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R-LOC[®]



EARTHING, GROUNDING & LIGHTNING PROTECTION

Raychem RPG (P) Ltd.

ENGINEERING GROWTH . PIONEERING EXCELLENCE



(A TE Connectivity - RPG Enterprises JV)



Vasati Plant



venture company between TE Connectivity, USA. (a
rises, India (one of the top 10 business houses in

inics), U.S.A. is a US\$ 15 billion conglomerate &
components business and Engineering Products &

with interests in Power Generation, Distribution &
, Retail & Entertainment Sectors and a revenue

id in technologies serving the infrastructure sector,
Constant innovation is a way of life at Raychem RPG
ing CAGR of 40% for last 5 years stands testimony to

cross India. Our Core competencies lie into the
e Accessories, Transformers, Gas Meters, Cathodic
ing Products.

ed by Lloyd's Register of Quality Assurance Limited,

Focus on customers.

Develop a committed and responsive
community of Employees, Distributors and
Vendors.

Embrace growth and productivity through
Innovation and Entrepreneurship.

Communicate openly and demonstrate
integrity in all our activities.

Demonstrate passion for performance
through anticipation, speed and flexibility.

Protect the environment and contribute to
society around us.

PRODUCT APPROVAL



001:2007

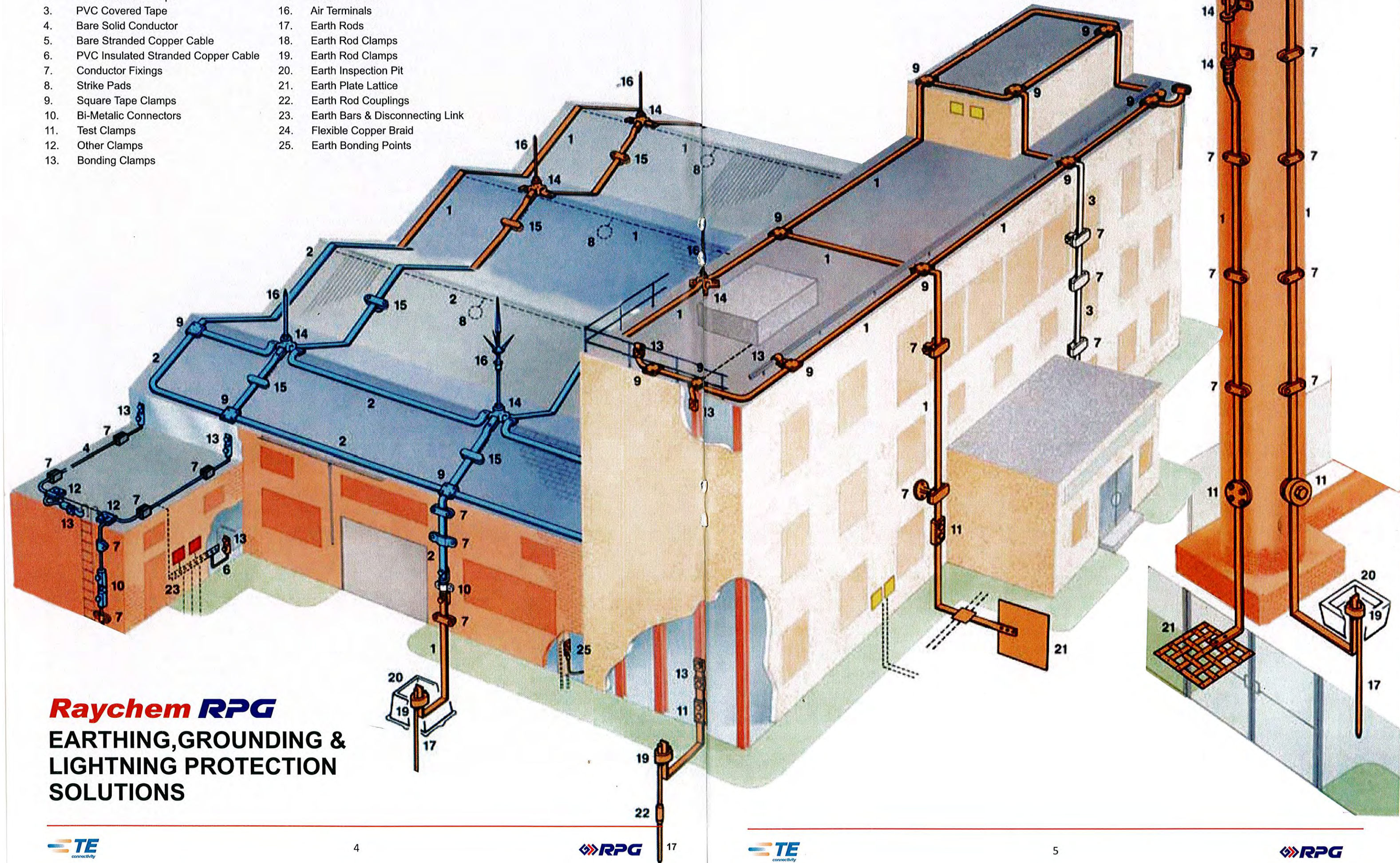
(Under Progress)

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|------|-------------------------------------|
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| 2. | Bare Aluminium Tape |
| 3. | PVC Covered Tape |
| 4. | Bare Solid Conductor |
| 5. | Bare Stranded Copper Cable |
| 6. | PVC Insulated Stranded Copper Cable |
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- | Item | Product |
|------|---------------------------------|
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| 23. | Earth Bars & Disconnecting Link |
| 24. | Flexible Copper Braid |
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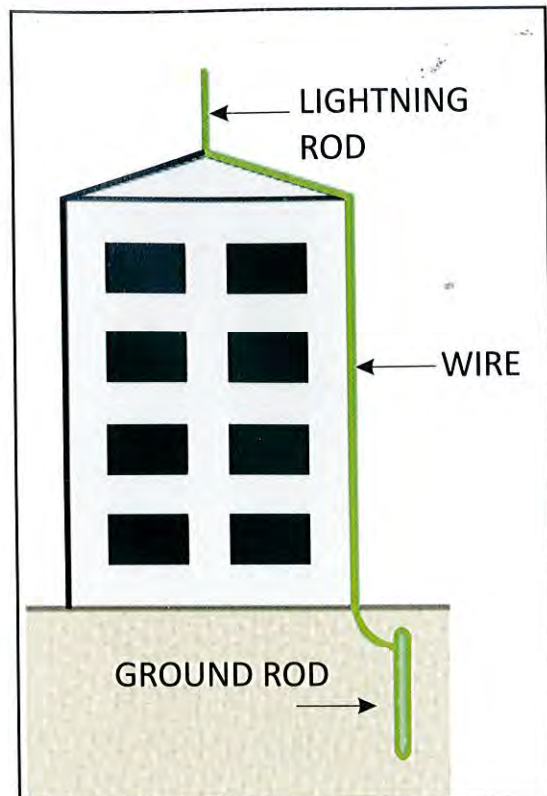
Raychem RPG
**EARTHING, GROUNDING &
 LIGHTNING PROTECTION
 SOLUTIONS**

PRINCIPLES OF LIGHTNING, EARTHING AND GROUNDING SYSTEM

Lightning protection, Earthing and Grounding are interdependent disciplines under the Raychem RPG's Lightning, Earthing and Grounding Protection System.

The focus of Raychem RPG's engineering and technical expertise encompasses the following:

- ◆ Capture the Lightning strike
- ◆ Convey the energy safely to the ground
- ◆ Dissipate energy into the grounding system
- ◆ Bond all ground points together
- ◆ Protect incoming AC power feeders
- ◆ Protect low voltage data/telecommunications circuits



At Raychem RPG we offer innovative, efficient grounding and bonding products along with a comprehensive consultancy on the Lightning protection, earthing, grounding system involving grounding requirements, installation systems, needs and layout of the facility in congruence with the appropriate codes and standards.

FREQUENTLY USED TERMS

Ground : A conducting connection, whether intentional or accidental between an electrical circuit or equipment and the earth or to some conducting body that serves in place of the earth



Earth : The conductive mass of the earth whose electric potential at any point is conventionally taken as equal to zero. The term 'earth' and 'ground' are used interchangeably

Bonding : The permanent joining of metallic parts to form an electrically conductive path will ensure electrical continuity and the capacity to conduct any current likely to be imposed.

Impedance : The total resistance of an electric circuit to the flow of alternating current.

CHARACTERISTICS OF A GOOD GROUNDING SYSTEM

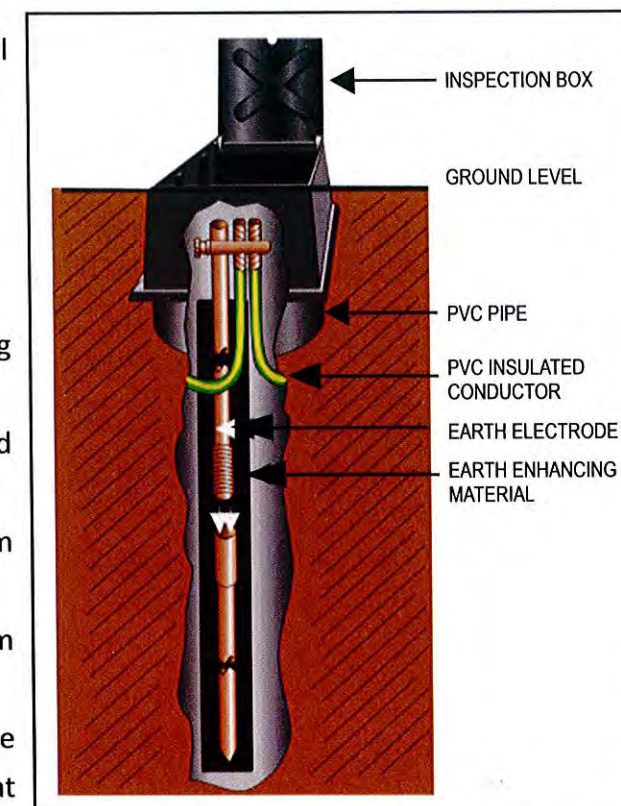
- ◆ Good electrical conductivity
- ◆ Conductors capable of withstanding available electrical fault currents
- ◆ Long life- at least 40 years
- ◆ Low ground resistance and impedance

Need for Grounding

The following aspects require the installation of grounding system:

- ◆ The most important reason is to protect people and property
- ◆ To help protect structures and equipment from unintentional contact with live conductors
- ◆ To help support maximum safety from electrical system faults and lightning

It is a fundamental fact that electricity always flows to the point of low potential. The task is to help ensure that electricity including faults, lightning and electronic noise, flows to this point with maximum safety to people while maintaining the reliability of equipment. Therefore we must ensure the safe controlled flow of electricity with minimum voltage drop to earth in all cases.



Typical Grounding System

PRINCIPLES OF GROUNDING

Ground Impedance

Soil resistivity is an important design consideration. It varies markedly for different soil types, moisture content and temperatures and gives rise to variations in ground impedance.

Short Direct connections

The voltage generated by a lightning discharge depends primarily on the risetime of the current and the impedance of the path to the ground. Extremely fast rise times result in significant voltage rises due to any series inductance resulting from long, indirect paths or sharp bends in the routing of the ground conductors. This is why short direct connections are important.

Coupling from the electrode system to the ground

The efficiency of a ground electrode system in coupling a lightning current to ground is dependent on a number of factors including the geometry of the ground electrode system, the shape of the conductors and the effective coupling into the soil.

