

Ray Lech® LV & MV Cable Solutions

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Ray 20 years of research and development

Raytech, located near Milano, the most important economic-financial area in Italy, is the company with the widest range of accessories and components for electrical cables in the world in terms of production.

Passion for design and innovation has allowed Raytech to evolve and

adapt to the needs of constantly expanding national and international market standards, as well as to meet the challenge of satisfying and surprising end users with new or improved products extremely rapidly, without ever skimping on the same scrupulous quality which has always distinguished them in the production field.



20.000 m² total which are home to:

CERTIFIED LABORATORY

equipped for all types of testing with alternating current, direct current, impulse, and load cycle.

PHYSICAL/CHEMICAL **LABORATORY**

within which stringent technical parameters are established and set to quarantee the highest quality standards.

The performance specifications of *Raytech* products have been tested and certified inside our laboratories to ensure maximum reliability to even our most demanding installers, who can find our products in **36 countries worldwide** through an established and highly qualified distribution network.

In an increasingly competitive and fast market, Raytech is known as a precursor of the best and most inventive technologies, for its integrity and passion which are the cornerstones of its twenty years in the business.



PRODUCTION SITE

implemented over the years, with machines of our own design, engineered to provide the market with innovative solutions or improvements that are reliable and effective over time.

TEAM

highly qualified operators in accordance with ISO 9001:2008.

STOCK

adequate to process orders within **24 hours** of receipt.





Low Voltage

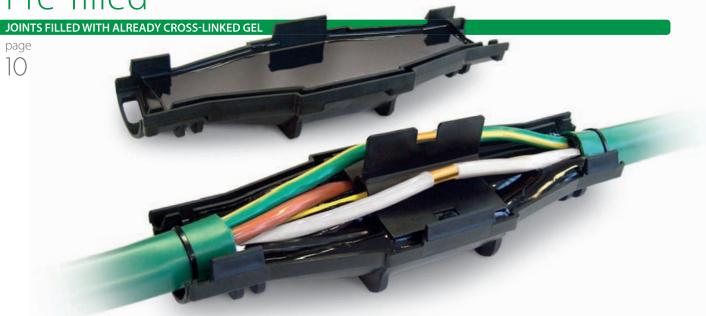




JOINTS

Straight or branch jointing systems for low voltage cables up to 1 kV with gel, PVC, rubber, neoprene rubber insulation FLEXI^{più}, G-SETTE, G-SETTE^{più}, AFUMEX, FLEXSTREME, etc.

Pre-filled



Integrated connection







Free connection









King Joint Y King Joint L

King Joint

Rapid Joint

Clik Fire

A2A Joints Mammut Gel

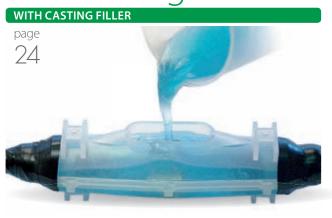
System Plus

JOINTS EQUIPPED WITH COMPLETE CONNECTION SYSTEM











Magic Power Joint

Magic Joint







Magic Joint Fire Rubber Joint

Raycast



System Fast RP

JOINTS WITH 4 SHEAR BOLT CONNECTORS







Rapid Joint RP

Magic Power Joint RP



Magic Joint RP





Raycast RP

GLV RP

Heat-shrink







GLV

Terminals



	SYSTEM FREE CO	S WITH DINNECTION		2		X		
TYPE OF JOINT	Magic Power Joint	Magic Joint	Rapid Joint	Clik Joint	Rubber Joint	Raycast	Wonder Joint	GLV
PRE-FILLED			•	•				
FOR CASTING	•	•			•	•		
INJECTABLE							•	
HEAT-SHRINK								•
extra-fast installation			•				•	
fast installation	•	•		•	•	•		
straight	•	•	•	•	•	•	•	•
branch	•	•		•	•	•	•	•
for copper cable	•	•	•	•	•	•	•	•
for aluminium cable	•	•	•		•	•		•
for screened cable	•		•			•		•
for armoured cable	•		•			•		•
for signalling and control	•		•			•		•
for telephone cable	•		•			•		•
1x single core cable	•	•	•	•	•	•	•	
2x two-core cable	•	•	•	•	•	•	•	•
3x three-core cable	•	•	•	•	•	•	•	•
4x four-core cable	•	•	•	•	•	•	•	•
5x five-core cable								
for cables up to 630 mm ²	•	•				•		•
flame retardant	•	•	•	•	•		•	•
complete with separator	•	•	•	•	•	•	•	
complete with screw connectors								
for underwater use	•	•	•	•	•	•	•	•
for high depth	•				-		•	•
re-enterable	•							•
Non-toxic / without shelf life	•	•		•	•		•	•



SYSTEMS WITH SEPARATOR









SYSTEMS WITH SHEAR BOLT



SEPARAT AND CON	OR NNECTORS		-4	All of		~	SHEAR BO CONNEC	TORS			C
King Joint	King Joint L	King Joint Y	Magic Power Joint System Plus	Magic Joint System Plus	Raycast System Plus	Wonder Joint System Plus	Magic Power Joint RP	Magic Joint RP	Raycast RP	Rapid Joint RP	GLV RP
•	•	•								•	
			•	•	•		•	•	•		
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JOINTS

for integrated connections







King Joint

Range of fast gel pre-filled straight or branch type joints for 0.6/1 kV multi core cables of up to 5 conductors

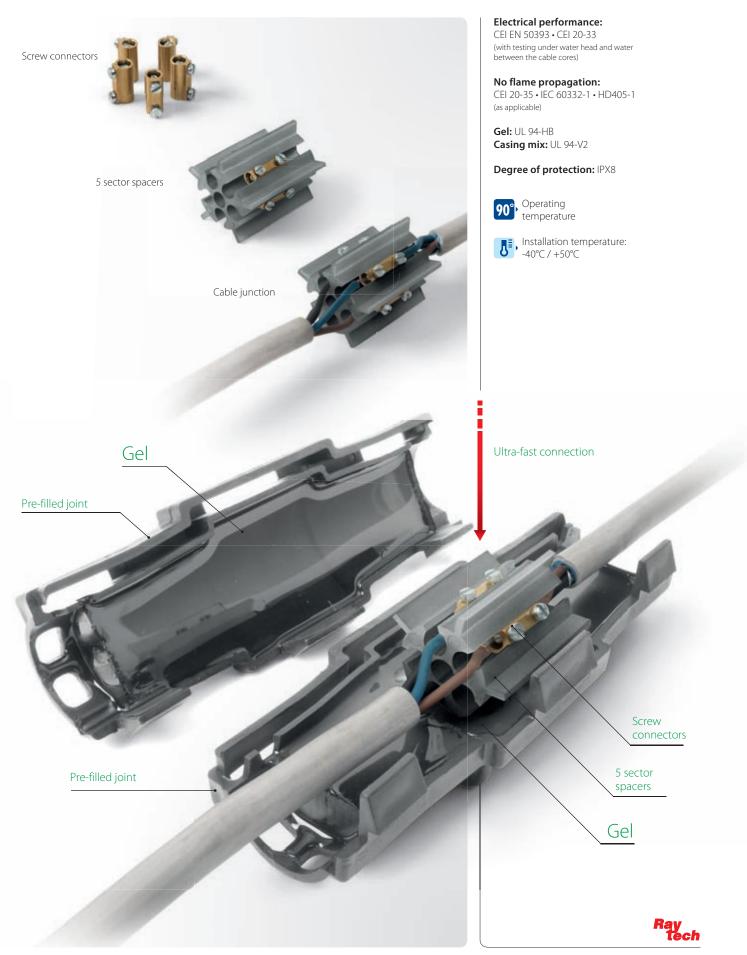
The primary insulation, consisting of a cross-linked polymer gel and extremely strong plastic insulating housing, make the Class 2, in accordance with the definitions contained in CEI Regulation 64-8. The joint, tested in accordance with the most important international specifications with repeated bending and twisting cycles and immersion in water, was found to comply with the mechanical, electrical and sealing requirements necessary for accessories for plastic cables. The joint and its components have no self life, are chemically inert and therefore completely safe; the conductor connections are re-accessible even after long operating periods. Packaged with self-extinguishing material, it is flame retardant. Suitable for cables with a temperature of +90°C.

