant vulcanized rubber sole for maximum grip, minimum wear & improved cut resistance.
- Heat resistant upto 300deg Celsius for 30 sec.
- Complete boot tested at 20kV, 3 mins and 10 kV for 8hours.
- Sole tested for 35 kV upto 3 minutes.
- Shelf life - more than 10 years.
- Shaft is made from yellow Polyflex dielectric compound having following durability features:
  - Lining - Washable knitted nylon (seamless).
  - Insole - Moisture absorbing, machine washable.

Operating Voltages in AC	Withstand Voltage	Leakage Current
≤ 1000	10,000	5 mA/ boot (5kV)
≤ 7500	20,000	10 mA/ boot (10kV)
≤ 17000	30,000	13 mA/ boot (20kV)

All above parameter are tested as per EN 50321

Applications:

Power utilities, railways, electrical sub station, electrical operations- indoors as well as outdoors.

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Electrical Hazards Protection

Gloves

Introduction

Elecsafe gloves provide complete hand protection from electrical shock during electrical operations.

Elecsafe Advantage

Elecsafe electrical insulating rubber gloves are made with highest quality rubber which gives unique benefits like :

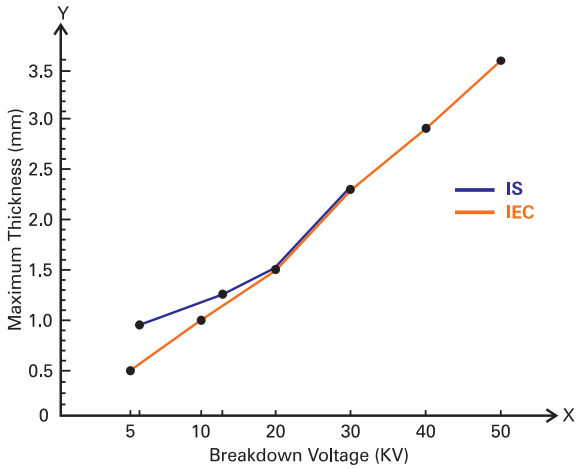
- Tensile Strength ≥ 16MPa - Gives higher operating life.
- Average elongation at break ≥ 600% - flexibility for different hand sizes.
- Puncture resistance ≥ 18N/mm - Gives higher puncture resistance.
- Tension set ≤ 15 % - Non deforming

Gloves as per IS-4770

- Used for applications ranging from 500V to 17kV.
- Resistance to ozone - Longer storage life
- Resistance to Moisture Absorption - Suitable for rainy and humid conditions.

Gloves as per IEC-60903 : 2002-03

- Made from high quality synthetic latex rubber for better properties in less thickness.
- Automated dipping process to control design variables.
- Gloves voltage applications from 500V to 40kV.
- Contoured design for less fatigue.
- Elecsafe offers complete range of gloves in all classes and sizes.
- Added benefit of resistance to acid, oil, ozone and very low temperature.
- Conforms to Ageing Requirements and Flame Retardant properties.



Comparison : Thickness Vs Breakdown Voltage

Leather Over Gloves

- Mechanical protection against cut, abrasion & punctures
- Manufactured with top grain cow hide leather.
- Provides dual benefit of dielectrical as well as mechanical resistance.

Cotton Liner Gloves

- Knitted from stretch fabric these gloves are worn to reduce discomfort due to perspiration & slippage.

Applications

Distribution and Utilities, Railways, Oil and Gas, Heavy Engineering etc.

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Electrical Hazards Protection

Safety Helmets

Introduction

Elecsafe offers a complete range of safety helmets confirming IS2925: 1984 & ANSI Z89.1 Class E

Elecsafe Advantage

- Unique Aerodynamic Design for better diversion of falling object.
- Light weight & ergonomically comfortable design for fatigue free operation.
- Soft sweatband for ease of wear and absorption of sweat.
- Slots for fixing accessories like ear muff and arc face shield.
- Higher impact resistance ensures better safety.

Design Variants

- Elecsafe Hard Hat
- Elecsafe premium design with air vents

Elecasfe helmets are made from high quality HDPE and ABS material which ensures superior mechanical & dielectric properties (upto 2.2kV)

All variants such as Ratchet, Pinlock, Chin Strap and with or without Chin Cup, in 6/8 point suspension are available.

ELECSAFE™ Electrical Insulating Helmet

Elecsafe R & D has come up with unique variant by developing electrical insulating helmets conforming to the American Standard ANSI Z89.1-Class E which is specially designed standard for testing electrical parameters. These helmets are designed to provide high level head protection from accidental electrical shocks from live line wires and working in congested electrical work areas. Electrical helmets are tested upto the voltage levels of 33000V at NABL lab & also tested for mechanical properties as per IS2925:1984.