The basic philosophy of any grounding installation should be an attempt to maximize the surface area of electrodes or conductors with the surrounding soil. Not only does this help to lower the earth resistance of the grounding system but also greatly improves the impedance of the grounding system under lightning surge conditions. (Refer Fig 1)

Equipotential Bonding

Equipotential bonding helps to ensure that hazardous potential differences do not occur between different incoming conductors such as metallic water services, power systems, telecommunication systems and the local ground.

Electrically and mechanically robust and reliable

Mechanical coupling can be used to join ground conductors but suffers from corrosion effects when dissimilar metals are involved. As well as mechanical strength. Raychem RPG manufactured connections provide excellent low impedance, long life electrical connections with excellent corrosion resistance.

Ground Resistance

When current flows from a ground electrode into the surrounding soil, it is often described as flowing through a series of concentric shells of increasing diameter. (Refer Fig 1)

Each successive shell has a greater area for current flow and consequently lower resistance. At some point distance from the earth conductor the current dissipation becomes so large and current density so small that the resistance is negligible.

In theory the ground resistance may be derived from the general formula

$$R = \rho \times (L/A)$$

R = resistance in ohms of the ground rod to the earth (or soil)

ρ = average resistivity in ohms-cm

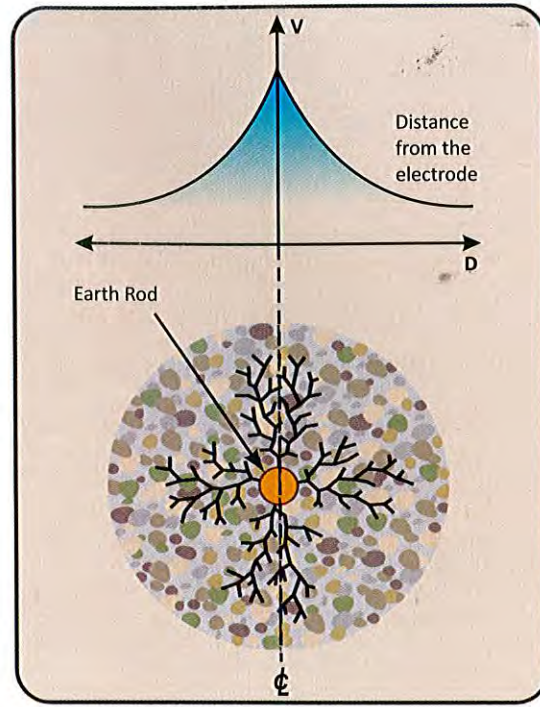
L = grounding electrode length in cm

A = grounding electrode area in sq. cm

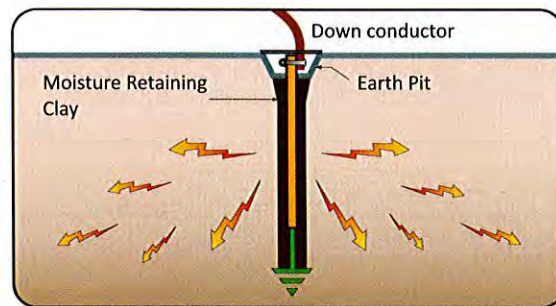
Conditions influencing Soil Resistivity

The resistivity (ρ) of the earth itself (soil resistivity) can significantly impact the overall impedance of the grounding system. Several other factors determine the overall resistivity of the earth which are as follows:

- ◆ Soil composition
- ◆ Moisture content
- ◆ Mineral content
- ◆ Contaminants



(Fig 1)



Lightning Energy Dissipation

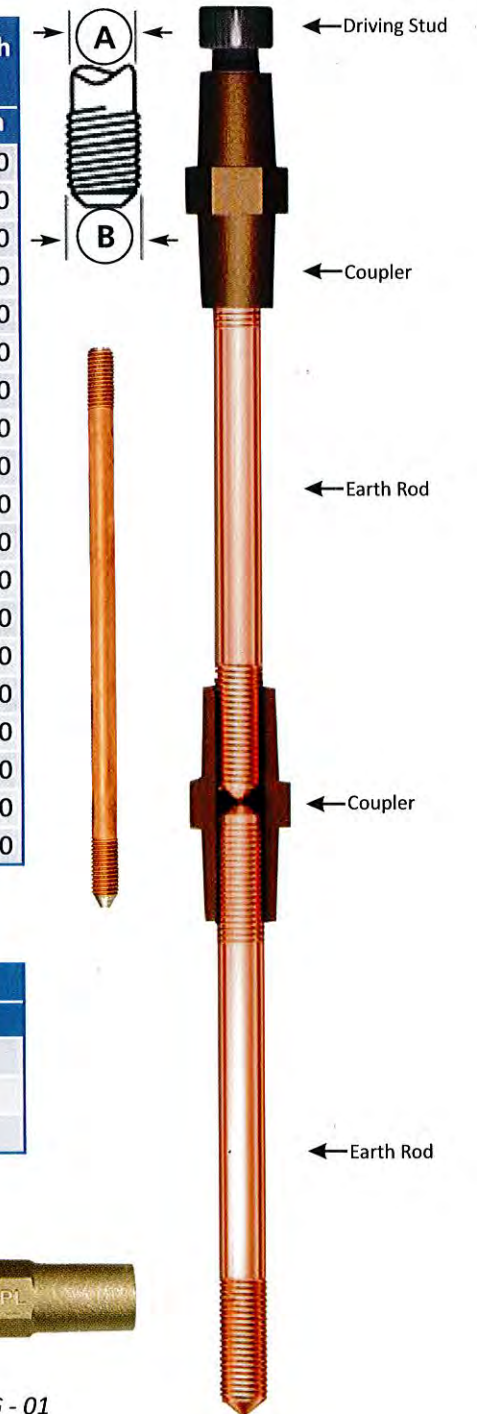
GROUNDING EQUIPMENT

EARTH RODS

COPPER BONDED EARTH RODS - EXTERNALLY THREADED

Raychem RPG copper bonded earth rods-254 microns are manufactured by electroplating 99.9 % pure electrolytic copper onto a low carbon steel bar with high tensile strength (minimum 600N/mm²). To prevent oxidation of copper bonding, each rod is treated with Benzol Triazole derivatives. Threads on the rods are formed by roll threading process giving extra strength to the threads and eliminating risk of chipping of threads while driving the rod in the ground. The rods are Externally threaded and matched with couplers internally threaded

Product Code		Nominal Diameter	Shank Diameter "A"	Thread Diameter "B"	Rod Length	
254 Microns	30 Microns	Inch	mm	Inch	Feet	mm
RET - 01	RETC - 01	1/2"	12.7	9/16"	4'	1220
RET - 02	RETC - 02	1/2"	12.7	9/16"	5'	1520
RET - 03	RETC - 03	1/2"	12.7	9/16"	6'	1830
RET - 04	RETC - 04	1/2"	12.7	9/16"	8'	2440
RET - 05	RETC - 05	1/2"	12.7	9/16"	10'	3050
RET - 06	RETC - 06	5/8"	14.2	5/8"	4'	1220
RET - 07	RETC - 07	5/8"	14.2	5/8"	5'	1520
RET - 08	RETC - 08	5/8"	14.2	5/8"	6'	1830
RET - 09	RETC - 09	5/8"	14.2	5/8"	8'	2440
RET - 10	RETC - 10	5/8"	14.2	5/8"	10'	3050
RET - 11	RETC - 11	5/8"	16	5/8"	4'	1220
RET - 12	RETC - 12	5/8"	16	5/8"	6'	1830
RET - 13	RETC - 13	5/8"	16	5/8"	8'	2440
RET - 14	RETC - 14	5/8"	16	5/8"	10'	3050
RET - 15	RETC - 15	3/4"	17.2	3/4"	4'	1220
RET - 16	RETC - 16	3/4"	17.2	3/4"	5'	1520
RET - 17	RETC - 17	3/4"	17.2	3/4"	6'	1830
RET - 18	RETC - 18	3/4"	17.2	3/4"	8'	2440
RET - 19	RETC - 19	3/4"	17.2	3/4"	10'	3050



COUPLER - INTERNALLY THREADED

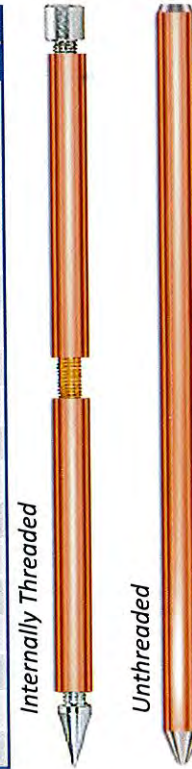
Rod Size		Product Code		
Inch	mm	Brass	Al. Bronze	Gunmetal
1/2"	12.7	RECB - 01	RECA - 01	RECG - 01
5/8"	16	RECB - 02	RECA - 02	RECG - 02
3/4"	19	RECB - 03	RECA - 03	RECG - 03



COPPER BONDED EARTH ROD - UNTHREADED & INTERNALLY THREADED

Raychem RPG copper bonded earth rods-254 microns are manufactured by electroplating 99.9 % pure electrolytic copper onto a low carbon steel bar with high tensile strength (minimum 600N/mm²). To prevent oxidation of copper bonding, each rod is treated with Benzol triazole derivatives.

Product Code Unthreaded		Product Code Internally Threaded		Rod Diameter		Rod Length	
254 Microns	30 Microns	254 Microns	30 Microns	Inch	mm	Feet	mm
REU - 01	REUC - 01	REI - 01	REIC - 01	3/8"	9.5	4'	1200
REU - 02	REUC - 02	REI - 02	REIC - 02	3/8"	9.5	5'	1520
REU - 03	REUC - 03	REI - 03	REIC - 03	3/8"	9.5	8'	2440
REU - 04	REUC - 04	REI - 04	REIC - 04	1/2"	12.7	4'	1220
REU - 05	REUC - 05	REI - 05	REIC - 05	1/2"	12.7	5'	1520
REU - 06	REUC - 06	REI - 06	REIC - 06	1/2"	12.7	6'	1830
REU - 07	REUC - 07	REI - 07	REIC - 07	1/2"	12.7	8'	2440
REU - 08	REUC - 08	REI - 08	REIC - 08	1/2"	12.7	10'	3050
REU - 09	REUC - 09	REI - 09	REIC - 09	5/8"	16	4'	1220
REU - 10	REUC - 10	REI - 10	REIC - 10	5/8"	16	5'	1520
REU - 11	REUC - 11	REI - 11	REIC - 11	5/8"	16	6'	1830
REU - 12	REUC - 12	REI - 12	REIC - 12	5/8"	16	8'	2440
REU - 13	REUC - 13	REI - 13	REIC - 13	5/8"	16	10'	3050
REU - 14	REUC - 14	REI - 14	REIC - 14	3/4"	19	4'	1220
REU - 15	REUC - 15	REI - 15	REIC - 15	3/4"	19	5'	1520
REU - 16	REUC - 16	REI - 16	REIC - 16	3/4"	19	6'	1830
REU - 17	REUC - 17	REI - 17	REIC - 17	3/4"	19	8'	2440
REU - 18	REUC - 18	REI - 18	REIC - 18	3/4"	19	10'	3050



COUPLER - UNTHREADED

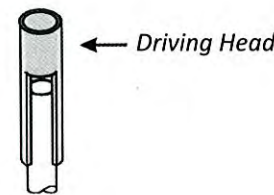
Rod Size		Product Code		
Inch	mm	Brass	Al. Bronze	Gunmetal
1/2"	12.7	REBU - 01	RECU - 01	REGU - 01
5/8"	16	REBU - 02	RECU - 02	REGU - 02
3/4"	19	REBU - 02	RECU - 03	REGU - 03