- For multicore cables of up to 5 cores
- 5 sector spacers for proper centring of five-core connection
- Complete with screw connectors
- For straight and branch connections, including armoured cable
- For all types of application, including submersible
- Re-accessible and with no shelf life

 Flame retardant Non toxic and safe King Joint King Joint Y King Joint L



PRE-FILLED WITH GEL for integrated connections





for integrated connections

King Joint L Straight joints, including armoured cable







Product	LINE CONNECTIONS Cable formation and conductor cross sections (n° x mm²)	Ø max cables (mm)	Dimensions A x B x C (mm)
• King Joint L6	2 x 1,5 - 6 3 x 1,5 - 6	20.5	105 x 55 x 55
	4 x 1,5 - 6 5 x 1,5 - 6	20,5	103 / 33 / 33



Product	STRAIGHT CONNECTIONS Cable formation and conductor cross sections (n° x mm²)	Ø max cables (mm)	Dimensions A x B x C (mm)
• King Joint L10 • King Joint L10 - ARM	2 x 2,5 - 10 3 x 2,5 - 10 4 x 2,5 - 10 5 x 2,5 - 10	24	180 x 60 x 60



Product	STRAIGHT CONNECTIONS Cable formation and conductor cross sections (n° x mm²)	Ø max cables (mm)	Dimensions A x B x C (mm)
• King Joint L25 • King Joint L25 - ARM	2 x 4 - 25 3 x 4 - 25 4 x 4 - 25 5 x 4 - 25	31	210 x 65 x 65

ARM type joints complete with continuity device suitable for connection to armoured wire or steel tape cables.

Installation sequence King Joint L











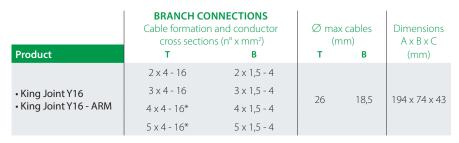
PRE-FILLED WITH GEL for integrated connections

King Joint Y

Branch joints, including armoured cable

	BRANCH CONNECTIONS Cable formation and conductor cross sections (n° x mm²)				Dimensions A x B x C
Product	Т	ТВ		В	(mm)
	2 x 1,5 - 6	2 x 1,5 - 4			
• King Joint Y6	3 x 1,5 - 6	3 x 1,5 - 4	22.5	10 E	138 x 60 x 37
• King Joint Y6 - ARM	4 x 1,5 - 6	4 x 1,5 - 4	22,5	18,5	136 X 00 X 3/
	5 x 1,5 - 6	5 x 1,5 - 4			

T: Through cable - B: Branch cable



T: Through cable - B: Branch cable

^{*} For armoured cables max conductor cross section 10 mm².

Product	BRANCH CONNECTIONS Cable formation and conductor cross sections (n° x mm²) T B		1	k cables nm) B	Dimensions A x B x C (mm)
King Joint Y35King Joint Y35 - ARM	2 x 10 - 35 3 x 10 - 35	2 x 1,5 - 6 3 x 1,5 - 6	36	26	290 x 105 x 51
	4 x 10 - 35*	4 x 1,5 - 6			

T: Through cable - B: Branch cable

ARM type joints complete with continuity device suitable for connection to **armoured wire or steel tape cables**.







Installation sequence King Joint Y







^{*} For armoured cables max conductor cross section 25 mm².

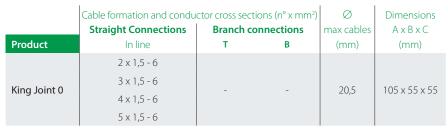


for integrated connections

King Joint

Straight and branch joints





T:Through cable - B: Branch cable

		Cable formation and condu	Ø	Dimensions			
		Straight Connections	Branch co	onnections	max cables	$A \times B \times C$	
	Product	In line	Т	В	(mm)	(mm)	
		2 x 1,5 - 6	2 x 4	2 x 2,5			
	King Joint 1	3 x 1,5 - 6	3 x 4	3 x 2,5	20,5	150 x 56 x 30	
	King Joint 1	4 x 1,5 - 6	4 x 4	4 x 2,5	20,3	130 X 30 X 30	
		5 x 1,5 - 6	5 x 4	5 x 2,5			

T:Through cable - B: Branch cable









	Cable formation and conductor cross sections (n° x mm²)					
	Straight Co	onnections	nnections Branch connections			Dimensions
Product	Crimp connectors			max cables (mm)	A x B x C (mm)	
	2 x 4 - 25	2 x 4 - 16	2 x 10	2 x 6		
Vina laint 3	3 x 4 - 25	3 x 4 - 16	3 x 10	3 x 6	30	220 x 85 x 46
King Joint 2	4 x 4 - 25	4 x 4 - 16	4 x 10	4 x 6	30	220 X 65 X 40
	5 x 4 - 25	5 x 4 - 16	5 x 10	5 x 6		

T: Through cable - B: Branch cable

	Cable formation and conductor cross sections (n° x mm²)				Dimensions
	Straight Connections	Branch co	onnections	max cables	$A \times B \times C$
Product	In line	Т	В	(mm)	(mm)
		2 x 4 - 25	2 x 1,5 - 4		
King Joint 3	-	3 x 4 - 25	3 x 1,5 - 4	30	220 x 85 x 46
		4 x 4 - 25	4 x 1,5 - 4		

T: Through cable - B: Branch cable

Installation sequence of King Joint 1 and 2 separator









Ray Tech



for free connections

Rapid Joint

Radial closing gel pre-filled joint for extruded insulation cables up to 1 kV

Primary insulation, consisting of a cross-linked polymer gel, and the exceptionally robust insulating plastic casing render Class 2 joints in accordance with the definitions contained in standard CEI 64-8. The joint has been tested in accordance with the main international specifications, with repeated flexing and torsion tests and immersion in water, and has been declared as conforming to the mechanical, electrical and sealing specifications required for plastic cable accessories. The joint and its components have an unlimited shelf life, are chemically inert and therefore completely safe. Conductor connections are re-enterable even after long periods of operation. Packaged with self-extinguishing material, flame retardant, for cables at 90°C working temperature. The radial closing system facilitates joint application, making them re-enterable only by means of a tool.

- For straight connections (in line)
- For multi core cables of up to 4 cores
- Wide range of cable formations
- With suitable spacers
- Re-enterable only by means of a tool
- For all types of application, including submersible
- Suitable for 3 core crossing
- Non-toxic, with no expiry date

Electrical performance:

CEI EN 50393 • CEI 20-33 (with testing under water head and water between the cable cores) Class 2 in accordance with CEI 64-8.

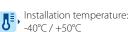
No flame propagation:

CEI 20-35 • IEC 60332-1 • HD405-1 (as applicable)
Low smoke and toxic and corrosiand corrosive gas emissions

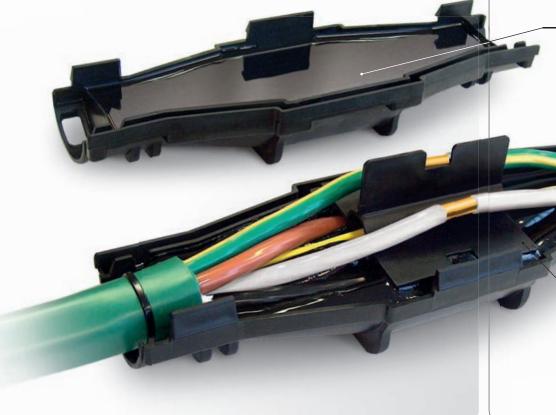
Gel: UL 94-HB **Casing mix:** UL 94-V2

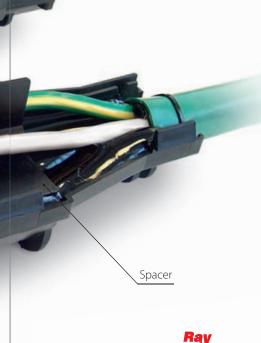
Degree of protection: IPX8





Gel







for free connections



Rapid Joint

Straight joints for 0.6/1 kV extruded cables



For COPPER cables	Cable forma		onductor cro mm²)	With optical fibre separator	Dimensions A x B	
Product	1x	2x	3x	4x	4x	(mm)
Rapid Joint L6	1,5 - 50	1,5 - 6	1,5 - 6	1,5 - 6	-	105 x 55
Rapid Joint L10	2,5 - 150	2,5 - 16	2,5 - 10	2,5 - 10	-	180 x 60
Rapid Joint L25	120 - 240	2,5 - 35	2,5 - 25	2,5 - 25	-	210 x 65
Rapid Joint L95	185 - 400	35 - 95	25 - 70	25 - 70	16 - 50	320 x 100
For ALUMINIUM cables	1x	2x	3x	4x	4x	(mm)
Rapid Joint L 25	120 - 240	16 - 35	10 - 25	10 - 25	-	210 x 65
Rapid Joint L 95	185 - 400	35 - 95	25 - 70	25 - 70	16 - 50	320 x 100



Rapid Joint S/ARM

Straight joints for 0.6/1 kV extruded cables, for screened or tape or wire armoured cables



For copper wire SCREENED cables	Cable forma		onductor cro mm²)	With optical fibre separator	Dimensions A x B	
Product	1x	2x	3x	4x	4x	(mm)
Rapid Joint L 10-S	2,5 - 120	2,5 - 10	2,5 - 10	2,5 - 10	-	180 x 60
Rapid Joint L 25-S	120 - 185	16 - 25	10 - 25	10 - 25	-	210 x 65
Rapid Joint L 95-S	240 - 400	35 - 95	25 - 70	25 - 70	16 - 50	320 x 100

For copper tape ARMOURED cables	2x	3x	4x	4x	(mm)
Rapid Joint L 10-ARM	2,5 - 10	2,5 - 10	2,5 - 10	-	180 x 60
Rapid Joint L 25-ARM	16 - 25	10 - 25	10 - 25	-	210 x 65
Rapid Joint L 95-ARM	35 - 95	25 - 70	25 - 70	16 - 50	320 x 100

Joint supplied with armour continuity device.