Available Accessories

Ear Muffs, Face Shield, Chemical Splash Goggles

Applications

Electrical substations & power generation plants.

Electrical transmission towers.

Engineering workshops & construction industry.

Operations , maintenance, inspection and surveillance.

Inside the arc rated hoods.

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Electrical Hazards Protection

Insulating Rubber Mats

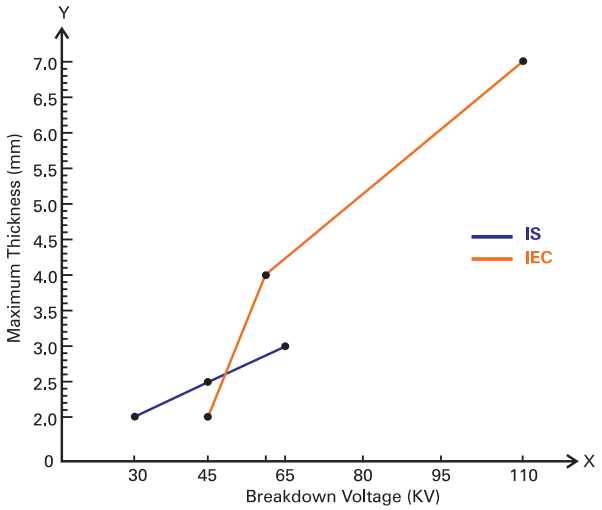
Introduction

Elecsafe high voltage insulating rubber mats conforms to IEC 61111:2002 and are manufactured using high quality elastomer rubber in order to provide complete protection against electric shock due to electrical earth faults. These rubber matts are suitable for use in outdoor and indoor applications and are generally placed in front of electrical panels and switchgears in orders to create a safe working environment for the operators.

Elecsafe Advantage

High quality EPDM formulations offers low leakage current values also giving better resilience and toughness to mats against ozone, UV and general weathering.

- Slip resistant
- Not affected by of acid or oil.
- Hydrophobic in nature.
- Fire resistant.
- Halogen free flame retardant.
- Mats available for 415V to 66kV voltage applications.
- Higher breakdown voltage in lesser thickness.
- Thickness variation from 2-7 mm as per voltage applications.
- Continuous rolls of 10m in lengths.



Elecsafe high voltage dielectric flooring is also available. It is a combination of high quality anti-tracking adhesive, dielectric polymer tough tile and mat cover. Flooring provides long term solutions against high voltages.

Applications

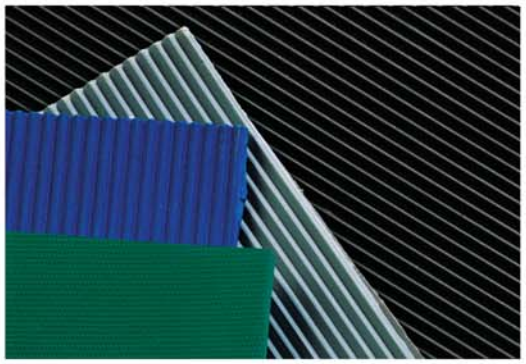
Electrical substations & power generation plants.

Industrial segments

Engineering workshops

Maintenance and operations

Inspection and surveillance



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Arc Flash Protection

Arc Suits

Introduction

Arc Suit is a specially designed protection garment used worldwide to effectively protect human life from electrical flash. They are made from special flame resistant fabric (FR) meeting IEC 61482-1 & IEC 61482-2 and tested as per ASTM 1959. They are classified as per HRC 1, HRC 2, HRC 3, HRC 4 based on the ATPV values as per NFPA 70 E values.

Elecsafe Advantage

- Inherently flame resistant FR fabric – properties retained over life span.
- Lightweight fabric – Ranging from 6.5 to 9 oz/yard^2 for user comfort.
- Unique design – Various combinations for fatigue free operation.
- For higher ATPV air ventilated design garments.
- Stitching thread – garments made with FR rated thread.
- Hydrophilic as well as hydrophobic composition available.
- Various ATPV values garment starting from 8.4 & upto 100 cal/cm^2
- Heat Attenuation factor (HAF) – upto 80% to ensure minimum exposure to flash.

Arc rated accessories are available to compliment all risk category depending upon applications & incident energy handling requirement.

Hazards Risk Category - HRC	Clothing Description	Required Minimum Arc Rating of PPE cal/cm2
HRC -1	Coverall (1 Layer)	4
HRC -2	Coverall (1 Layer) + Arc Face Shield	8
HRC -3	Jacket+Pant (1 / 2 Layer) + Arc Hood	25
HRC -4	Jacket + Pant Bib Type (3 or more Layers) + Arc Hood	40

Applications

Electrical switch gear control board, motor control board operations and steel industries, railways, electrical generating stations, electrical maintenance operations

Various Terms Used

HRC – Hazard Risk Category
ATPV – Assured Thermal Protection Value
NFPA – National Fire Protection Association

Arc Suits

Garment designs

As the ATPV value increases number of layers of fabric also increases, so does the weight & discomfort factor for the prolonged use. We have various garment designs available to suit various climatic & operating preference.