REGU - 03

DRIVING HEAD

Product Code	Rod Size	
	Inch	mm
RDH - 01	1/2"	12.7
RDH - 02	5/8"	16
RDH - 03	3/4"	19



DRIVING STUD

Product Code	Rod Size	
	Inch	mm
RDS - 01	1/2"	12.7
RDS - 02	5/8"	16
RDS - 03	3/4"	19



SOLID COPPER EARTH ROD - INTERNALLY THREADED

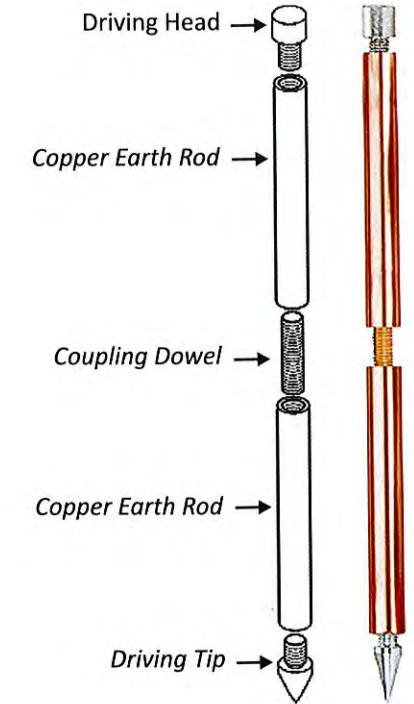
Raychem RPG manufactured solid copper earth rods are made from high conductivity hard drawn copper. They are ideally suitable where soil conditions are very corrosive, such as soil with high salt and moisture content. These rods are also available with tin plating in order to reduce the risk of oxidation and increasing shelf life.

INTERNALLY THREADED

Product Code	Rod Diameter		Rod Length	
	Inch	mm	Feet	mm
RIS - 01	5/8"	16	4'	1220
RIS - 02	5/8"	16	6'	1830
RIS - 03	5/8"	16	8'	2440
RIS - 04	3/4"	19	4'	1220
RIS - 05	3/4"	19	6'	1830
RIS - 06	3/4"	19	8'	2440
RIS - 07	1"	25	4'	1220
RIS - 08	1"	25	6'	1830

COUPLERS - EXTERNALLY THREADED

Product Code	Rod Size	
	Inch	mm
RICU - 01	1/2"	12
RICU - 02	5/8"	16
RICU - 03	3/4"	19



SOLID COPPER EARTH ROD - EXTERNALLY THREADED

Raychem RPG manufactured solid copper earth rods are made from high conductivity hard drawn copper. They are ideally suitable where soil conditions are very corrosive, such as soil with high salt and moisture content.

Product Code	Nominal Diameter	Shank Diameter "A"	Thread Diameter "B"	Rod Length	
				Feet	mm
RES - 01	1/2"	12.7	9/16"	4'	1220
RES - 02	1/2"	12.7	9/16"	5'	1520
RES - 03	1/2"	12.7	9/16"	6'	1830
RES - 04	1/2"	12.7	9/16"	8'	2440
RES - 05	1/2"	12.7	9/16"	10'	3050
RES - 06	5/8"	14.2	5/8"	4'	1220
RES - 07	5/8"	14.2	5/8"	5'	1520
RES - 08	5/8"	14.2	5/8"	6'	1830
RES - 09	5/8"	14.2	5/8"	8'	2440
RES - 10	5/8"	14.2	5/8"	10'	3050
RES - 11	5/8"	16	5/8"	4'	1220
RES - 12	5/8"	16	5/8"	6'	1830
RES - 13	5/8"	16	5/8"	8'	2440
RES - 14	5/8"	16	5/8"	10'	3050
RES - 15	3/4"	17.2	3/4"	4'	1220
RES - 16	3/4"	17.2	3/4"	5'	1520
RES - 17	3/4"	17.2	3/4"	6'	1830
RES - 18	3/4"	17.2	3/4"	8'	2440
RES - 19	3/4"	17.2	3/4"	10'	3050



SOLID COPPER EARTH ROD ACCESSORIES

Product Code	Rod Diameter		Product
	Inch	mm	
RID - 01	5/8"	16	Driving Head
RID - 02	3/4"	19	Driving Head
RID - 03	1"	25	Driving Head
RIC - 01	5/8"	16	Coupling Dowell
RIC - 02	3/4"	19	Coupling Dowell
RIC - 03	1"	25	Coupling Dowell
RIT - 01	5/8"	16	Driving Tip
RIT - 02	3/4"	19	Driving Tip
RIT - 03	1"	25	Driving Tip



Driving Tip

EARTHROD TESTING :  APPROVAL SYNOPSIS

EarthRod Code	Nominal Diameter	Test for 254 Micron Coated Rod	Test Method	Applicable UL Standard
RET - 04	12.7	STEEL CORE PROPERTIES	Tensile strength greater than 552 MPa (80,000 lb per square inch)	UL 467
RET - 05	12.7		Rockwell hardness greater than B80.	
RET - 09	14.2	Mechanical Test	ADHESION TEST To shear off sufficient metal to expose the bond between the copper and the ground rod electrode.	UL 467
RET - 10	14.2		DUCTILITY TEST At room temperature (25±5°C) ground rod electrode is permanently bent through a 30-degree angle, maintains ductility.	UL 467
RET - 18	17.2		COPPER PLATING The copper thickness shall not be less than 0.25 mm (0.010 in.) For ground rod electrodes 12.7 mm (0.50 in.) or greater in diameter, as per ASTM E376 .	UL 467
Electrical Test for all above		SHORT TIME CURRENT TEST	Temperature range 80 Deg. Deformity not seen on passage of current of 150kv from both sides of Earth rod.	UL 467

COUPLERS TESTING :  APPROVAL SYNOPSIS

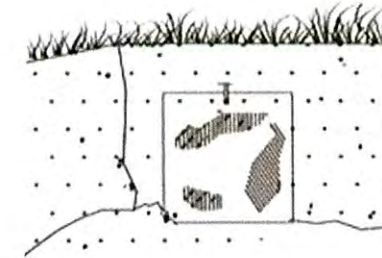
Coupler Code	Nominal Diameter	Test	Test Method	Applicable UL Standard
RECU - 58	14.28	CONDUCTIVITY	Coupling should give 95% of Conductivity.	UL 467, ANSI/NEMA GR 1-2007
RECU - 58	15.87	Mechanical Test	IMPACT The top ground rod electrode shall be subjected to an impact energy of 54 J (40 ft-lb) imparted by a dropped mass. It should withstand the load	UL 467, ANSI/NEMA GR 1-2007
RECU - 34	19.04		PULLOUT The joining coupling and copper bonded ground rod electrodes Must withstand a pullout force of no less than 6.7 kN (1500 lbf) before separation.	UL 467, ANSI/NEMA GR 1-2007
		BEND	The Earthing Rod and Coupler joint is bent by 30 deg and check the Breakage	UL 467, ANSI/NEMA GR 1-2007

GROUNDING ACCESSORIES

EARTH PLATE - SOLID COPPER

Earth plates are made up of electrolytic grade solid copper sheet. (Also on request made up of Steel sheet with electrolytic grade copper bonding.) Solid copper plates provide a long lasting earthing solution in places where driving earth rods might be impractical. They are often installed in conjunction with Low-Resistance Earthing Compound.

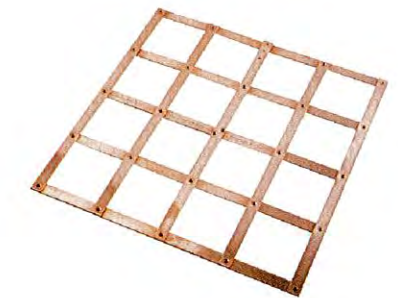
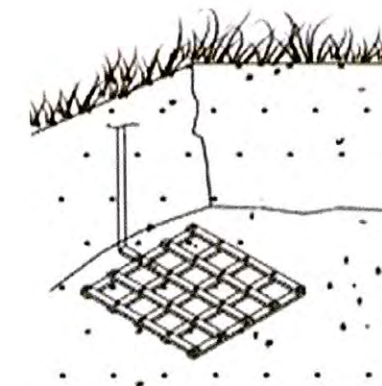
Product Code	Plate Size mm
REP - 01	500x500x1.5
REP - 02	500x500x3
REP - 03	600x600x1.5
REP - 04	600x600x3
REP - 05	900x900x1.5
REP - 06	900x900x3
REP - 07	1000x1000x
REP - 08	1000x1000x3



EARTH LATTICE

Earth Lattice is made from Copper Tape of various combination. Copper tapes are of electrolytic grade copper. They are often used for potential grading and are a preferred option on installations such as telecommunication towers, where touch and step potential could cause problems.

Product Code	Lattice Size mm
REL - 01	500x500x2
REL - 02	500x500x3
REL - 03	500x500x5
REL - 04	600x600x2
REL - 05	600x600x3
REL - 06	600x600x5
REL - 07	900x900x2
REL - 08	900x900x3
REL - 09	900x900x5
REL - 10	1000x1000x2
REL - 11	1000x1000x3
REL - 12	1000x1000x5



INSPECTION HOUSING EARTH BARS

These earth bars fit into the slots provided in the concrete inspection housing and are used when multiple connections to the earth rod are required.

Product Code	Hole Diameter mm	No. Holes
RIH - 01	11	5
RIH - 02	11	7

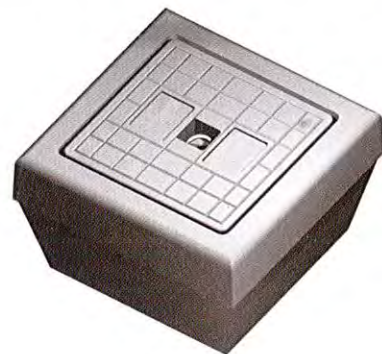


CONCRETE INSPECTION PIT

Concrete Inspection Pit is suitable for most types of earthing and lightning protection installations. It is not suitable for use in areas where high load, small wheel vehicles are used. The Lightweight inspection pit is recommended for this type of application.

Product Code	Description
RIP - 33	Concrete Inspection Pit

320MM(L) x 320MM(W) x 183MM(H)



LIGHT WEIGHT EARTH PIT

Manufactured from High quality polymer. The Lid is manufactured out of HDG Steel.

Product Code	Description
REP - 33	Concrete Inspection Pit



EARTH ROD SEALS

The earth rod seal is made up of plastic.

The earth rod seal is fitted when the earth rod connection is below the water level and there is a possibility of water entering the inspection housing from below the ground. Raychem RPG manufactured earth seals are designed to suit the earth rods of various diameters from 1/2" to 3/4". These seals are used along with Earth pits.

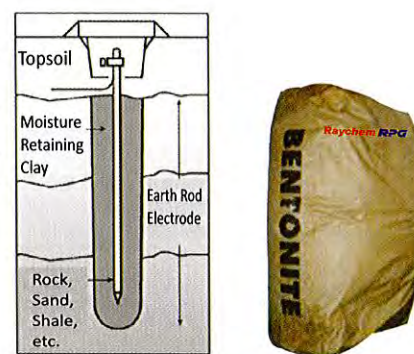
Product Code	Description
RES - 33	Earth Rod Seal



BENTONITE MOISTURE RETAINING CLAY

Used as an earth-electrode backfill to reduce soil resistivity by retaining moisture. The clay is a sodium activated montmorillonite, which when mixed with water swells to many times its dry volume. It has the ability to hold its moisture content for a considerable period of time and to absorb moisture from the surrounding soil (e.g. from rainfall).