Rapid Joint IP68

Straight joints with polyamide gland striain relief



For COPPER cables	Cable form	ation and co (n° x ı	Ø cable	Dimensions A x B		
Product	1x	2x	3x	4x	(mm)	(mm)
Rapid Joint L1,5-IP68	4 - 25	1,5 - 6	1,5 - 2,5	1,5	8 - 13	105 x 55
Rapid Joint L6-IP68	25 - 70	1,5 - 10	1,5 - 6	1,5 - 6	12 - 18	180 x 60
Rapid Joint L10-IP68	70 - 95	10 - 16	6 - 10	4 - 10	16 - 20	210 x 65



for free connections

Rapid Joint LS

Straight joints for signalling and control cables



Product	Conductor cross sections (mm²)	5x	7x	10x	(n°	ble fo cond 16x	ducto	rs)	40x	75x	100x	Dimensions A x B (mm)
Rapid Joint-LS1	1,5 2,5	•	•	•	•	•	•					180 x 60
Rapid Joint-LS2	1,5 2,5					•	•	•	•			210 x 65
Rapid Joint-LS3	1,5 2,5						•	•	•	•	•	320 x 100



Rapid Joint T

Straight joints for telephone cables



UNscreened Product	SCREENED Product	N° pairs per conductor cross sections (n° x mm²)	Dimensions A x B (mm)
Rapid Joint-T26	Rapid Joint-TS26	(1 - 26) x (0,5 - 0,6)	180 x 60
Rapid Joint-T61	Rapid Joint-TS61	(30 + 1 - 64 + 1) x (0,5 - 0,6)	210 x 65
Rapid Joint-T101	Rapid Joint-TS101	(60 + 1 - 100 + 1) x (0,5 - 0,6)	320 x 100



Rapid Joint MT

Straight joints for medium voltage extruded insulation cables for public lighting



Product	Voltage (kV)	Cable formation and conductor cross sections $(n^{\circ} \times mm^{2})$	Dimensions A x B (mm)
Rapid Joint MT1	3	1 x 10 - 150	210 x 65
Rapid Joint MT2	3	1 x 95 - 300	320 x 100



To be used with RG7H1R 1.8/3 kV cable, or 6/10 kV operated at 3 kV







Preparation of cables and connections.

Spacers insertion and Joint closing.

Joint completed.





for free connections

Clik Fire

Straight or branch joint pre-filled with gel, **Electrical performance:** flame retardant, for multi core cables up to 4 cores

The combination of the primary insulation in a cross-linked polymer gel and the highly robust insulating plastic case makes this a Class 2 joint defined by CEI 64-8. The joint has been tested in accordance with the main international spécifications, with repeated flexing and torsion tests and immersion in water, it has been declared as conforming to the mechanical, electrical and sealing spécifications required for plastic cable accessories. The joint and its components have an unlimited shelf life, they are chemically inert and therefore completely safe; the connections are re-entrable even after long working periods. Made of self-extinguishing components the joint is flame retardant. For cables at 90°C working temperature.



Typical applications





CEI EN 50393 • CEI 20-33

(with testing under water head and water between the cable cores) Class 2 in accordance with CEI 64-8.

No flame propagation:

CEI 20-35 • IEC 60332-1 • HD405-1 (as applicable)

> Gel: UL 94-HB Casing mix: UL 94-V2

Degree of protection: IPX8

Operating 90° temperature



Installation temperature: $-40^{\circ}\text{C} / +50^{\circ}\text{C}$











for free connections

Clik Fire

Straight or branch multi core joints for 0.6/1 kV extruded cables



Product		n and conductor ns (n° x mm²) 1 or 2 branch cables	Ø max (m Through or straight		Dimensions A x B x C (mm)
CLIK 0 Fire	1 x 2,5 - 50 2 x 2,5 - 6	1 x 1,5 - 10 2 x 1,5	16	10	95 x 43 x 28
CLIK 1 Fire	1 x 6 - 95 2 x 1,5 -1 6 3 x 1,5 - 10 4 x 1,5 - 10	1 x 1,5 - 35 2 x 1,5 - 6 3 x 1,5 - 6 4 x 1,5 - 4	20,5	15	150 x 56 x 30
CLIK 2 Fire	1 x 50 - 185 2 x 10 - 35 3 x 6 - 35 4 x 6 - 35	1 x 16 - 185 2 x 1,5 - 35 3 x 1,5 - 35 4 x 1,5 - 16	30	29	220 x 85 x 46



Sections evaluated on the base extruded 0,6 1 kV cable.

Clik Fire

Branch joints with 30° output for 0.6/1 kV extruded cables



	Cable formation and conductor cross sections (n° x mm²)		Ø max cables (mm)		Dimensions A x B x C
Product	Through	Branch	Through	Branch	(mm)
CLIK 2000 Fire	1 x 2,5 - 25	1 x 1,5 - 16	14	12,5	75 x 40 x 21
CLIK 2001 Fire	1 x 6 - 95 2 x 1,5 - 16 3 x 2,5 - 16 4 x 2,5 - 10	1 x 1,5 - 70 2 x 1,5 - 10 3 x 1,5 - 10 4 x 1,5 - 6	22,5	18,5	138 x 60 x 37
CLIK 2002 Fire	1 x 50 - 150 2 x 1,5 - 25 3 x 4 - 25 4 x 4 - 16	1 x 1,5 - 70 2 x 1,5 - 10 3 x 1,5 - 10 4 x 1,5 - 6	26	18,5	194 x 74 x 43
CLIK 2003 Fire	1 x 150 - 240 2 x 16 - 50 3 x 16 - 50 4 x 16 - 50	1 x 50 - 120 2 x 10 - 25 3 x 10 - 25 4 x 6 - 16	36	26	290 x 105 x 51





Sections evaluated on the base extruded 0,6 1 kV cable.



for free connections



Approvals

Electrical performance:

CEI EN 50393 • CEI 20-33 • IP 0033 (A2A)

No flame propagation:

CEI 20-35 • IEC 60332-1 HD405-1 A2A certified (as applicable)

> Gel: UL 94-HB Casing mix: UL 94-V2

Degree of protection: IPX8





Installation temperature: -40°C / +50°C



Clik Fire - A2A

Main line branch joint for parallel type public lighting systems

Branch joints from main to main cable, from main to pole rise, from overhead line to pole equipment, from pre-assembled cable to pole equipment, of a type certified by Azienda Elettrica Milanese (A2A, ex AEM). Accessories are complete with mantel-type, pre-insulated Allen screw connectors and, for installations with traps, with the specific protection monitor plate. Joints are non-toxic, with no shelf life and re-enterable.

Product	Approval code	Branch type	Through cable (n° x mm²)	Branch cable (n° x mm²)
CLIK 2 Fire Dor/Palo	E 27.012	Main / Pole	RG7R 2 x 1 x 16	FG7OR 2 x 2,5
CLIK 1 Fire Dor/Dor	E 27.013	Main / Main	RG7R 4 x 1 x 16	RG7R 4 x 1 x 16
CLIK 1 Fire Aer/Dap	E 27.014	Overhead line / Equipment	UG7R 2 x 1 x 16	FG7R 2 x 1 x 4
CLIK 2 Fire Prec/Dap	E 27.015	Pre-assembled / Equipment	RE4E4X 2 x 1 x 10	FG7OR 2 x 2,5



Approvals

Electrical performance:

CEI EN 50393 • CEI 20-33 • IP 0033 (A2A)

No flame propagation:

CEI 20-35 • IEC 60332-1 HD405-1 A2A certified (as applicable)

> Gel: UL 94-HB Casing mix: UL 94-V2

Degree of protection: IPX8





Installation temperature: -40°C / +50°C



Clik Fire - A2A (Fuse)

Branch joint from main to pole rise, with protection fuse

Branch joints from main to pole rise complete with disconnectable fuse holder and fuse with signal indicating intervention. Accessories are complete with mantel-type, pre-insulated Allen screw connectors and, for installations with traps, with the specific protection monitor plate. Joints are non-toxic, with no shelf life and re-enterable and flame retardant.