Coverall – This is single piece garment which covers body from neck to toe. This is one of the easiest to wear and comes with side pockets to keep your tools handy.

Jacket + Pant Type – this type of garmenting option is recommended for HRC 3 & 4, comes in two piece garment & can be worn easily. Hood is worn over head which has inbuilt arc rated face shield & Class E helmet.

Bib Type + Jacket + Hood / Switch Coat + Leggings + Hood – This is recommended for HRC 4 category due to high thickness of fabric layers. Bib type pant is free size & has in-built suspenders which reduces fatigue of weight. The pile waist strap can be adjusted to suit various positions. Switch Coat is a knee length single garment supported by leggings.

Arc Suit Kit

We can give you kits which has following items which are certified to various International or IS standards.

- Arc Rated Face Shield with/ without chin cup
- Only Arc Hood for Category 4 - optional
- Electrical Helmet
- Balaclava
- Dielectric Shoes
- Insulating Rubber Mats
- Insulating Rubber gloves
- FR rated shoes cover
- Anti Fog goggles
- Leather over gloves, Cotton Liners
- Kit Bag

Accessories

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Fall Protection

Safety Harness

Introduction – Harness is to be worn by person who is working at heights or vertical operations which has risk of falling. They are designed as per EN 361:2002 which is a latest standard for this category.

1. *Adjustment Shoulder Buckles: Made from top grade corrosion resistant steel.*
2. *Sternal D ring: To be used as attachment point for fall protection while climbing or entering confined space.*
3. *Ventral D ring: Multiple application D ring used for rope access rescue and many other applications.*
4. *Work Positioning Belt: Made of knitted mesh pads which provides comfortable lower back support while working.*
5. *Thigh Straps: Provided with adjustment Buckles and knitted mesh in the pads give better shock absorption.*
6. *Combination Buckles: Provide very comfortable adjustment keeping the harness snug fit to the body. They are also easy to adjust and used.*
7. *Shoulder Straps: Fully padded with padding made from comfortable knitted mesh for extra back and shoulder support.*
8. *Stitching pattern: Unique stitching pattern provides more stitching strength.*
9. *D plate Dorsal Webbing holding Crossplate: Maintains the D ring in place even after fall.*

- A *Adjustment Buckles: Designed to enable easy pull down and adjust the shoulder straps for a comfort fit.*
- B *Two Front D rings: Provided for fall protection while climbing or entering into confined places.*
- C *Lateral D rings: Provided for Work Positioning Lanyards to enable the worker to work comfortably with both hands free.*
- D *Chest Strap: Provided with metallic/ plastic adjustment buckle in order to enable the user to bring chest strap in required position.*
- E *Thigh Strap: Provided with metallic adjustment buckle in order to adjust the thigh straps as per requirement.*
- F *Forked Lanyard: Provides the facility to move in all directions while remaining safely anchored at one place*
- G *Dorsal D ring: For fall arrest and suitable for site work or platform working where worker only needs to be attached with no other requirements for climbing, work positioning etc.*
- H *Fluorescent Cotton Coverall: For all weather use with high visibility properties.*

ENERGY ABSORBER

Absorbes one major part of impact incured in a fall. Energy Absorber are made of 44 mm wide webbing and shring wrapped and reduces the fall impact to less than 6 KN.

FALL ARRESTORS

Retractable Fall Arrester: Used in those areas which have small fall clear distances. In the event of fall the block locks itself and arrests the fall immediately, it limits the impact of fall felt on the body to less then 6 KN.

Rope Grab Fall Arrester: Works on 14mm to 16mm diameter anchorage line. Unique gravity locking system and Double Locking System

Ropes, Hooks and Lanyards

Introduction

Elecsafe introduces a wide range of single and double Lanyards, having different configuration of connectors. Ropes are available in lengths 1m, 1.5m, 1.8m and 2.0m. The Lanyards are made of 12mm dia polyamide rope, with loop ends protected by abrasion resistant thimble which prevents damage from metallic contact.

Work Positioning Belt

Enables the worker to work at heights in a safe suspended position.

Rescue Kit / Descending Kit

Safety Harness ES 560

Anchorage Web Sling -2 Nos

Grip Descender

Fall Arrestor

Work Positioning Lanyard

Karamantle Rope 50 mtrs

Karabiner-3 Nos

Anchorage Line

Safety Training Program

Electrical safety training starts with your company's commitment to same. Our electrical safety training course is structured to train your electrical staff on necessary use, care, maintenance, inspection & utilization of the working systems while using Elecsafe PPEs. This training course is developed to ensure that operators are instructed to operate the Elecsafe PPEs within the guidelines of current norms & safety regulations. Raychem RPG's electrical safety program will aid employees & companies minimize the risk of personal injury and equipment damage due to operator's error.