Product Code	Description
RBM - 33	Bentonite Moisture Retaining Clay



CLAMPS AND BONDS

The clamps are suitable for use with a combination of rod size, tape and conductors.

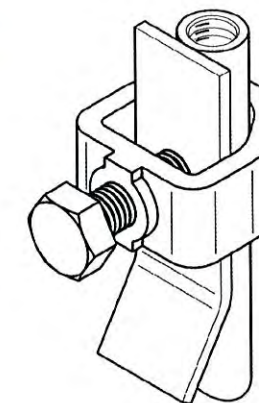
ROD TO TAPE CLAMP (TYPE A)

Material : High strength copper alloy / gun metal

Combination Type : Rod and Tape

Usage : These clamps are used for joining earth rods to different sizes of copper tapes

Product Code	Nominal Rod Dia		Max Tape Sq mm
	Inch	mm	
RCA - 01	1/2 "	12.7	26X12
RCA - 02	5/8"	16	26X12
RCA - 03	3/4"	20	26X10
RCA - 04	5/8"	16	30X2
RCA - 05	3/4"	20	30X2
RCA - 06	5/8"	16	40X12
RCA - 07	5/8"	16	51X8
RCA - 08	3/4"	20	51X12
RCA - 09	1/2 "	12.7	26X20
RCA - 10	5/8"	16	26X18
RCA - 11	1"	25	26X10



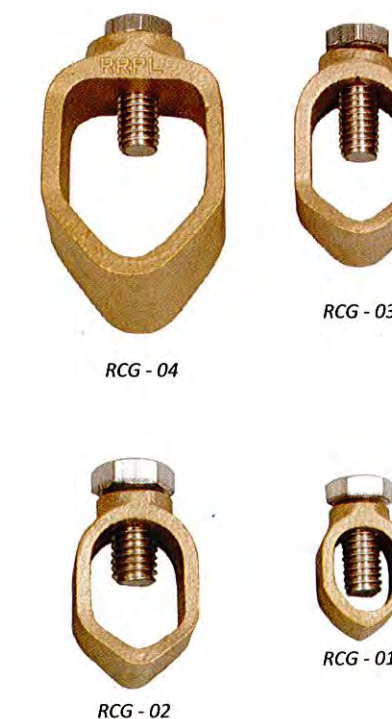
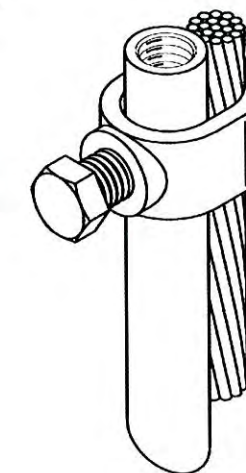
ROD TO CABLE CLAMP (TYPE G)

Material : High strength copper alloy / gun metal

Combination Type : Rod and Conductor

Usage : These clamps are used for joining earth rods to different sizes of stranded copper conductor.

Product Code	Nominal Rod Dia		Conductor Range sq mm
	Inch	mm	
RCG - 01	3/8 "	9.5	6-35
RCG - 02	1/2 "	12.5	16-50
RCG - 03	5/8 "	16	16-70
RCG - 04	3/4 "	20	35-95
RCG - 05	1 "	25	70-120
RCG - 06	1. 1/2 "	38	120-150



U-BOLT : SINGLE PLATE TYPE FOR HORIZONTAL FLAT TAPE (TYPE E)

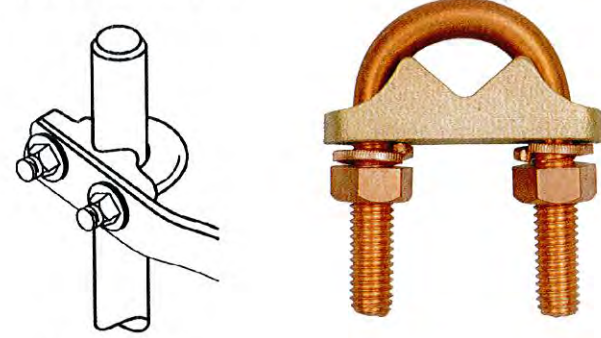
The versatile range of Raychem RPG “U” bolt clamps can be used to connect flat tapes and stranded cables to earth rods, reinforcing bars (re-bar), hand rails etc.

Material : Clamp is made of gunmetal and U-Bolt is manufactured from high strength copper alloy

Combination Type : Rod and Tape

Usage : Used for connecting flat copper tapes to the rods in Horizontal position

Product Code	Nominal Diameter		Hole Centres
	Inch	mm	mm
RUE - 01	5/8"	16	37
RUE - 02	3/4"	19	37
RUE - 03	1"	25	37
RUE - 04	1 1/2"	38	54
RUE - 05	2"	51	64



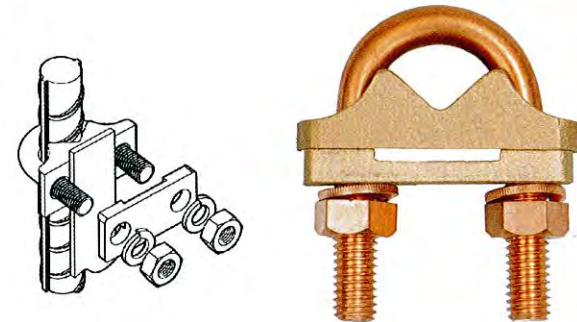
U-BOLT : DOUBLE PLATE TYPE FOR VERTICAL FLAT TAPE

Material : Clamp is made of gunmetal and U-Bolt is manufactured from high strength copper alloy

Combination Type : Rod and Tape

Usage : Used to connect flat tapes in vertical position on the rod

Product Code	Nominal Diameter		Tape Width
	Inch	mm	mm
RUD - 01	5/8"	16	25
RUD - 02	3/4"	19	25
RUD - 03	1"	25	25
RUD - 04	1 1/2"	38	25
RUD - 05	2"	51	25



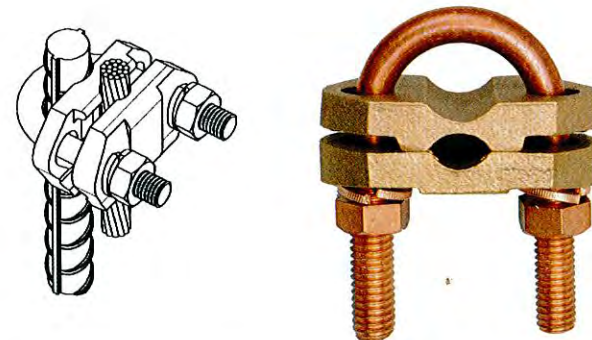
U BOLT : DOUBLE PLATE TYPE FOR VERTICAL STRANDED CABLES (TYPE GUV)

Material : Clamp is made of gunmetal and U-Bolt is manufactured from high strength copper alloy

Combination Type : Rod and conductor

Usage : Used for connecting copper round stranded conductors in vertical and horizontal position on the rod

Product Code	Nominal Diameter		Conductor Range
	Inch	mm	mm
RUC - 01	5/8"	16	16 - 150
RUC - 02	5/8"	16	150 - 300
RUC - 03	3/4"	20	16 - 70
RUC - 04	3/4"	20	70 - 300
RUC - 05	1"	25	16 - 70
RUC - 06	1"	25	70 - 300



REBAR CLAMPS

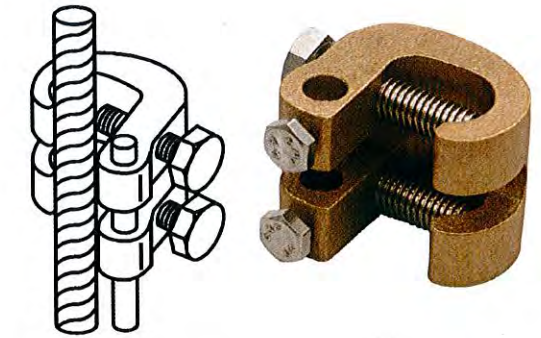
The versatile range of Raychem RPG Re-bar clamps is used to connect re-bar to re-bar or re-bar stranded cable. They provide a strong mechanical connection along with excellent resistance to corrosion.

Material : Gunmetal

Type : Conductor to Reinforcing bar

Usage : For bonding to reinforcing bar, steam pipes, handrails etc.

Product Code	Conductor Dia mm	Rebar Dia mm	Material
RREC - 01	8	8-18	Gunmetal
RREC - 02	8	18-38	Gunmetal



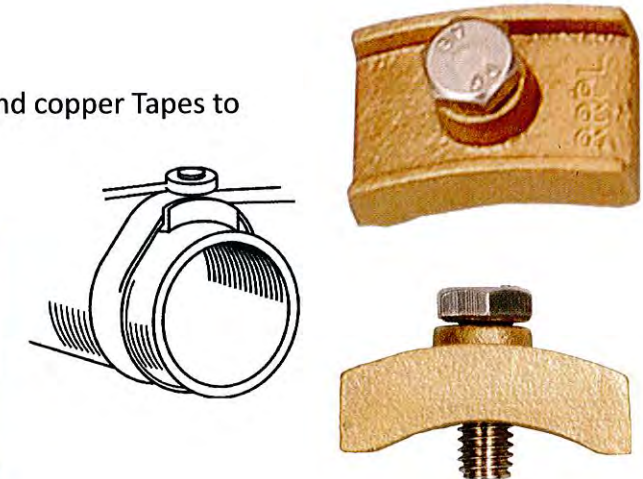
WATERMAIN PIPE BOND

Material : Gunmetal

Combination Type : Tape and Pipe

Usage : Used in bonding of metallic water main pipes and copper Tapes to the Earthing or Lightning protection system

Product Code	Max tape width	Conductor material
RWP - 01	26	Copper
RWP - 02	26	Aluminium
RWP - 03	38	Copper
RWP - 04	38	Aluminium



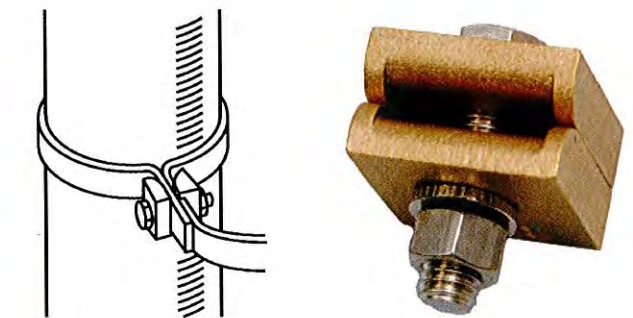
RAIN WATER PIPE BOND

Material : Gunmetal

Combination Type : Tape and Pipe

Usage : Used in bonding of tapes to rainwater pipes

Product Code	Max tape width mm	Bolt size	Details
RRP - 01	26	M10	For Copper Conductor
RRP - 02	26	M10	For Aluminium Conductor
RRP - 03	38	M10	For Copper Conductor
RRP - 04	38	M10	For Aluminium Conductor