Product	Fuse inserted	Branch type	Through cable (n° x mm²)	Branch cable (n° x mm²)
CLIK 2 Fire Dor/Palo Fuse	16 A	Main / Pole	RG7R 4 x 1 x 16	FG7OR 2 x 2,5





for free connections

Mammut Gel Cover

Accessory pre-filled with gel for straight connections for the protection, safety and covering of electrical connections using strip connectors or alternatives

- For 3 x 1 to 6 mm² cables or 3-wire insulated cables
- For civil and industrial connections
- To put household systems in order
- Also for underwater use

• Non-toxic and with no expiration



Electrical performance:

CEI EN 50393 • CEI 20-33 (with testing under water head and water between the cable cores) Class 2 in accordance with CEI 64-8.

No flame propagation:

CEI 20-35 • IEC 60332-1 HD405-1 (as applicable)

Gel: UL 94-HB Casing mix: UL 94-V2



90° Operating temperature



Installation temperature: -40°C / +50°C

			B
Product	Housed Choco-block type connectors	Pieces per box	Dimensions $A \times B \times C$ (mm)
Mammut Gel Cover	two 4 mm²	8	61 x 35 x 28
Mammut Gel Cover 6	three 4 mm ² three 6 mm ²	6	63 x 41 x 28

Installation sequence



















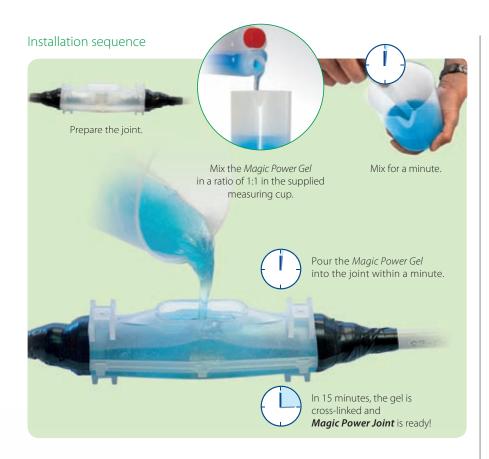
Magic Power Joint

Straight or branch joint with Magic Power Gel for extruded insulation cables up to 1 kV

Joints for extruded cables F(R)G7OR 0.6/1 kV. Easy installation, composed of two anti-fracture plastic shells, to be filled with non-toxic quick cross linking bicomponent insulation such as Magic Power Gel. Suitable for installation in traps, channels or directly underground or under water. Non-toxic, safe, light and re-enterable. Thanks to the softness of the insulation, they are able to absorb external shock without cracking or fracturing. The extreme stickiness of the insulation together with its softness allow it to transmit water pressure for installation even at high depths.

- Re-enterable and inspectable joint
- Insulated with *Magic Power Gel*, the innovative self-amalgamating gel
- For installations even in harsh conditions and high depths!
- Extremely adherent and tight sealing





Electrical performance: CEI EN 50393 • CEI 20-33

(with testing under water head and water between the cable cores)

Gel: UL 94-HB

Degree of protection: IP68





RE-ENTERABLE



REMOVABLE



INSPECTIONABLE



REUSABLE







Magic Power Joint L

Straight joint for 0.6/1 kV extruded cables



For COPPER cables Product	Cable format	ion and conduc	ctor cross section	ns (n° x mm²) 4x	Dimensions A x B (mm)
Magic P Joint L10	2,5 - 50	1,5 - 10	1,5 - 10	1,5 - 10 *	180 x 50
Magic P Joint L25	16 - 150	4 - 25	4 - 25	2,5 - 25	215 x 55
Magic P Joint L35	16 - 185	16 - 35	16 - 35	16 - 35	232 x 70
Magic P Joint L50	50 - 300	16 - 50	16 - 50	16 - 50	266 x 72
Magic P Joint L95	120 - 400	25 - 95	25 - 95	25 - 95	330 x 75
Magic P Joint L120	240 - 500	70 - 120	70 - 120	50 - 120	365 x 95
Magic P Joint L240	400 - 1000	120 - 300	120 - 240	120 - 240	510 x 120
Magic P Joint L300	630 - 2000	240 - 400	240 - 300	240 - 300	760 x 180
For ALUMINIUM cables	1x	2x	3x	4x	(mm)
Magic P Joint L50	16 - 150	16 - 25	16 - 25	16 - 25	266 x72
Magic P Joint L120	185 - 400	25 - 95	25 - 95	25 - 95	365 x 95
Magic P Joint L240	400 - 630	95 - 185	95 - 185	95 - 185	510 x 120
Magic P Joint L300	630 - 2000	185 - 300	185 - 300	185 - 300	760 x 180

^{*} Magic Power Joint 10 suggested for cable diameters smaller than 16 mm.



Magic Power Joint Y

Branch joint for 0.6/1 kV extruded cables



For COPPER cables		ole forma	_	conduct x	or cross . 3		(n° x mr 4		Dimensions A x B
Product	Т	В	Т	В	T	В	Т	В	(mm)
Magic P Joint Y6	4 - 50	4-50	4 - 10	4 - 10	2,5 - 6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90
Magic P Joint Y25	50 - 150	50 - 150	10 - 25	10 - 25	6-25	6-16	6-25	6 - 10	220 x 105
Magic P Joint Y95	120 - 400	95 - 240	25 - 95	16 - 50	25 - 95	16 - 50	25 - 95	10 - 50	315 x 115
Magic P Joint Y240*	240 - 630	240 - 630	95 - 240	50 - 240	95 - 240	50 - 240	95 - 240	50 - 240	600 x 285

T: Through - B: Branch



^{*} also for aluminium cables.

Magic Power Joint L-S

Straight joint for 0.6/1 kV screened extruded cables



For COPPER cables	Cable format	Cable formation and conductor cross sections (n° x mm²)							
Product	1x	2x	3x	4x	A x B (mm)				
Magic P Joint L10-S	2,5 - 50	1,5 - 10	1,5 - 6	1,5 - 6	180 x 50				
Magic P Joint L25-S	16 - 120	4 - 25	4 - 16	2,5- 16	215 x 55				
Magic P Joint L35-S	16 - 185	16 - 35	16 - 25	16 - 25	232 x 70				
Magic P Joint L50-S	50 - 240	16 - 50	16 - 50	16 - 50	266 x 72				
Magic P Joint L120-S	240 - 500	70 - 120	70 - 120	50 - 95	365 x 95				
Magic P Joint L240-S	400 - 1000	120 - 300	120 - 185	120 - 185	510 x 120				
Magic P Joint L300-S	630 - 2000	240 - 400	240 - 300	240 - 300	760 x 180				

For ALUMINIUM cables	1x	2x	3x	4x	(mm)
Magic P Joint L50-S	16 - 150	16 - 25	16 - 25	16 - 25	266 x 72
Magic P Joint L120-S	185 - 400	25 - 95	25 - 95	25 - 95	365 x 95
Magic P Joint L240-S	400 - 630	95 - 185	95 - 185	95 - 185	510 x 120
Magic P Joint L300-S	630 - 2000	185 - 300	185 - 300	185 - 300	760 x 180



Magic Power Joint Y-S

Branch joint for 0.6/1 kV screened extruded cables



For COPPER cables		ole forma x	tion and	conduct x	or cross	(n° x mr 4		Dimensions A x B	
Product	Т	В	Т	В	Т	В	Т	В	(mm)
Magic P Joint Y6-S	4-35	4 - 35	4 - 10	4 - 10	2,5 - 6	2,5 - 6	2,5 - 6	2,5-6	180 x 90
Magic P Joint Y25-S	35 - 120	35 - 120	10 - 25	10 - 25	6 - 16	6 - 16	6 - 16	6-10	220 x 105
Magic P Joint Y95-S	95 - 300	70 - 150	25 - 95	16 - 50	16-70	16 - 35	16 - 50	10-35	315 x 115
Magic P Joint Y240-S*	240 - 630	150 - 630	95 - 240	50 - 240	70 - 240	35 - 240	50 - 240	35-240	600 x 285

- T: Through B: Branch
- * also for aluminium cables.









