



# **PERSONAL PROTECTION SOLUTIONS**

Head-to-Toe  
in Electrical Safety

# ELECTRICAL INSULATION MATS

## How Do Electrical Insulation Mats Work?

Electrical Insulation mats are made of rubber. Rubber, due to its properties of resistivity, is used in many applications throughout industry to insulate and protect; it is an obvious choice for electrical safety matting and is tested vigorously to ensure it meets the required level of protection.

Rubber is a natural dielectric material and will therefore inhibit the flow of electric charge as a result of its molecular structure, preventing the free flow of electrons. The dielectric and electrically resistant properties of rubber make it an ideal insulator. This when combined with the flexibility and cushioning nature of the material, makes it a perfect choice for electrical safety matting.

Maintaining the insulating properties of Rubber is intrinsically linked to the construction of the compound. Any additives (dyes, fillers, preservatives and curatives) can affect the electrical resistance, hence strict quality control standards are maintained throughout the manufacturing process, to maintain the insulation performance.

## Electrical Insulation Mats

Electrical Insulation Rubber Mats comply to **IEC 61111 / ASTM D 178 / AS/NZS 2978** and manufactured using **high quality elastomer rubber** in order to provide complete protection against electric shock, due to earth faults.

Electrical Insulation Mats are suitable for use in **outdoor** and **indoor** applications and are generally placed in front of electrical panels, switch gears & high voltage equipment, in order to create a safe working environment for the operators/users.

The Electrical Insulation mat insulates the worker from the ground to avoid him being crossed by electrical current, in case of direct contact or pace voltage. The choice of Class must be determined according to the maximal nominal voltage of the network.

The marking colour is made according to the colour coding of the Standard. Matting complies to the following specifications required by the Standard

- Puncture resistance test
- Dielectric test
- Ageing test
- Flame retardance test
- Acid resistance test
- Oil resistance test

## Mat Specification

- Material: Rubber
- Temp Range:-40°C to +65°C
- Colour available in black and dark grey

## Mat Features

- Withstand upto 50 kV
- Electrical mat is hard wearing and non-slip and can be easily cleaned or washed with a mild detergent
- Anti-fatigue nature, comforting feet while standing for prolonged period
- Matting is packed in 10 meter rolls to avoid joints, however cut lengths are also supplied
- Comply with IEC 61111 / ASTM D 178 / AS/NZS 2978 requirements
- Every 300 mm is marked with class and working voltage details
- Electrically tested for each meter



## CLASSIFICATION

The following division is based on threshold level of electric current resistance.

Classification	Max Working Voltage	Proof Test Voltage	Withstand Voltage
Class 0	1,000 AC	5,000 AC	10,000 AC
Class 1	7,500 AC	10,000 AC	20,000 AC
Class 2	17,000 AC	20,000 AC	30,000 AC
Class 3	26,500 AC	30,000 AC	40,000 AC
Class 4	36,000 AC	40,000 AC	50,000 AC



IEC 61111

## ELECTRICAL INSULATING GLOVES

Rubber Electrical Insulating Gloves protect people working on live voltages or working in proximity of electrical installations from electrical shocks. Our gloves can be used for a wide range of voltages from **500 V to 36000 V** and comply with **EN60903:2003**, **IEC60903:2014** and **CE category III**. Its **ergonomic** design provides comfort to the wearer for longer duration and its thickness ensures the **dexterity**. For mechanical protection from cut and abrasion, rubber gloves must be used along with leather over glove. For composite gloves leather protectors will not be required. Our gloves come with two different cuff patterns Rolled edge (O) and Straight edge (S).