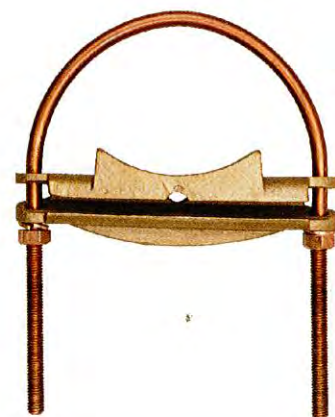
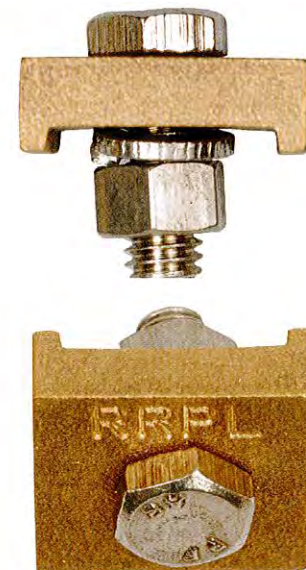
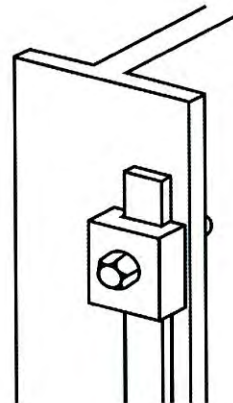
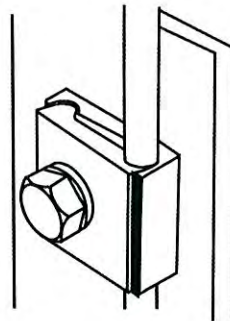
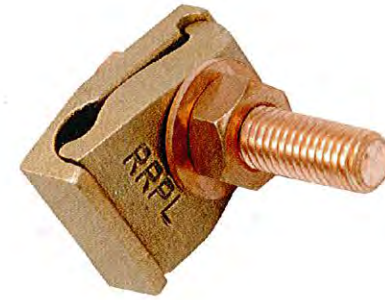
TOWER EARTH CLAMP

Tower earth clamps are used for bonding copper conductors onto steel surfaces. The double-plate design provides a robust fixing in areas where cladding may be installed or where the complete clamp will be covered by concrete. The clamp is fixed by drilling a hole in the steelwork and securing with the screw provided.

Material : Gunmetal

Combination Type : Conductor and steel structure

Usage : Used for bonding Copper Cables or wires to steel structures



Product Code	Conductor Size	Channel Thickness mm	Bolt Size
RTB - 01	16-70	10	M10
RTB - 02	70-120	10	M12
RTB - 03	25-50	10	M10
RTB - 04	120-185	10	M12
RTB - 05	185-240	10	M12

B BOND

Material : Gunmetal

Combination Type : Tape and steel structure

Usage : Used for bonding tape to steel structures

Product Code	Tape Size	Bolt Size	Conductor Material
RBB - 01	26	M10	Copper
RBB - 02	26	M10	Aluminium
RBB - 03	31	M10	Copper

PIPE CLAMP (Type 1)

Material : Gunmetal

Combination Type : Conductor and Pipe

Usage : Used for providing positive earth continuity for water pipes

Product Code	Pipe Diameter		Conductor Range Sq. mm
	Inch	mm	
RPC - 101	1/2"-1"	13-25	25-95
RPC - 102	1 1/4"-2"	32-50	25-95
RPC - 103	2 1/2"-3 1/2"	65-90	25-95
RPC - 104	4"-5"	100-125	25-95
RPC - 105	6"	150	25-95
RPC - 106	8"	200	25-95
RPC - 107	10"	250	25-95
RPC - 108	12"	300	25-95

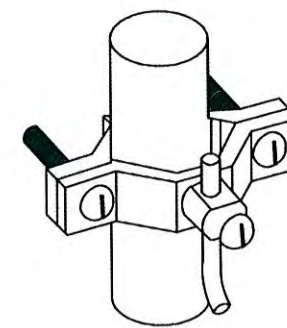
PIPE CLAMPS (TYPE 2)

Material : Gunmetal

Combination Type : Conductor and pipe

Usage : Used for providing positive earth continuity for Water pipes

Product Code	Pipe Size inch	Conductor range sq. mm
RPC - 01	1/2" - 1"	Upto 16
RPC - 02	1 1/4" - 2"	Upto 16
RPC - 03	2 1/2" - 4"	Upto 16



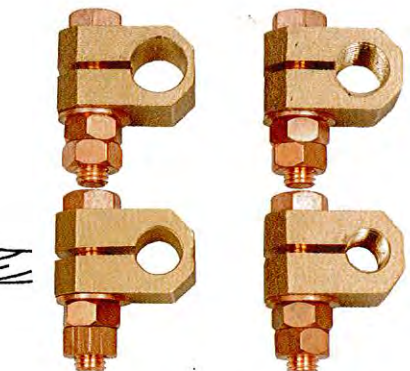
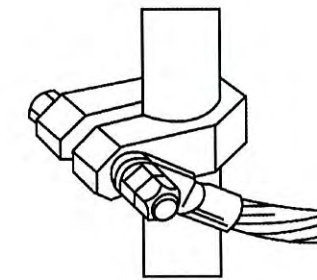
SPLIT CONNECTOR CLAMP

Material : High strength copper alloy / Gunmetal

Combination Type : Rod to Cable Lugs

Note: Split connector clamps are most suitable for unthreaded rods

Product Code		Nominal Rod Dia	
Unthreaded	Threaded	Inch	mm
RSBU - 01	RSBT - 01	3/8"	9.5
RSBU - 02	RSBT - 02	1/2"	12.5
RSBU - 03	RSBT - 03	5/8"	16
RSBU - 04	RSBT - 04	3/4"	20
RSBU - 05	RSBT - 05	1"	25



Unthreaded Threaded

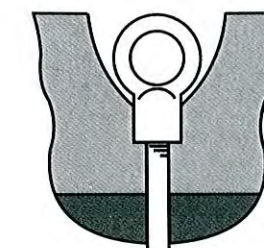
EYE BOLT

Material : Gunmetal

Combination Type : Ground Rod

Usage : The Eye bolt can be screwed direct onto a copper bond grounding rod. The eye bolt offers an earthing point for boats, trucks etc.

Product Code	Nominal Rod Dia	
	Inch	mm
REB - 01	3/8"	12.5
REB - 02	5/8"	14.2
REB - 03	3/4"	17.2

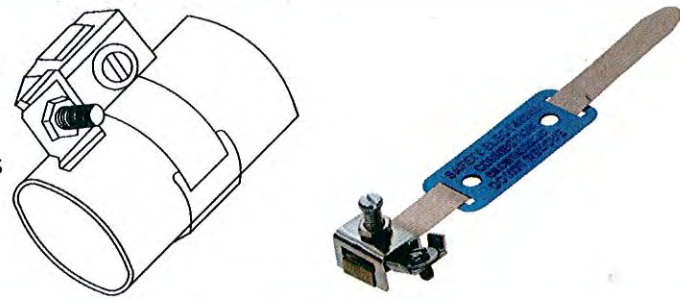


EARTHING CLAMP (TYPE EC)

Material : Stainless steel / Phosphorus bronze straps with copper alloy connector

Usage : Used for making earth connections on pipes

Designed and manufactured as per BS 951 standard. Available in three standard lengths for pipe diameters of 12- 32 mm, 32-50mm, 50-75mm



Product Code	Terminal Size	Features	Material
RET - 33	A-D 2.5- 10 sq mm	Colour coded Red suitable for non corrosive dry atmospheric conditions	Brass
RET - 34	A-D 2.5- 10 sq mm	Colour coded Blue suitable for corrosive humid conditions	Phosphorus / Bronze
RET - 35	A-E 2.5- 16 sq mm	Colour coded Blue suitable for corrosive humid conditions	Phosphorus / Bronze

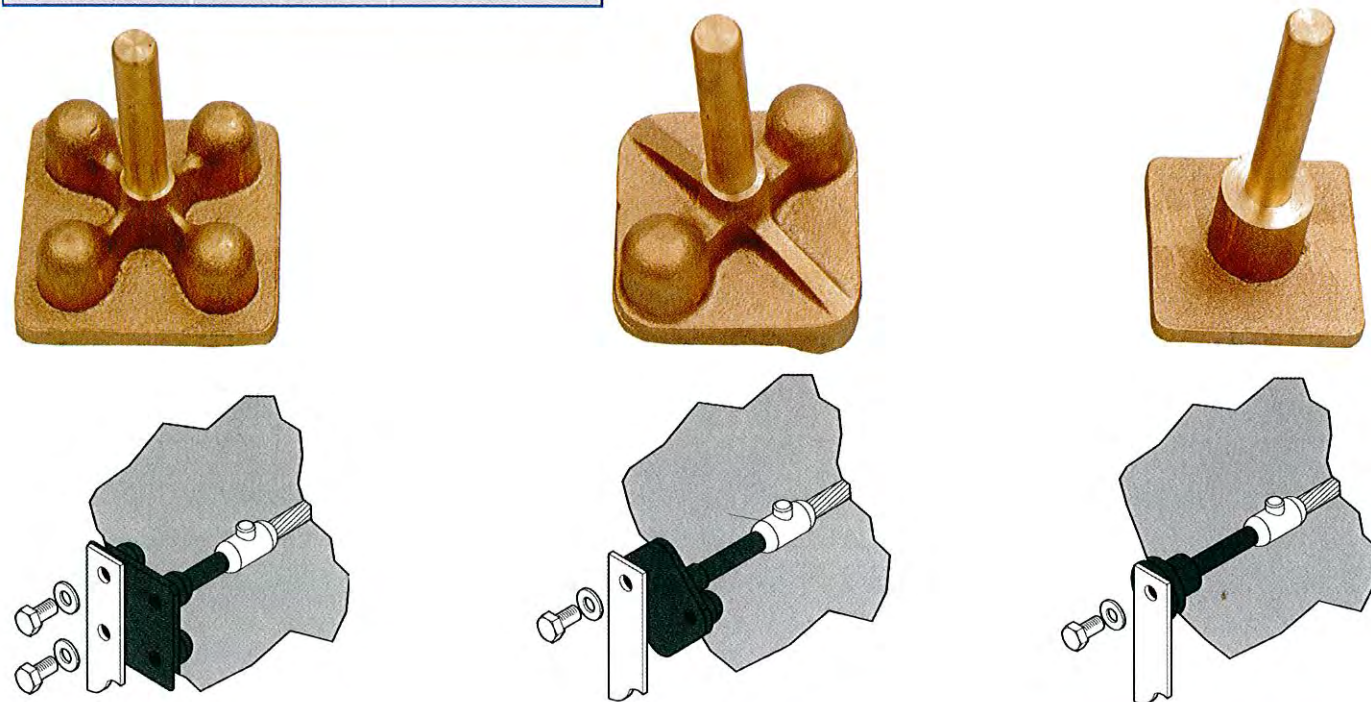
EARTH POINTS

Material : Gunmetal

Combination Type : Reinforced bar

Usage : Used for providing an earth point when connected to continuous reinforcing bars