Magic Power Joint L-ARM

Straight joint for 0,6/1 kV extruded cables with tape, wire or plate armouring



For COPPER cables	Cable formation ar	ections (n° x mm²)	Dimensions	
Product	2x	3x	4x	A x B (mm)
Magic P Joint L10-ARM	1,5 - 10	1,5 - 6	1,5 - 6	180 x 50
Magic P Joint L25-ARM	4 - 25	4 - 16	2,5 - 16	215 x 55
Magic P Joint L35-ARM	16 - 35	16 - 25	16 - 25	232 x 70
Magic P Joint L50-ARM	16 - 50	16 - 50	16 - 50	266 x 72
Magic P Joint L120-ARM	70 - 120	70 - 120	50 - 95	365 x 95
Magic P Joint L240-ARM	120 - 300	120 - 185	120 - 185	510 x 120
Magic P Joint L300-ARM	240 - 400	240 - 300	240 - 300	760 x 180

For ALUMINIUM cables	2x	3x	4x	(mm)
Magic P Joint L50-ARM	16 - 25	16 - 25	16 - 25	266 x 72
Magic P Joint L120-ARM	25 - 95	25 - 95	25 - 95	365 x 95
Magic P Joint L240-ARM	95 - 185	95 - 185	95 - 185	510 x 120
Magic P Joint L300-ARM	185 - 300	185 - 300	185 - 300	760 x 180



Magic Power Joint Y-ARM

Branch joint for 0,6/1 kV extruded cables with tape, wire or plate armouring



For WIRE armoured COPPER cables		rmation ar x	nd conduc		sections (n 4		Dimensions A x B
Product	Т	В	Т	В	Т	В	(mm)
Magic P Joint Y6-ARM-F	4 - 10	4 - 10	2,5 - 6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90
Magic P Joint Y25-ARM-F	10 - 25	10 - 25	6 - 16	6 - 16	6 - 16	6-10	220 x 105
Magic P Joint Y95-ARM-F	25 - 70	16 - 50	25 - 70	16 - 35	25 - 50	10 - 35	315 x 115
Magic P Joint Y240-ARM-F*	70 - 240	50 - 240	70 - 240	35 - 240	50 - 240	35 - 240	600 x 285

For TAPE OR PLATE	2x		, 3	X	, 4	·X	
armoured COPPER cables	Т	В	Т	В	Т	В	(mm)
Magic P Joint Y6-ARM	4-10	4 - 10	2,5 - 6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90
Magic P Joint Y25-ARM	10 - 25	10 - 25	6 - 16	6 - 16	6 - 16	6 - 10	220 x 105
Magic P Joint Y95-ARM	25 - 70	16 - 50	25 - 70	16 - 35	25 - 50	10 - 35	315 x 115
Magic P Joint Y240-ARM*	70 - 240	50 - 240	70 - 240	35 - 240	50 - 240	35 - 240	600 x 285

 $[{]f T}$: Through - ${f B}$: Branch



^{*} also for aluminium cables.



Magic Power Joint-SL

Straight joint for signaling and control multi core extruded 0,6/1 kV cables



LV

Product	Conductor cross sections (mm²)	Cable formation (n° conductors) 5x 7x 10x 12x 16x 19x 24x 40x 75x 100x 250x 500x	Dimensions A x B (mm)
Magic P Joint SL11	1,5 2,5		180 x 50
Magic P Joint SL12	1,5 2,5	• • • •	215 x 55
Magic P Joint SL13	1,5 2,5	• • •	266 x 72
Magic P Joint SL14	1,5 2,5		330 x 75
Magic P Joint SL15	1,5 2,5	• • •	365 x 95
Magic P Joint SL16	1,5 2,5		510 x 120
Magic P Joint SL17	1,5 2,5	• • •	760 x 180



Magic Power Joint-SY

Branch joint for signaling and control multi core extruded 0,6/1 kV cables



Product	Conductor cross sections (mm²)		7x			forn 16x						250x	500x	Dimensions A x B (mm)
Magic P Joint SY1	1,5 2,5	•	•	•	•	•	•							180 x 90
Magic P Joint SY2	1,5 2,5			•	•	•	•	•						220 x 105
Magic P Joint SY3	1,5 2,5						•	•	•	•				315 x 115
Magic P Joint SY4	1,5 2,5								•	•	•	•	•	600 x 285



Magic Power Joint-TeTS

Straight joint for telephone cables



UNscreened	SCREENED	N° pairs per conductor cross	Dimensions
Product	Product	sections (n° x mm²)	A x B (mm)
Magic P Joint T16	Magic P Joint TS16	1 - 16 x 0,5 - 0,6	180 x 50
Magic P Joint T25	Magic P Joint TS25	16 - 25 x 0,5 - 0,6	215 x 55
Magic P Joint T35	Magic P Joint TS35	25 - 35 x 0,5 - 0,6	266 x 72
Magic P Joint T40	Magic P Joint TS40	35 - 40 x 0,5 - 0,6	330 x 75
Magic P Joint T64	Magic P Joint TS64	40 - 64 x 0,5 - 0,6	365 x 95
Magic P Joint T500	Magic P Joint TS500	60 - 500 x 0,5 - 0,6	510 x 120
Magic P Joint T1000	Magic P Joint TS1000	450 - 1000 x 0,5 - 0,6	760 x 180







Electrical performance:

CEI EN 50393 • CEI 20-33 (with testing under water head and water between the cable cores) Class 2 in accordance with CEI 64-8.

Gel: UL 94-HB

Degree of protection: IP68

Magic Joint

Straight or branch joint with Magic Gel filling gel for extruded insulation cables up to 1 kV

Joints for extruded cables F(R)G7OR 0.6/1 kV. Easy installation, composed of two anti-fracture plastic shells, to be filled with non-toxic quick cross linking bicomponent insulation with no shelf life, Magic Gel type. Suitable for installation in traps, channels or directly underground or under water. Non-toxic, safe, light and re-enterable. Thanks to the softness of the insulation, they are able to absorb external shock without cracking or fracturing. The extreme stickiness of the insulation, together with its softness allow it to transmit water pressure for installation even at high depths. Thanks to the materials used, joints are completely non-toxic, safe, re-enterable even after long periods of operation.

- Quick cross linking gel, (only 10 minutes at 23°C)
- Extremely adherent and tight sealing
- Non-toxic and safe
- No shelf life









Magic Joint

Straight joint for 0.6/1 kV extruded cables



For COPPER cables Product	Cable format	Cable formation and conductor cross sections ($n^{\circ} \times mm^{2}$) 1x 2x 3x 4x							
Magic Joint 4	1,5 - 25	1,5 - 4	1,5 - 4	1,5 - 4	160 x 45				
Magic Joint 10	2,5 - 50	1,5 - 10	1,5 - 10	1,5 - 10 *	180 x 50				
Magic Joint 25	16 - 150	4 - 25	4 - 25	2,5 - 25	215 x 55				
Magic Joint 35	16 - 185	16 - 35	16 - 35	16 - 35	232 x 70				
Magic Joint 50	50 - 300	16 - 50	16 - 50	16 - 50	266 x 72				
Magic Joint 95	120 - 400	25 - 95	25 - 95	25 - 95	330 x 75				
Magic Joint 120	240 - 500	70 - 120	70 - 120	50 - 120	365 x 95				
Magic Joint 240	400 - 1000	120 - 300	120 - 240	120 - 240	510 x 120				
Magic Joint 300	630 - 2000	240 - 400	240 - 300	240 - 300	760 x 180				

For ALUMINIUM cables	1x	2x	3x	4x	(mm)
Magic Joint 50	16 - 150	16 - 25	16 - 25	16 - 25	266 x 72
Magic Joint 120	185 - 400	25 - 95	25 - 95	25 - 95	365 x 95
Magic Joint 240	400 - 630	95 - 185	95 - 185	95 - 185	510 x 120
Magic Joint 300	630 - 2000	185 - 300	185 - 300	185 - 300	760 x 180

^{*} Magic Joint 10 suggested for cable diameters smaller than 16 mm.



Magic Joint Y

Branch joint for 0.6/1 kV extruded cables

For COPPER cables		Cable formation and conductor cross sections (n° x mm²) 1x							Dimensions A x B
Product	Т	В	Т	В	Т	В	Т	В	(mm)
Magic Joint Y 6	4-50	4 - 50	4 - 10	4 - 10	2,5 - 6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90
Magic Joint Y25	50 - 150	50 - 150	10 - 25	10 - 25	6-25	6 - 16	6 - 25	6 - 10	220 x 105
Magic Joint Y95	120 - 400	95 - 240	25 - 95	16 - 50	25 - 95	16 - 50	25 - 95	10 - 50	315 x 115
Magic Joint Y240*	240 - 630	240 - 630	95 - 240	50 - 240	95 - 240	50 - 240	95 - 240	50 - 240	600 x 285

- ${\bf T}$: Through ${\bf B}$: Branch
- * also for aluminium cables.

Magic Joint Fire

Straight or branch joint with quick cross linking bi-component cast gel for 0.6/1 kV flame retardant cables

Magic line joints are now also available in the flame retardant version, MAGIC JOINT-FIRE, particularly suitable for installations in places most at risk of fire: available in straight and branch types, they maintain the electrical and sealing characteristics of the traditional Magic line described above, but add a self-extinguishing property, together with their low smoke and toxic gas development and absence of halogen, as required by main international legislation.





• Extremely adherent and tight sealing

• For 0.6/1 kV extruded cables

• Non-toxic and safe

No shelf life



Installation sequence









Electrical performance:

CEI EN 50393 • CEI 20-33 (with testing under water head and water between the cable cores)

Class 2 in accordance with CEI 64-8.