## RUBBER GLOVES

Product Code	Class	Length (cm) Y	Category	Palm Size X	Packaging Colour	Cuff pattern Z
KL-AXYZ	00	28/36	AZC	8-9-10-11-12	Beige	O/S
KL-BXYZ	0	28/36	AZC	8-9-10-11-12	Red	O/S
KL-CXYZ	1	36/41	RC	8-9-10-11-12	White	O/S
KL-DXYZ	2	36/41	RC	8-9-10-11-12	Yellow	O/S
KL-EXYZ	3	36/41	RC	8-9-10-11-12	Green	O/S
KL-FXYZ	4	41	RC	8-9-10-11-12	Orange	O/S

While ordering kindly replace "X" with palm size, "Y" with length (cm), "Z" with 'O' for rolled edge cuff pattern and 'S' for straight cuff pattern.

\*Obtaining the category authorises an additional of 0.6mm Signification of category letters :

A : Acid, Z : Ozone, H : Oil, C : Very low temperature, R: A +Z+H

## GLOVE ACCESSORIES

### Over Gloves (Leather Protectors)

- Over gloves are made from cow hide leather and split leather at cuff or comes in goat leather & split leather
- The gloves comply to CE, EN 388-2122 / EN 388 3133, EN 420
- These gloves are used as an additional protection for Rubber electric gloves
- They protect the rubber electrical gloves from cut, tear & puncture
- The gloves come with velcro adjustment strap which ensures proper fitting of over gloves



### Inner Gloves

- Inner gloves are made of cotton
- Gloves are worn under electrical gloves, to provide comfort to wearer by absorbing perspiration
- Gloves comply to CE EN 388 (minimum risk only)
- Mitten type gloves are also available (fingerless)



## CLASSIFICATION AS PER IEC 60903 - 2014

Classification	Max Working Voltage	Proof Test Voltage	Withstand Voltage
Class 00	500 AC	2,500 AC	5,000 AC
Class 0	1,000 AC	5,000 AC	10,000 AC
Class 1	7,500 AC	10,000 AC	20,000 AC
Class 2	17,000 AC	20,000 AC	30,000 AC
Class 3	26,500 AC	30,000 AC	40,000 AC
Class 4	36,000 AC	40,000 AC	50,000 AC

## FEATURES

- Manufactured at Raychem RPG's state of art manufacturing facility in Vasai, near Mumbai.
- Insulating gloves are manufactured from natural rubber latex procured from RPG Group's rubber tree farms. This ensures uniformity in the insulating properties of rubber.
- Gloves are powder free
- Type tested in renowned international laboratories
- Low Protein tested to avoid allergic reaction to users
- Gloves Revalidation Service offered as per IEC 60903-2014 after every 6 months of usage

## FLASH PROTECTION ARC SUITS



Arc suit is a specially designed protection garment used worldwide to effectively protect human life from electric flash. They are made from special **flame retardant fabric (FR)** complying to **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 ATPV values, as per **NFPA 70 E** values.

### Benefits

- **Inherently** flame resistant FR fabric (properties retained over life span)
- **Lightweight** fabric ranging from 6.5 to 9 oz/yd<sup>2</sup> for user comfort
- Unique design in various combinations for fatigue free operation
- Higher ATPV **air ventilated design** garments
- Stitching with **FR rated thread**
- Various ATPV value garment starting from 8.4 & upto 100 cal/cm<sup>2</sup>
- Heat attenuation factor (HAF) upto 80% to ensure minimum exposure to flash

**Arc rated accessories are available to compliment all risk categories depending upon applications and incident energy handling requirement.**

### Applications

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

### Various Terms Used

- HRC – Hazard Risk Category
- ATPV – Arc Thermal Performance Value
- NFPA – National Fire Protection Association

## Garment Designs

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

### Coverall

Single piece garment covering the body from neck to toe. It is easy to wear.

### Bib Type + Jacket + Hood

The garment 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 the fatigue of weight. The pile waist strap can be adjusted to suit various positions.

### ARC SUIT KIT

- Arc Suit
- Arc rated Face Shield with/ without chin cup (optional)
- Arc Hood for Category 4 (optional)
- Electrical Helmet with voltage sensor (optional)
- Dielectric Shoes (optional)
- Insulating Rubber Gloves (optional)
- Leather over Gloves, Cotton Liners (optional)
- Kit Bag





## HELMET WITH VOLTAGE SENSOR

### A Life Saving Electrical Smart Helmet

Raychem RPG's Electrical Insulating Helmets comply to American Standard **ANSIZ89.1 Class E**, for testing electrical parameters and **mechanical properties as per IS2925:1984**.