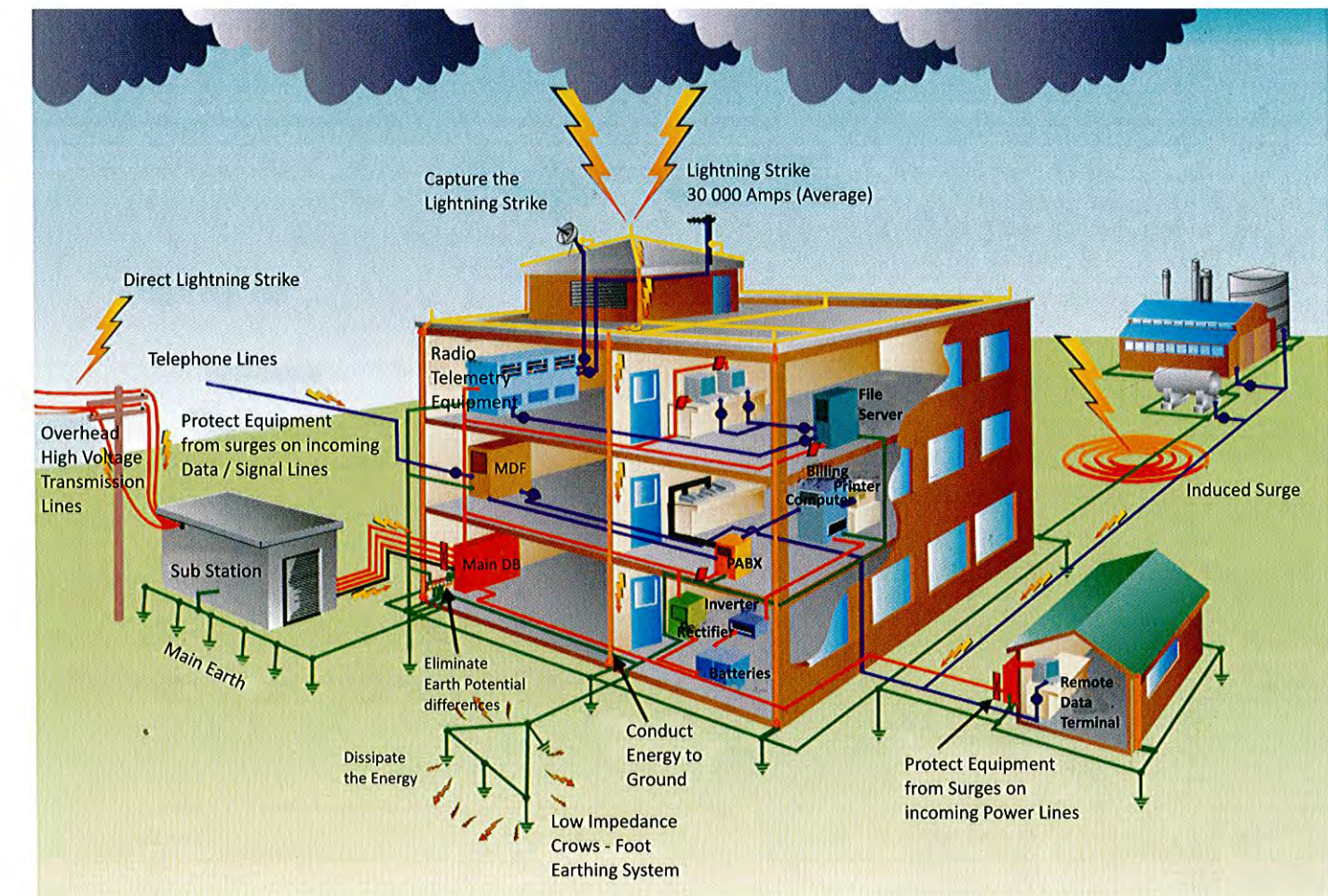
Product Code	No of Holes	Hole Size (mm)
RBP - 01	1	M8
RBP - 02	1	M10
RBP - 03	1	M12
RBP - 04	1	M16
RBP - 05	2	M8
RBP - 06	2	M10
RBP - 07	4	M8
RBP - 08	4	M10



LIGHTNING, GROUNDING AND EARTHING SYSTEM DESIGN

Lightning, Earthing and Grounding systems are important. Care should be taken to design a system that is appropriate both for clearing ground faults and dissipating lightning energy. The system must have a long performance life, meet applicable codes / standards of safety and have sufficient bonding points to make it easy to add new equipment / facility grounding to it easily.

The system design considerations :	Performance of Grounding System depends on :
<ul style="list-style-type: none"> ◆ Purpose of the facility ◆ Design life of facility ◆ Soil resistivity at 3 depths ◆ Corrosive nature of soil ◆ Shape and available area of facility site ◆ Existing structures and their grounding systems ◆ Public access and personnel use ◆ Adjacent facilities and electrical systems ◆ Future uses, additions and equipment for facility 	<ul style="list-style-type: none"> ◆ Grounding Electrode Conductors ◆ Grounding Connections ◆ Electrode to Soil Resistances ◆ Soil Properties



Typical Lightning Protection System

MULTIPLE POINTS

Material : Multiple points are made from Copper Alloy and the taper Spike from EC grade copper

Product Code	Thread Dia Inch	Thread Dia mm	Description
RMP - 01	5/8"	15.87	Multiple Point for 5/8" rod
RMP - 02	3/4"	19.04	Multiple Point for 3/4" rod
RTP - 01	5/8"	15.87	Taper Spike for 5/8" rod
RTP - 02	3/4"	19.04	Taper Spike for 3/4" rod



RMP - 01



RTP - 01

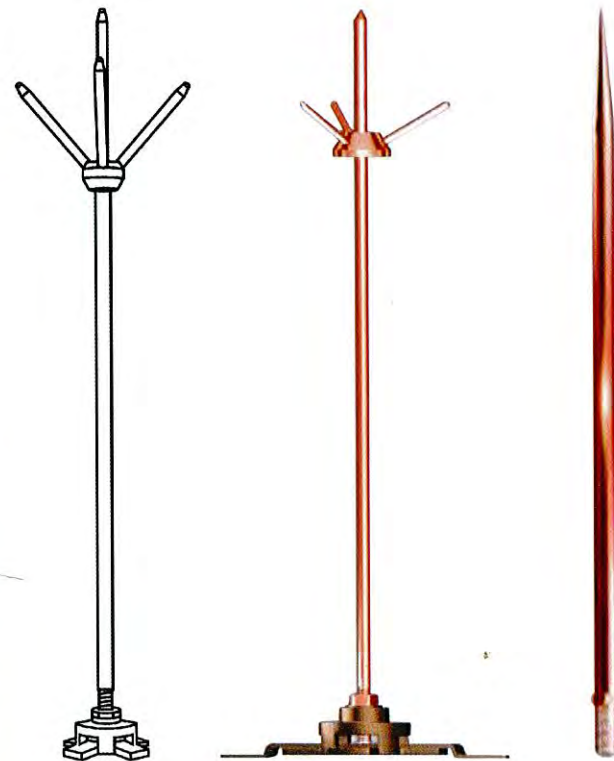
TAPER POINTED AIR ROD

Air rods form an important part of the air termination network of a lightning protection system. All of our air rods are supplied with a locknut enabling the rod to be locked tight against the conductor.

Material: The rods are made up of high conductivity EC Grade Copper & Aluminium

Relevant standard : BS 2874 & BS 2987

Product Code	Thread Size	Length	Material
RAR - 01	5/8"	300	Copper
RAR - 02	5/8"	500	Copper
RAR - 03	5/8"	1000	Copper
RAR - 04	5/8"	1500	Copper
RAR - 05	5/8"	2000	Copper
RAR - 06	3/4"	300	Copper
RAR - 07	3/4"	500	Copper
RAR - 08	3/4"	1000	Copper
RAR - 09	3/4"	1500	Copper
RAR - 10	3/4"	2000	Copper
RARA - 01	5/8"	300	Aluminium
RARA - 02	5/8"	500	Aluminium
RARA - 03	5/8"	1000	Aluminium
RARA - 04	5/8"	1500	Aluminium
RARA - 05	5/8"	2000	Aluminium



ELEVATION ROD

Material : Manufactured from High conductivity Copper to BS 2874 & Aluminium to BS 2987

Combination Type : Air Terminal Base to Air Rod

Product Code	Thread Size	Length	Material
RER - 01	5/8"	300	Copper
RER - 02	5/8"	500	Copper
RER - 03	5/8"	1000	Copper
RER - 04	5/8"	1500	Copper
RER - 05	5/8"	2000	Copper
RER - 06	3/4"	300	Copper
RER - 07	3/4"	500	Copper
RER - 08	3/4"	1000	Copper
RER - 09	3/4"	1500	Copper
RER - 10	3/4"	2000	Copper

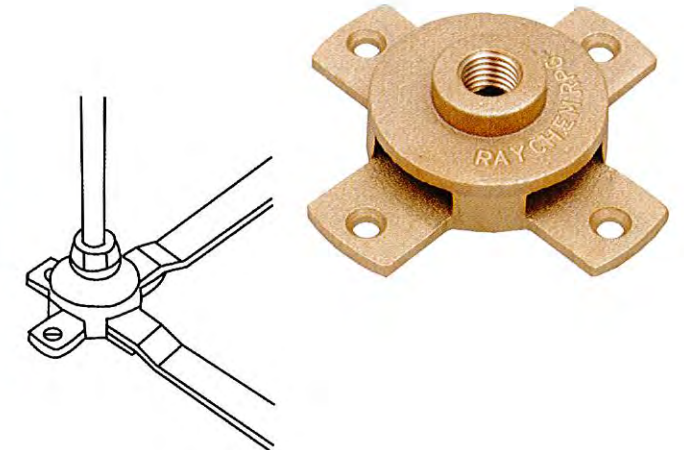


AIR TERMINAL BASE (TAPE TYPE)

Material : Gunmetal & Aluminium

Combination Type : Air Terminal and tape

Product Code	Nominal Rod Dia		Max Tape Size mm	Material
	Inch	mm		
RAT - 01	5/8"	M16	25X6	Gunmetal
RAT - 02	5/8"	M16	25X6	Aluminium
RAT - 03	3/4"	M20	25X6	Gunmetal
RAT - 04	3/4"	M20	25X6	Aluminium

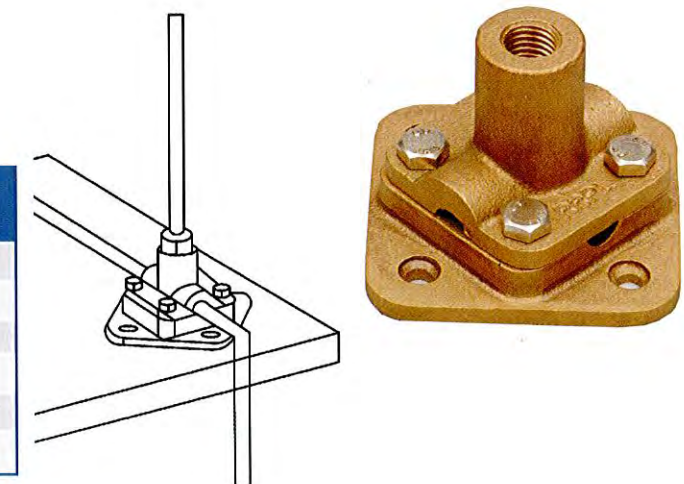


AIR TERMINAL BASE - CONDUCTOR TYPE

Material : Gunmetal & Aluminium.