No flame propagation:

CEI 20-35 • IEC 60332-1 HD405-1 (as applicable)

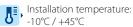
Low smoke and toxic and corrosive gas emissions

Gel: UL 94-HB Casing mix: UL 94-V2

Degree of protection: IP68



Operating 90° Uperaums temperature









Magic Joint Fire

Straight joint for 0.6/1 kV extruded cables



For COPPER cables	Cable forma	Dimensions			
Product	1x	2x	3x	4x	A x B (mm)
Magic Joint 4-Fire	1,5 - 25	1,5 - 4	1,5 - 4	1,5 - 4	160 x 45
Magic Joint 10-Fire	2,5 - 50	1,5 - 10	1,5 - 10	1,5 - 10 *	180 x 50
Magic Joint 25-Fire	16 - 150	4 - 25	4 - 25	2,5 - 25	215 x 55
Magic Joint 35-Fire	16 - 185	16 - 35	16 - 35	16 - 35	232 x 70
Magic Joint 50-Fire	50 - 300	16 - 50	16 - 50	16 - 50	266 x 72
Magic Joint 95-Fire	120 - 400	25 - 95	25 - 95	25 - 95	330 x 75
Magic Joint 120-Fire	240 - 500	70 - 120	70 - 120	50 - 120	365 x 95
Magic Joint 240-Fire	400 - 1000	120 - 300	120 - 240	120 - 240	510 x 120
Magic Joint 300-Fire	630 - 2000	240 - 400	240 - 300	240 - 300	760 x 180

For ALUMINIUM cables	1x	2x	3x	4x	(mm)
Magic Joint 50-Fire	16 - 150	16 - 25	16 - 25	16 - 25	266 x 72
Magic Joint 120-Fire	185 - 400	25 - 95	25 - 95	25 - 95	365 x 95
Magic Joint 240-Fire	400 - 630	95 - 185	95 - 185	95 - 185	510 x 120
Magic Joint 300-Fire	630 - 2000	185 - 300	185 - 300	185 - 300	760 x 180



Magic Joint Y Fire Branch joint for 0.6/1 kV extruded cables



	Cal	Cable formation and conductor cross sections (n° x mm²)								
For COPPER cables	1	Х	2	Χ	. 3	X	4		Dimensions	
Product	Т	В	T	В	Т	В	Т	В	A x B (mm)	
Magic Joint Y 6-Fire	4-50	4 - 50	4 - 10	4 - 10	2,5 - 6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90	
Magic Joint Y25-Fire	50 - 150	50 - 150	10 - 25	10 - 25	6 - 25	6 - 16	6 - 25	6 - 10	220 x 105	
Magic Joint Y95-Fire	120 - 400	95 - 240	25 - 95	16 - 50	25 - 95	16 - 50	25 - 95	10 - 50	315 x 115	

T: Through - B: Branch

Magic Joint S Fire

Straight joint for signalling and control

A) В
A	В

Product	Conductor cross sections (mm²)	Cable formation (n° conductors) 5x 7x 10x 12x 16x 19x 24x 40x 75x 100x 250x 500x	Dimensions A x B (mm)
Magic Joint S11 Fire	1,5 2,5		180 x 50
Magic Joint S12 Fire	1,5 2,5		215 x 55
Magic Joint S13 Fire	1,5 2,5		266 x 72
Magic Joint S14 Fire	1,5 2,5		330 x 75
Magic Joint S15 Fire	1,5 2,5	• • •	365 x 95
Magic Joint S16 Fire	1,5 2,5		510 x 120
Magic Joint S17 Fire	1,5 2,5		760 x 180



Magic Joint SY Fire

Branch joint for signalling and control



Product	Conductor cross sections (mm²)	5x	7x	Cable 1 10x	format 12x	ion (n' 16x		uctors 24x	*	75x	Dimensions A x B (mm)
Magic Joint SY1 Fire	1,5 2,5	•	•	•	•	•	•				180 x 90
Magic Joint SY2 Fire	1,5 2,5				•	•	•	•			220 x 105
Magic Joint SY3 Fire	1,5 2,5						•	•	•	•	315 x 115



Magic Joint T Fire

Straight joint for telephone cable



UNscreened	SCREENED	N° pairs per conductor cross	Dimensions
Product	Product	sections (n° x mm²)	A x B (mm)
Magic Joint T16-Fire	Magic Joint TS16-Fire	1 - 16 x 0,5 - 0,6	180 x 50
Magic Joint T25-Fire	Magic Joint TS25-Fire	16 - 25 x 0,5 - 0,6	215 x 55
Magic Joint T35-Fire	Magic Joint TS35-Fire	25 - 35 x 0,5 - 0,6	266 x 72
Magic Joint T40-Fire	Magic Joint TS40-Fire	35 - 40 x 0,5 - 0,6	330 x 75
Magic Joint T64-Fire	Magic Joint TS64-Fire	40 - 64 x 0,5 - 0,6	365 x 95
Magic Joint T500-Fire	Magic Joint TS500-Fire	60 - 500 x 0,5 - 0,6	510 x 120
Magic Joint T1000-Fire	Magic Joint TS1000-Fire	450 - 1000 x 0,5 - 0,6	760 x 180





FOR CASTING • RUBBER

Rubber Joint

Electrical performance:

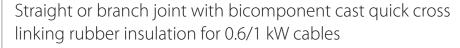
CEI EN 50393 • CEI 20-33 (with testing under water head and water between the cable cores) Class 2 in accordance with CEI 64-8.

Degree of protection: IP68

Operating 90° temperature



Installation temperature: $-15^{\circ}\text{C} / +45^{\circ}\text{C}$



With new Magic Rubber insulation, designed and developed by Raytech for 0.6/1 kV cables. A new line of accessories with extremely high mechanical characteristics, as well as dielectric and thermal properties. The new line is absolutely non-toxic, is re-enterable even after long periods of operation, is free of exotherm during cross linking, is extremely fast-acting and has no shelf life. Significant also for its very low emission of toxic and corrosive gases and fumes. Thanks to its exceptional mechanical characteristics, these joints are especially suitable for placement in traps or channels where there is the possibility of handling even after the laying of cables or, however, in cases of heavy abrasion, or mechanical stress within the normal parameters of installation and operation.

- Quick cross linking rubber (only 15 minutes)
- Very high mechanical and elastic characteristics
- For 0.6/1 kV extruded cables
- Non-toxic and safe





Rubber Joint

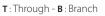
Straight joint for 0.6/1 kV extruded cables

For COPPER cables	Cable forma	tion and conduc	tor cross section	s (n° x mm²)	Dimensions
Product	1x	2x	3x	4x	A x B (mm)
Rubber Joint 4	1,5 - 25	1,5 - 4	1,5 - 4	1,5 - 4	160 x 45
Rubber Joint 10	2,5 - 50	1,5 - 10	1,5 - 10	1,5 - 10 *	180 x 50
Rubber Joint 25	16 - 150	4 - 25	4 - 25	2,5 - 25	215 x 55
Rubber Joint 35	16 - 185	16 - 35	16 - 35	16 - 35	232 x 70
Rubber Joint 50	50 - 300	16 - 50	16 - 50	16 - 50	266 x 72
Rubber Joint 95	120 - 400	25 - 95	25 - 95	25 - 95	330 x75
Rubber Joint 120	240 - 500	70 - 120	70 - 120	50 - 120	365 x 95
Rubber Joint 240	400 - 1000	120 - 300	120 - 240	120 - 240	510 x 120
Rubber Joint 300	630 - 2000	240 - 400	240 - 300	240 - 300	760 x 180

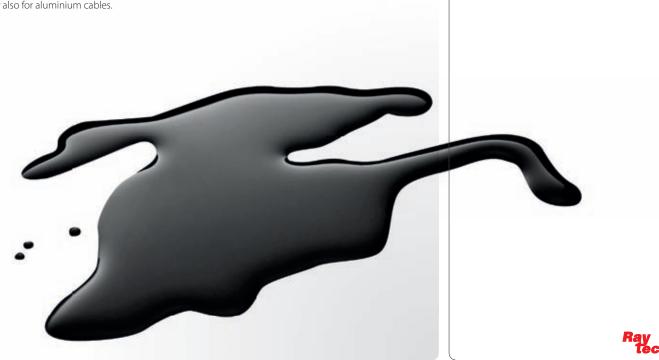
Rubber Joint Y

Branch joint for 0.6/1 kV extruded cables

For COPPER cables		ole forma x	_	X	tor cross	(n° x mr		Dimensions A x B	
Product	Т	В	Т	В	Т	В	Т	В	(mm)
Rubber Joint Y6	4-50	4 - 50	4 - 10	4 - 10	2,5 - 6	2,5 - 6	2,5 - 6	2,5-6	180 x 90
Rubber Joint Y25	50 - 150	50 - 150	10 - 25	10 - 25	6 - 25	6 - 16	6 - 25	6 - 10	220 x 105
Rubber Joint Y95	120 - 400	95 - 240	25 - 95	16 - 50	25 - 95	16 - 50	25 - 95	10 - 50	315 x 115
Rubber Joint Y240*	240 - 630	240 - 630	95 - 240	95 - 240	95 - 240	95 - 240	95 - 240	50 - 240	600 x 285



^{*} also for aluminium cables.