Who should attend?

Utility, industrial, commercial electrical personnel involved in hands-on roles or maintenance operations. This includes engineers, technicians, electricians, linemen, supervisors & other personnel who work on or near energized or de-energized electrical equipment & systems.

For more information please e-mail your queries to:

elecsafe@raychemrpg.com

Caution : PPEs should be used by electrical operators who are thoroughly trained for its correct and safe use. Training should be in accordance with the employer's work procedures & standards.

ENERGY PRODUCTS DIVISION - SAFETY

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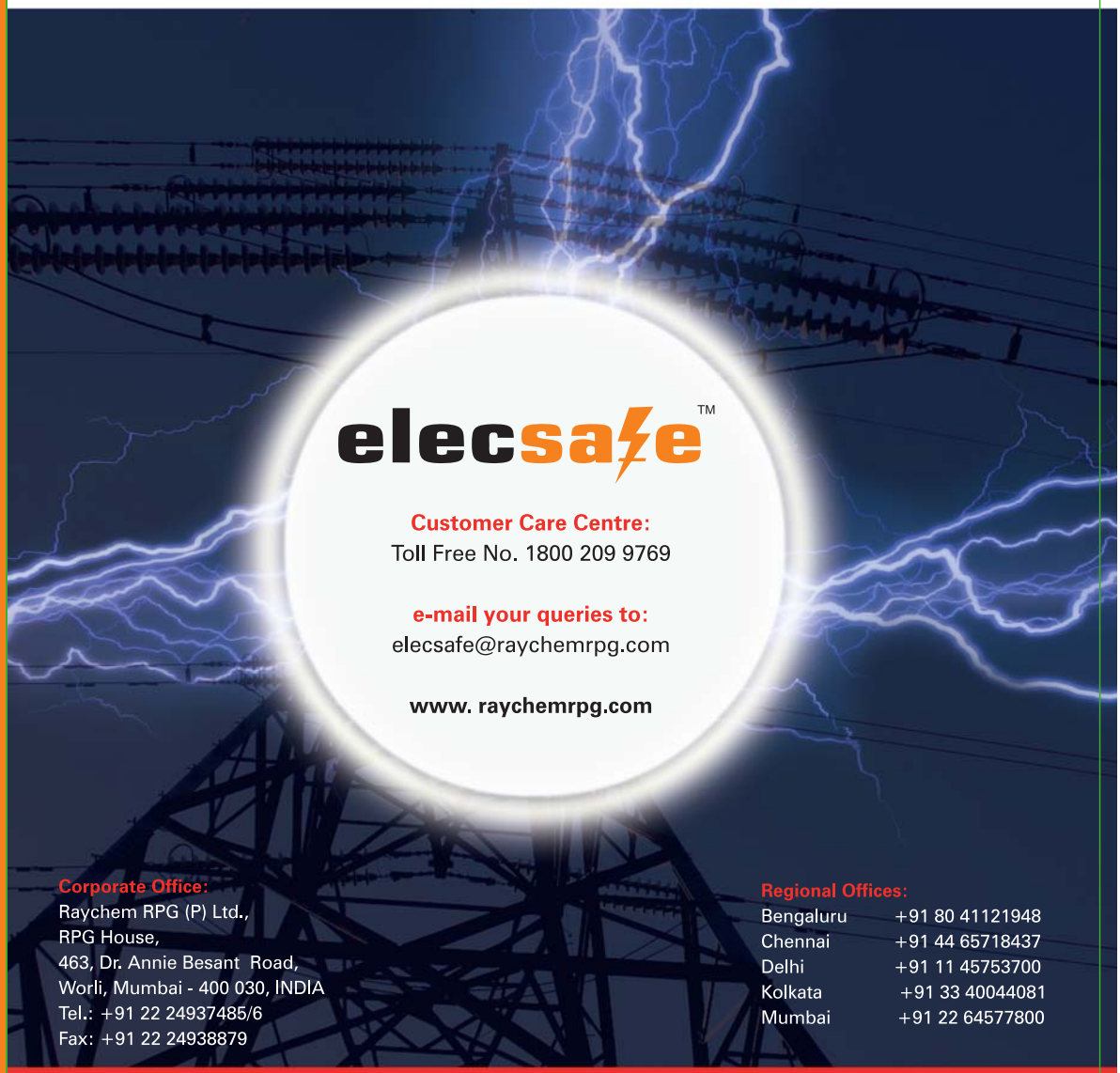

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