Combination Type : Air Terminal and Conductor

Product Code	Conductor Size Sq. mm	Thread Dia
RAT - 101	50	5/8"
RAT - 102	50	3/4"
RAT - 103	70	5/8"
RAT - 104	70	3/4"
RAT - 105	95	5/8"
RAT - 106	95	3/4"

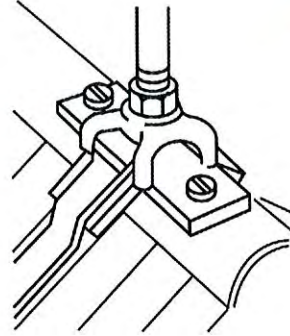


RIDGE SADDLE

Material : Gunmetal

Combination Type : Air Terminal and Tape

Usage : This is used for Supporting Lightning Conductor Air Terminals on the Roof Ridges



Product Code	Thread Dia Inch	Thread Dia mm	Max Tape Size mm	Rod Material
RRS - 01	5/8"	15.87	30X6 mm	Gunmetal
RRS - 02	5/8"	15.87	30X6 mm	Aluminium
RRS - 03	3/4"	19.04	30X6 mm	Gunmetal
RRS - 04	3/4"	19.04	30X6 mm	Aluminium

SIDE MOUNTING ROD BRACKETS

Material : Gunmetal and Brass

Combination Type : Rod

Usage : Used to support and continue Elevation Rod. It provides a 75mm projection from the face of the wall



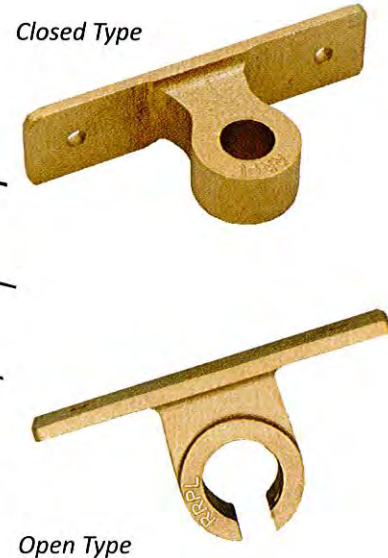
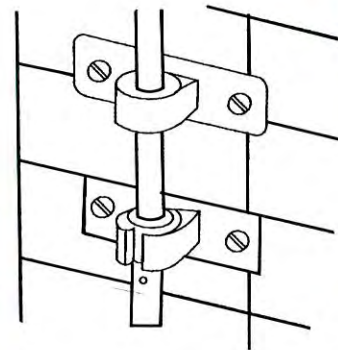
Product Code	Rod Dia in mm	Material
RSMB - 01	16	Gunmetal
RSMB - 02	20	Gunmetal

ROD BRACKETS

Material : Gunmetal and Aluminium

Combination Type : Rod

Usage : Used to support and continue Elevation Rod



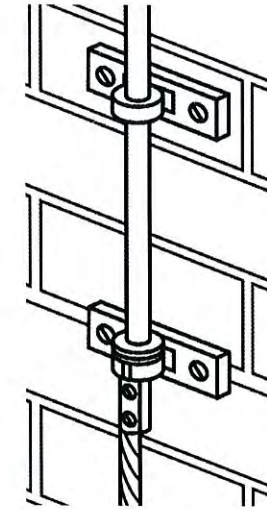
Product Code Open Type	Product Code Closed Type	Rod Dia in mm	Material
RROB - 01	RRCB - 01	16	Gunmetal
RROB - 02	RRCB - 02	20	Gunmetal

ROD TO TAPE COUPLING

Material : Gunmetal and Aluminium

Combination Type : Rod and Tape

Usage : Used to connect elevation Rod to Earthing Tape



Product Code	Nominal Rod Dia		Thread Dia mm	Material
	Inch	mm		
RTC - 01	5/8"	14.2	15.87	Gunmetal
RTC - 02	5/8"	14.2	15.87	Aluminium
RTC - 03	3/4"	17.2	19.04	Gunmetal
RTC - 04	3/4"	17.2	19.04	Aluminium

ROD TO CABLE COUPLING

Material : Gunmetal and Aluminium

Combination Type : Rod and Cable

Usage : Used to connect elevation Rod to Cable



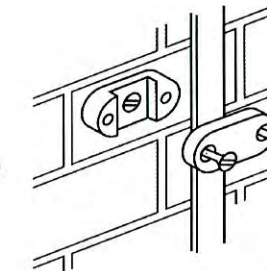
Product Code	Thread Dia		Conductor Size Sq mm
	Inch	mm	
RRC - 01	5/8"	15.87	35-95
RRC - 02	3/4"	19.04	35-95

D.C TAPE CLIP

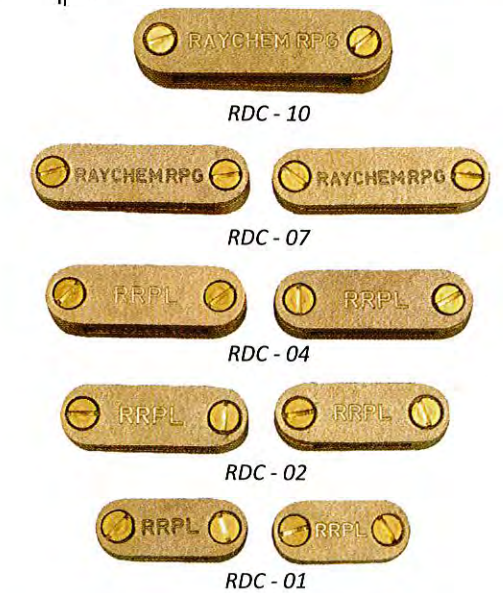
Material : Gunmetal and Aluminium

Combination Type : Tape

Usage : Support and Secure Flat tape to the structure



Product Code	Conductor Size mm	Material
RDC - 01	20 x 3	Gunmetal
RDC - 02	25 x 3	Gunmetal
RDC - 03	25 x 4	Gunmetal
RDC - 04	25 x 6	Gunmetal
RDC - 05	31 x 3	Gunmetal
RDC - 06	31 x 6	Gunmetal
RDC - 07	38 x 3	Gunmetal
RDC - 08	38 x 5	Gunmetal
RDC - 09	38 x 6	Gunmetal
RDC - 10	50 x 3	Gunmetal
RDC - 11	50 x 4	Gunmetal
RDC - 12	50 x 6	Gunmetal
RDC - 13	50 x 8	Gunmetal
RDC - 14	25 x 3	Aluminium
RDC - 15	25 x 6	Aluminium
RDC - 16	25 x 8	Aluminium



DC Tape Clip Product Family

SQUARE TAPE CLAMP

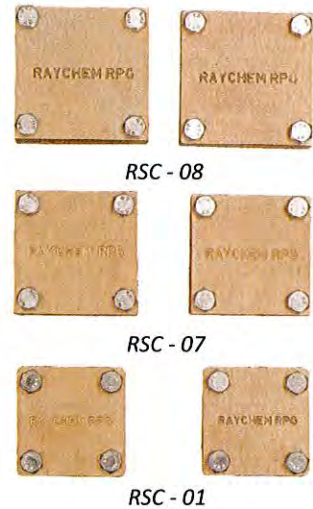
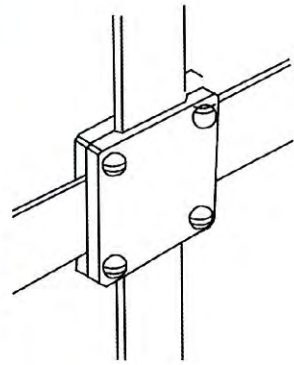
These Raychem RPG four-way connectors are suitable for making cross, straight through or tee joints in flat tape. The base has a countersunk hole in the middle for securing the clamp to the buildings surface and the lid is fixed by means of four screws.

Material : Gunmetal / Phosphor Bronze / Aluminium

Combination Type : Tape

Usage : Used for 4 way connections, straight through or Tee joints for Tapes

Product Code	Tape Size mm	Material
RSC - 01	20 x 3	Gunmetal
RSC - 02	25 x 3	Gunmetal
RSC - 03	25 x 3	Aluminium
RSC - 04	25 x 6	Gunmetal
RSC - 05	38 x 3	Gunmetal
RSC - 06	38 x 3	Aluminium
RSC - 07	38 x 6	Gunmetal
RSC - 08	50 x 3	Gunmetal
RSC - 09	50 x 6	Gunmetal
RSC - 10	50 x 6	Aluminium



Square Tape Clamp product family

OBLONG TEST CLAMP

Designed to join a range of tape sizes in a straight through position. In many applications the clamp enables tapes to be overlapped and secured by the two set screws.

Material : Gunmetal

Combination Type : Tape

Usage : Used for straight through Tape joints

Product Code	Tape size mm	Material Clamp
ROC - 01	26x8	Gunmetal
ROC - 02	38x6	Gunmetal
ROC - 03	51x10	Gunmetal
ROC - 04	26x8	Phosphorus Bronze
ROC - 05	26x8	Aluminium

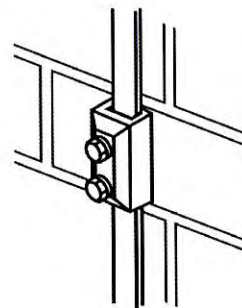


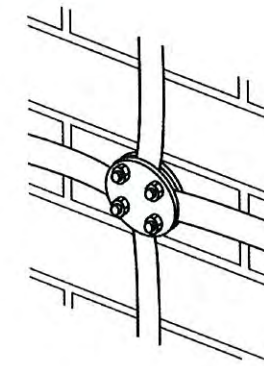
PLATE TEST CLAMP

Material : Gunmetal

Combination Type : Tape

Usage : Used to create a disconnecting joint between the down conductor system and Earthing system. The clamp can be used as a 4-Way clamp

Product Code	Tape Size mm
RPC - 33	25 x 3



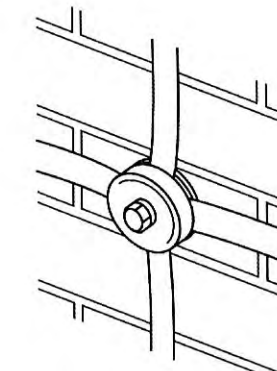
SCREWDOWN TEST CLAMP

Material : Gunmetal

Combination Type : Tape

Usage : Used to create a disconnecting joint between the down conductor system and Earthing system

Product Code	Tape Size mm
RSC - 253	25 x 3

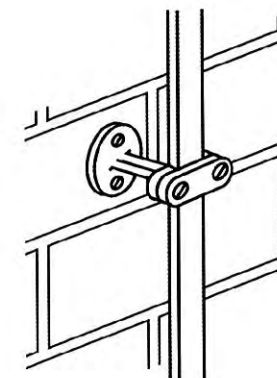


BACK PLATE HOLDFAST STEM

Material : Gunmetal

Usage : Required for installation of Tape when the Tape is to be secured away from the face of wall. This should be used with appropriate D.C clip

Product Code	Weight in Kg
RSC - 01	0.3
RSC - 02	0.13

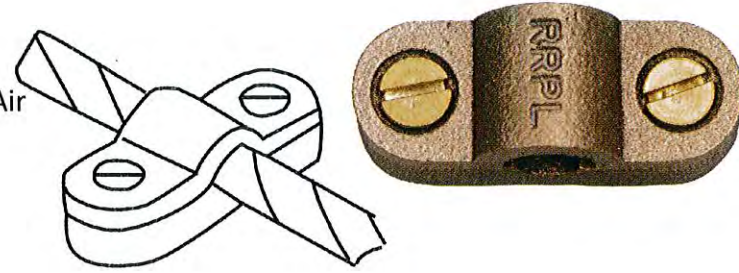


HEAVY DUTY CONDUCTOR SADDLE

Material : Gunmetal

Combination Type : Conductor

Usage : Used in conjunction with Wall Mounted Air Terminal Base



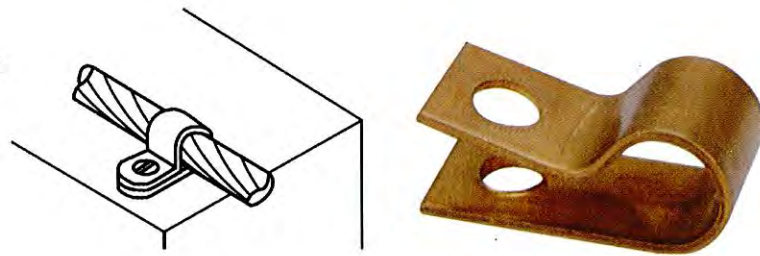
Product Code	Conductor Dia mm
RHDS - 01	8
RHDS - 02	10
RHDS - 03	11
RHDS - 04	17.5