^{*} Rubber Joint 10 suggested for cable diameters smaller than 16 mm.



FOR CASTING • RESIN

Raycast

Straight or branch joint with bicomponent epoxy resin insulation for 0.6/1 kV cables

Straight or branch joints for 0.6/1 kV extruded cables: easily installed, composed of two anti-fracture plastic shells, to be filled with bicomponent epoxy resin such as Rayresin. For installation in traps, channels or directly underground.

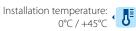


Electrical performance:

CEI EN 50393 • CEI 20-33 (with testing under water head and water between the cable cores) Class 2 in accordance with CEI 64-8.









Raycast L

Raycast L240

Straight joint for 0.6/1 kV extruded cables



510 x 120

For COPPER cables	Cable format	tion and conduc	tor cross section	ıs (n° x mm²)	Dimensions
Product	1x	2x	3x	4x	A x B (mm)
Raycast L10	2,5 - 50	1,5 - 10	1,5 - 10	1,5 - 10 *	180 x 50
Raycast L16/25	16 - 150	4 - 25	4 - 25	2,5 - 25	215 x 55
Raycast L35	16 - 185	16 - 35	16 - 35	16 - 35	232 x 70
Raycast L50	50 - 300	16 - 50	16 - 50	16 - 50	266 x 72
Raycast L95	120 - 400	25 - 95	25 - 95	25 - 95	330 x 75
Raycast L120	240 - 500	70 - 120	70 - 120	50 - 120	365 x 95
Raycast L240	400 - 1000	120 - 300	120 - 240	120 - 240	510 x 120
1					1
For ALUMINIUM cables	1x	2x	3x	4x	(mm)
Raycast L50	16 - 150	16 - 25	16 - 25	16 - 25	266 x 72
Raycast L120	185 - 400	25 - 95	25 - 95	25 - 95	365 x 95

95 - 185

95 - 185

95 - 185

^{400 - 630} * Raycast L10 is suggested for cable diameters not exceeding 16 mm.



FOR CASTING • RESIN

Raycast D

Branch joint for 0.6/1 kV extruded cable with 30° output



For COPPER cables	Cab		tion and	l conduc x	tor cross	ıs (n° x m . 4		Dimensions A x B	
Product	Т	В	Т	В	T	В	Т	В	(mm)
Raycast D6	4 - 50	4 - 50	4 - 10	4 - 10	2,5 -6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90
Raycast D16/D25	50 - 150	50 - 150	10 - 25	10 - 25	6 - 25	6 - 16	6-25	6 - 10	220 x 105
Raycast D95	120 - 400	95 - 240	25 - 95	16 - 50	25 - 95	16 - 50	25 - 95	10 - 50	315 x 115





Raycast L-S

Straight joint for 0.6/1 kV screened extruded cables



For COPPER cables	Cable forma	Cable formation and conductor cross sections (n° x mm²)										
Product	1x	2x	3x	4x	A x B (mm)							
Raycast L10-S	2,5 - 50	1,5 - 10	1,5 - 6	1,5 - 6	180 x 50							
Raycast L25-S	16 - 120	4 - 25	4 - 16	2,5- 16	215 x 55							
Raycast L35-S	16 - 185	16 - 35	16 - 25	16 - 25	232 x 70							
Raycast L50-S	50 - 240	16 - 50	16 - 50	16 - 50	266 x 72							
Raycast L120-S	240 - 500	70 - 120	70 - 120	50 - 95	365 x 95							
Raycast L240-S	400 - 1000	120 - 300	120 - 185	120 - 185	510 x 120							

For ALUMINIUM cables	1x	2x	3x	4x	(mm)
Raycast L50-S	16 - 150	16 - 25	16 - 25	16 - 25	266 x 72
Raycast L120-S	185 - 400	25 - 95	25 - 95	25 - 95	365 x 95
Raycast L240-S	400 - 630	95 - 185	95 - 185	95 - 185	510 x 120



Raycast D-S

Branch joint for 0.6/1 kV screened extruded cables

For COPPER cables		Cable formation and conductor cross sections (n° x mm²) 1x 2x 3x 4x									
Product	Т	В	Т	В	Т	В	Т	В	(mm)		
Raycast D6-S	4-35	4 - 35	4 - 10	4 - 10	2,5 - 6	1,5 - 6	2,5 - 6	2,5 - 6	180 x 90		
Raycast D25-S	35 - 120	35 - 120	10 - 25	10 - 25	6 - 16	6 - 16	6-16	6 - 10	220 x 105		
Raycast D95-S	95 - 300	70 - 150	25 - 95	16 - 50	16 - 70	16 - 35	16 - 50	10 - 35	315 x 115		

T: Through - B: Branch









FOR CASTING • RESIN



Raycast L-ARM

Straight joint for tape, wire or plate armoured cables



For COPPER cables Product	Cable formation ar 2x	Cable formation and conductor cross sections (n° x mm²) 2x 3x 4x								
Raycast L10-ARM	1,5 - 10	1,5 - 6	1,5 - 6	180 x 50						
Raycast L25-ARM	4 - 25	4 - 16	2,5 - 16	215 x 55						
Raycast L35-ARM	16 - 35	16 - 25	16 - 25	232 x 70						
Raycast L50-ARM	16 - 50	16 - 50	16 - 50	266 x 72						
Raycast L120-ARM	70 - 120	70 - 120	50 - 95	365 x 95						
Raycast L240-ARM	120 - 300	120 - 185	120 - 185	510 x 120						
				ı						
For ALUMINIUM cables	2x	3x	4x	(mm)						
Raycast L50-ARM	16 - 25	16 - 25	16 - 25	266 x 72						
Raycast L120-ARM	25 - 95	25 - 95	25 - 95	365 x 95						
Raycast L240-ARM	95 - 185	95 - 185	95 - 185	510 x 120						



Raycast D-ARM

Branch joint for tape, wire or plate armoured cables



For WIRE armoured COPPER cables		Cable formation and conductor cross sections (n° x mm²) 2x 3x 4x										
Product	т			т	В	A x B (mm)						
Raycast D6-ARM-F	4 - 10	4 - 10	2,5 - 6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90					
Raycast D16-ARM-F	10 - 25	10 - 25	6-16	6 - 16	6 - 16	6 - 10	220 x 105					
Raycast D95-ARM-F	25 - 70	16 - 50	25 - 70	16 - 35	25 - 50	10 - 35	315 x 115					
							1					
For TAPE OR PLATE	2		3	X	4		AxB					
armoured COPPER cables	Т	В	Т	В	Т	В	(mm)					
Raycast D6-ARM	4 - 10	4 - 10	2,5 - 6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90					
Raycast D16-ARM	10 - 25	10 - 25	6-16	6 - 16	6 - 16	6 - 10	220 x 105					
Raycast D95-ARM	25 - 70	16 - 50	25 - 70	16 - 35	25 - 50	10 - 35	315 x 115					

T: Through - B: Branch



Raycast LPS

Straight joint for very deep submersible pumps



For COPPER cables	Cable formation	on and conduc	tor cross sectio	ns (n° x mm²)	Dimensions
Product	1x	2x	3x	4x	A x B (mm)
Raycast LPS10	2,5 - 50	1,5 - 10	1,5 - 10	1,5 - 10	180 x 50
Raycast LPS25	16 - 150	4 - 25	4 - 25	2,5 - 25	215 x 55
Raycast LPS95	120 - 400	25 - 95	25 - 95	25 - 95	330 x 75
Raycast LPS240	400 - 1000	120 - 300	120 - 240	120 - 240	510 x 120



LV

Raycast DPS

Branch joint for very deep submersible pumps

For COPPER cables		ble form	ation and	d conduc	tor cross	sections x	Dimensions A x B		
Product	Т	В	T	В	Т	В	Т	В	(mm)
Raycast DPS6	4 - 50	4 - 50	4 - 10	4-10	2,5 - 6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90
Raycast DPS25	50 - 150	50 - 150	10 - 25	10 - 25	6-25	6-16	6-16	6 - 10	220 x 105
Raycast DPS95	120 - 400	95 - 240	25 - 95	16 - 50	25 - 95	16 - 50	25 - 95	10 - 50	315 x 115

T: Through - B: Branch



Raycast SL

Straight joint for signalling and control

Product	Conductor cross sections (mm²)	5x	7x		ble fo						100x	250x	Dimensions A x B (mm)
Raycast SL11	1,5 2,5	•	•	•	•	•							180 x 50
Raycast SL12	1,5 2,5			•	•	•	•	•					215 x 55
Raycast SL13	1,5 2,5					•	•	•	•				266 x 72
Raycast SL14	1,5 2,5							•	•	•			330 x 75
Raycast SL15	1,5 2,5								•	•	•		365 x 95
Raycast SL16	1,5 2,5									•	•	•	510 x 120