The helmets are made from high **quality HDPE** which provides higher **mechanical** and **dielectric properties**. They are used by workman requiring high level head protection from accidental and electrical shocks from live line wires and while working in congested electrical work areas.

When a linesman approaches live line of MV/HV, the sensor will detect the electro-static field in proximity (**non-contact type**) and alert him with a blinking LED and audible alarm. The Electronic Sensor is type tested as per **EMC IEC61000-4**.



### Applications & Features

- Electrical Transmission & Distribution Towers
- Electrical manufacturing, service, operation, testing & surveillance work areas
- Senses Electro-Static field of live line
- Detects 11 kV live line from 1.5 meters
- Provides alert through LED & Buzzer
- Easy to replace 2x AAA Batteries

### Benefits

- Unique aero dynamic 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. Sweat can be easily wiped off with cloth
- Slots for fixing accessories like ear muffs & arc face shield
- Higher impact resistance ensures safety

### Helmet Sensor Application Range

11 kV upto 33 kV  
Helmet Sensor Range 1

66 kV upto 110 kV  
Helmet Sensor Range 2

132 kV upto 220 kV  
Helmet Sensor Range 3

\*\*Above is representation of different ranges of voltage level in standard offering & can be customized as per requirement

\*\*Helmet Sensor is programmed for one range and it is not advisable to use for other ranges

\*\*Functional test report available from 11 kV to 220 kV from ERDA

\*\*Helmet sensor is ideal for line application and not for switchyard caged secure areas

## Smart Helmet with Integrated LED Torch

### Advantages

- High Performance LED up to 45 Lumens
- Easy to recharge Li-Ion Battery using Micro-USB Port
- Run time of 21 hours
- Three level of brightness setting
- Multi Axis Rotation (Covers 360°) Beam Coverage (100°)
- Light weight (20g)
- Allow Outdoor Application with IP 65
- Impact Resistance of 1.5 meter



## DIELECTRIC BOOTS

Dielectric boots are completely electrically insulated footwear designed to give added protection from electrical shocks during operations. Dielectric boots offers unique protection when compared to the usual industrial safety boots.

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

### Benefits

- Dielectric boots meet international standards as per **EN 50321**
- Made with epoxy coated steel toe
- Specially designed rubber cleated out sole for maximum grip & slip resistance
- Oil resistant vulcanized rubber sole for maximum grip, minimum wear and improved cut resistance
- Heat resistant
- Lining washable knitted nylon (seamless)
- Insole moisture absorbing, machine washable

### Applications

Power utilities, railways, electrical sub –station, electrical operations – indoors and outdoors



## REVALIDATION SERVICES

Our relationship with customers does not end but begins with the supply of our Personal Protection Equipment (PPE). At Raychem RPG, we understand that safety is a continuous journey and not a destination. Therefore, to ensure that PPE offers the intended safety to users, we provide revalidation services in line with recommendations of **IEC 60903** for Gloves and **IEC 61111** for Mats. This service not only checks the healthiness of the PPE but gives peace of mind to the user.



## ABOUT RAYCHEM RPG

The Company was incorporated in 1989. It is a 50:50 Joint Venture between TE Connectivity, U.S.A. (formerly Tyco Electronics) and RPG Enterprises, India.

Based on the foundation of trust and tradition, Raychem RPG is involved in engineering solutions and services. Pioneering in smart products and technologies, the company caters to infrastructure industries such as Power and Hydrocarbon.

Raychem RPG is organized around four Strategic Business Units (SBUs) to fulfill the demands of customers from domestic, as well as, global markets.

**Energy | Transformer | Oil & Gas | International**

# Raychem RPG

For details, connect with one of our offices, closest to your location.

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