ONE HOLE CLIP

Material : Copper / Aluminium

Combination Type : Conductor

Usage : Support and secure round conductor on structure



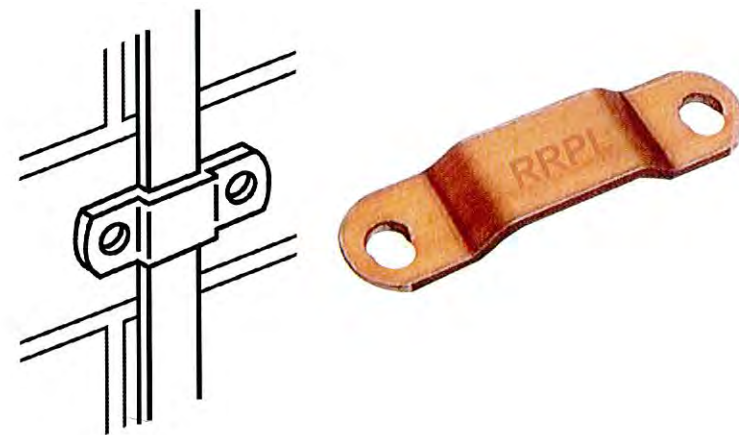
Product Code	Conductor Size Sq. mm
RHC - 01	25-35
RHC - 02	50-70
RHC - 03	95

TAPE CLIP

Material : Copper and aluminium strip

Combination Type : Tape

Usage : Support and Secure Flat tape to the structure



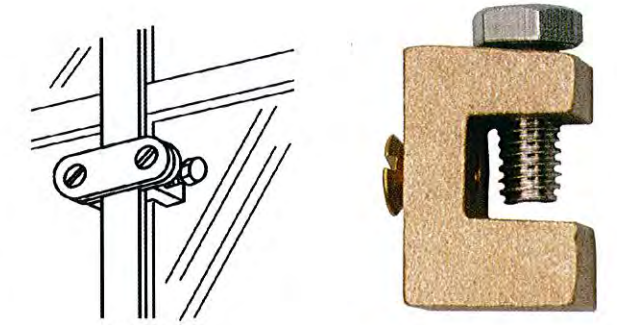
Product Code	Conductor Size Sq. mm
RTC - 101	20 x 3
RTC - 102	25 x 3
RTC - 103	50 x 6

GLAZING BAR HOLDFAST

Material : Gunmetal

Type : Conductor

Usage : Provides secure anchorage to thin metallic sections that cannot be drilled e.g. window mullions, angle iron etc. Once fixed any metallic or non metallic conductor clip can be attached with the screw provided



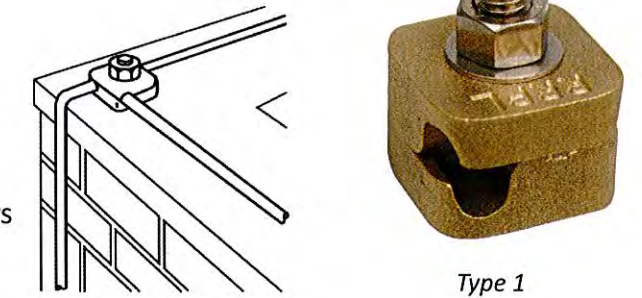
Product Code	Max Glazing Bar width mm	Material
RGB - 01	12	Gunmetal
RGB - 02	12	Aluminium

SQUARE CONDUCTOR CLAMP (TYPE 1 & TYPE 2)

Material : Gunmetal

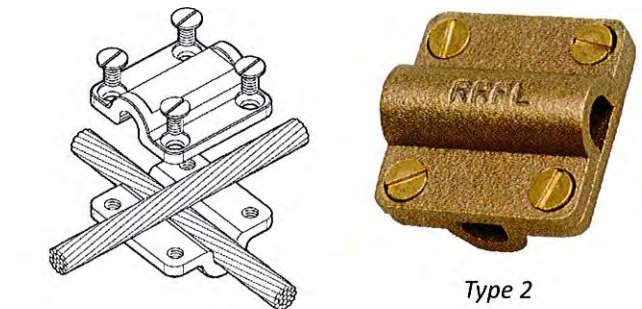
Combination Type : Conductor

Usage : Provides an effective low resistance connection between overlapping stranded conductors



Type 1

Product Code Type 1	Product Code Type 2	Conductor Size Sq. mm
RSC - 101	RSC - 201	35
RSC - 102	RSC - 202	50
RSC - 103	RSC - 203	70
RSC - 104	RSC - 204	95



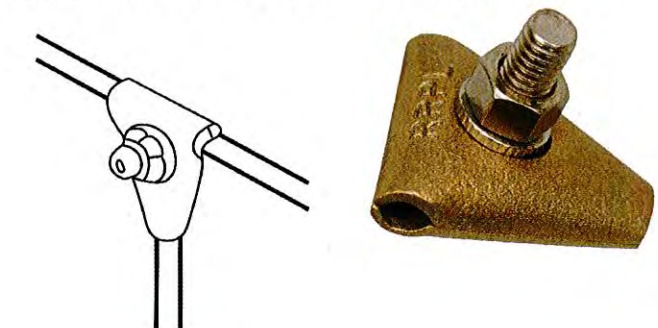
Type 2

TEE CLAMP

Material : Gunmetal

Combination Type : Conductor

Usage : Provides and effective low resistance Tee Joints in solid circular conductor networks



Product Code	Conductor size Sq mm
RTC - 135	35
RTC - 150	50 - 95

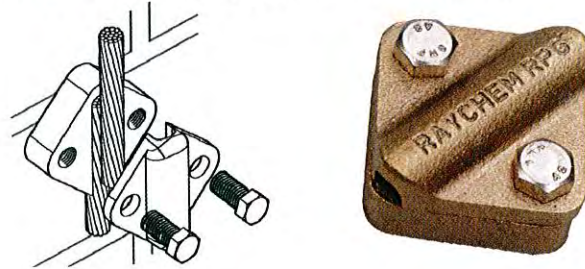
TEST CLAMP

Material : Gunmetal

Combination Type : Conductor

Usage : Provides an effective low resistance connection between overlapping stranded conductors

Product Code	Conductor Size Sq. mm
RRCT - 01	35
RRCT - 02	50
RRCT - 03	70
RRCT - 04	95



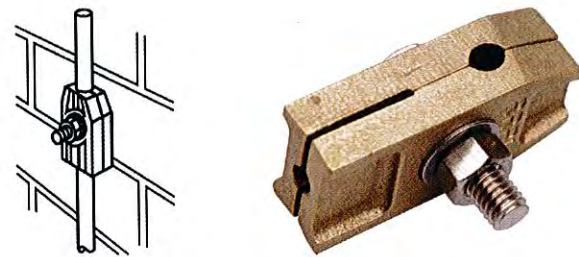
INTERFACE TEST CLAMP

Material : Gunmetal

Type : Conductor

Usage : Used to provide low resistance Tee Joints In solid circular conductor networks

Product Code	Conductor Dia mm	Conductor Size Sq. mm	Material
RITC - 01	8	25 x 3	Gunmetal
RITC - 02	8	25 x 3	Aluminium



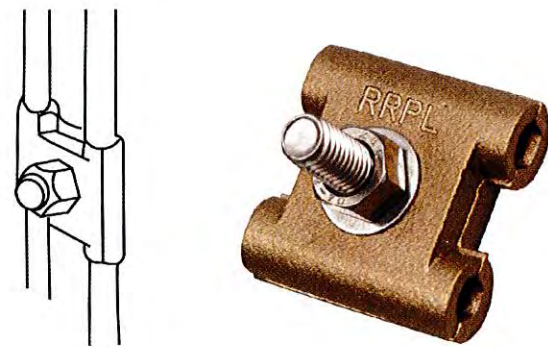
JOINTING CLAMP

Material : Gunmetal

Type : Conductor

Usage : Used to provide low resistance parallel joints in solid circular conductor network

Product Code	Conductor Dia mm	Material
RJC - 01	8	Gunmetal
RJC - 02	8	Aluminium



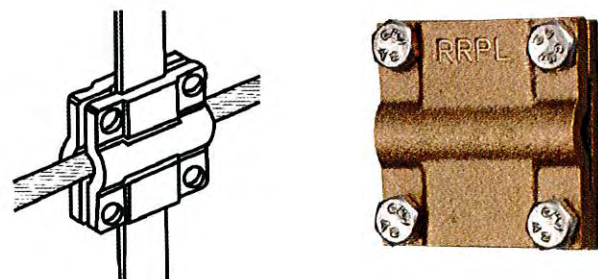
TAPE TO CONDUCTOR SQUARE CLAMP

Material : Gunmetal

Type : Conductor and Tape

Usage : Used to provide low resistance cross joints in solid circular conductor networks

Product Code	Conductor Dia mm	Material
RTSC - 01	8	Gunmetal
RTSC - 02	8	Aluminium



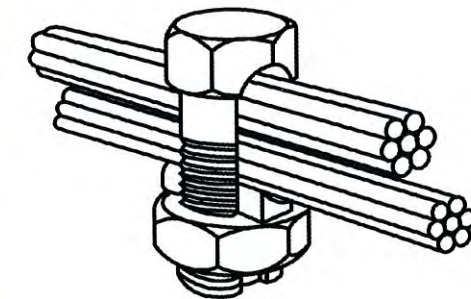
SPLIT BOLT

Material : Brass and Copper

Type : Conductor

Usage : The split bolt connector accept the wide range of stranded copper conductors. Brass line taps are made with high tensile brass as per BS 2874. Threads are formed by rolling process giving the nut extra clamping force. Pressure pads are made from extruded bars (Not Cast) preventing the pads from cracking. Brass line taps are manufactured in passivated natural brass with electro tinned finish. The are also supplied in high conductive copper

Product Code	Main Conductor A Sq. mm	Tap Conductor B Sq. mm
RSBC - 01	10	1.5 - 10
RSBC - 02	16	2.5 - 16
RSBC - 03	25	2.5 - 25
RSBC - 04	35	2.5 - 35
RSBC - 05	50	2.5 - 50
RSBC - 06	70	2.5 - 70
RSBC - 07	95	2.5 - 95
RSBC - 08	120	10 - 120
RSBC - 09	150	10 - 150
RSBC - 10	185	50 - 185
RSBC - 11	240	95 - 240



RSBC - 06



RSBC - 03



RSBC - 01

MECHANICAL FIXING LUGS (2 & 4 BOLTS)

Product Code	Conductor Size	Bolt Size Stud (Hole) Size	Dimensions mm			
			Palm Width	Distance between Bolts	Stud Centre Distance	Length of Lugs
RFL - 01	16	M8	18	4.5	12.5	12.5
RFL - 02	25	M8	18.5	6.5	13	13
RFL - 03	35	M12	23	7	15	15
RFL - 04	50	M12	23.5	8	16	15
RFL - 05	75	M12	26	10	20	14
RFL - 06	100	M12	31	13	17	20
RFL - 07	120	M15	33	14	10	17
RFL - 08	170	M15	36	16	20	18
RFL - 09	200	M16	38	18	23	20
RFL - 10	250	M16	41	18	25	23
RFL - 11	300	M20	46	23	28	25
RFL - 12	415	M20	54	25	35	28
RFL - 13	700	M20	60	32	34	35