Raycast SD

Branch joint for signalling and control

Product	Conductor cross sections (mm²)	5x	7x	Cable 10x	format 12x		° cond 19x			75x	Dimensions A x B (mm)
Raycast SD1	1,5 2,5	•	•	•	•	•	•				180 x 90
Raycast SD2	1,5 2,5					•	•	:			220 x 105
Raycast SD3	1,5 2,5						•	•	•	:	315 x 115



Raycast TL e TSL

Straight joint for telephone cable

			В
UNscreened	SCREENED	N° pairs per conductor cross sections	Dimensions
Product	Product	(n° x mm²)	A x B (mm)
Raycast TL16	Raycast TSL16	1 - 16 x 0,5 - 0,6	180 x 50
Raycast TL25	Raycast TSL25	16 - 25 x 0,5 - 0,6	215 x 55
Raycast TL35	Raycast TSL35	25 - 35 x 0,5 - 0,6	266 x 72
Raycast TL40	Raycast TSL40	35 - 40 x 0,5 - 0,6	330 x 75
Raycast TL64	Raycast TSL64	40 - 64 x 0,5 - 0,6	365 x 95
Raycast TL500	Raycast TSL500	60 - 500 x 0,5 - 0,6	510 x 120





Wonder joint L

Straight joint with injected gel insulation for 0.6/1 kV extruded cables



For COPPER cables	Cable forma	Dimensions			
Product	1x	2x	3x	4x	A x B (mm)
Wonder Joint L4	1,5 - 25	1,5 - 4	1,5 - 4	1,5 - 4	160 x 45
Wonder Joint L10	2,5 - 50	1,5 - 10	1,5 - 10	1,5 - 10	180 x 50
Wonder Joint L25	16 - 150	4 - 25	4 - 25	2,5 - 25	215 x 55



Wonder joint Y

Branch joint with injected gel insulation for 0.6/1 kV extruded cables



For COPPER cables		Cable formation and conductor cross sections (n° x mm²) 1								
Product	Т	В	Т	В	Т	В	Т	В	(mm)	
Wonder Joint Y6	4-50	4 - 50	4 - 10	4-10	2,5 - 6	2,5 - 6	2,5 - 6	2,5 - 6	180 x 90	
Wonder Joint Y25	50 - 150	50 - 150	10 - 25	10-25	6-25	6 - 16	6-25	6 - 10	220 x 105	







JOINTS



SYSTEM PLUS

Range of straight and branch joints with cast or injection filling, equipped with **screw or Allen screw connection system** for extruded insulation cables up to 1 kV









Four-core separator



Electrical performance:

CEI EN 50393 • CEI 20-33

(with testing under water head and water between the cable cores)

Degree of protection: IP68

Magic Joint System Plus

- Straight or branch "Y" joint or "T" branch joint
- Integrated connection system
- Single dose bag of Magic Gel

With four-core separator for "T" branch joint

Raycast System Plus

- Straight or branch "Y" joint or "T" branch joint
- Integrated connection system
- Single dose bag of Ray Resin

With four-core separator for "T" branch joint







Wonder Joint System Plus L

Straight joint with **injected gel**Five-core spacer + screw connectors



For COPPER cables	Cable forma	Cable formation and conductor cross sections (n° x mm²)									
Product	2x	3x	4x	5x	A x B (mm)						
Wonder Joint SP L6	1,5 - 6	1,5 - 6	1,5 - 6	1,5 - 6	180 x 50						
Wonder Joint SP L25	4 - 25	4 - 25	4 - 25	4 - 25	215 x 55						



Wonder Joint System Plus Y

Branch joint with **injected gel**Five-core spacer + screw connectors



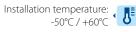
For COPPER cables	່ າ	V	2	d conduc x	1		v ,	Dimensions A x B	
Product	Т	В	Т	В	Т	В	Т	В	(mm)
Wonder Joint SP Y6	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	180 x 90
Wonder Joint SP Y16	4 - 16	1,5 - 4	4-16	1,5 - 4	4-16	1,5 - 4	4-16	1,5 - 4	220 x 105

T: Through - B: Branch

- Joints insulated with *Wonder Fluid*, single component gel
- Clean installation, re-enterable and inspectable
- Containers provided with no-return valve
- Even suitable for high depths
- Non-toxic and no shelf life
- For 0.6/1 kV extruded cables









Magic Power Joint System Plus L

Straight joint with cast gel

Five-core spacer + screw connectors



For COPPER cables	Cable format	Cable formation and conductor cross sections (n° x mm²)									
Product	2x	3x	4x	5x	A x B (mm)						
Magic P Joint SP L6	1,5 - 6	1,5 - 6	1,5 - 6	1,5 - 6	180 x 50						
Magic P Joint SP L16	4 - 16	4 - 16	4 - 16	4 - 16	215 x 55						
Magic P Joint SP L25	4 - 25	4 - 25	4 - 25	4 - 25	215 x 65						



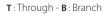
Magic Power Joint System Plus Y

Y branch joint with cast gel

Five-core spacer + screw connectors



For COPPER cables		Cable formation and conductor cross sections (n° x mm²) 2x								
Product	Т	В	Т	В	Т	В	Т	В	(mm)	
Magic P Joint SP Y6	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	180 x 90	
Magic P Joint SP Y16	4 - 16	1,5 - 4	4-16	1,5 - 4	4 - 16	1,5 - 4	4 - 16	1,5 - 4	220 x 105	





Magic Power Joint System Plus T

T branch joint with **cast gel** Four-core spacer + screw connectors



For COPPER cables	Cable f	Dimensions A x B					
Product	т	В	т	В	Т	В	(mm)
Magic P Joint SP T35	6 - 35	1,5 - 10	6 - 35	1,5 - 10	6 - 35	1,5 - 10	305 x 155

T: Through - B: Branch



- Re-enterable, removable, inspectable
- For installations even in harsh conditions and high depths
- Extremely adherent and tight sealing
- Non-toxic and no shelf life
- For 0.6/1 kV extruded cables









JOINTS SYSTEM PLUS



Magic Joint System Plus L

Straight joint with **cast gel**Five-core spacer + screw connectors

For COPPER cables	Cable format	Cable formation and conductor cross sections (n° x mm²)										
Product	2x	3x	4x	5x	A x B (mm)							
Magic Joint SP L6	1,5 - 6	1,5 - 6	1,5 - 6	1,5 - 6	180 x 50							
Magic Joint SP L16	4 - 16	4 - 16	4 - 16	4 - 16	215 x 55							
Magic Joint SP L25	4 - 25	4 - 25	4 - 25	4 - 25	215 x 65							



Magic Joint System Plus Y

Y branch joint with **cast gel**Five-core spacer + screw connectors



For COPPER cables	Cable 2		ion and conductor cross 3x T B T						Dimensions A x B
Product	Т	В	Т	В	Т	В	Т	В	(mm)
Magic Joint SP Y6	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	180 x 90
Magic Joint SP Y16	4-16	1,5 - 4	4 - 16	1,5 - 4	4 - 16	1,5 - 4	4 - 16	1,5 - 4	220 x 105

T: Through - B: Branch



Magic Joint System Plus T

T branch joint with **cast gel**Five-core spacer + screw connectors



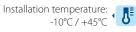
For COPPER cables	Cable formation and conductor cross sections (n° x mm²) 2x 3x 4x						Dimensions A x B
Product	Т	В	Т	В	Т	В	(mm)
Magic Joint SP T35	6-35	1,5 - 10	6-35	1,5 - 10	6 - 35	1,5 - 10	305 x 155

T: Through - B: Branch

- Joints insulated with *Magic Gel*
- Quick cross linking gel (only 10 minutes)
- Extremely adherent and tight sealing
- Non-toxic and no shelf life
- For 0.6/1 kV extruded cables











Raycast System Plus L

Straight joint with **cast resin** complete with spacer and screw connectors



For COPPER cables	Cable format	ion and conduc	ctor cross section	ns (n° x mm²)	Dimensions
Product	2x	3x	4x	5x	A x B (mm)
Raycast SP L6	1,5 - 6	1,5 - 6	1,5 - 6	1,5 - 6	180 x 50
Raycast SP L16	4 - 16	4 - 16	4 - 16	4 - 16	215 x 55
Raycast SP L25	4 - 25	4 - 25	4 - 25	4 - 25	215 x 65

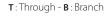


Raycast System Plus Y

Y branch joint with **cast resin** complete with spacer and screw connectors



For COPPER cables	Cable formation and conductor cross sections (n° x mm²) 2x 3x 4x 5x						X	Dimensions A x B	
Product	Т	В	Т	В	Т	В	Т	В	(mm)
Raycast SP D6	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	1,5 - 6	1,5 - 4	180 x 90
Raycast SP D16	4 - 16	1,5 - 4	4-16	1,5 - 4	4 - 16	1,5 - 4	4-16	1,5 - 4	220 x 105





Raycast System Plus T

T branch joint with **cast resin** complete with spacer and screw connectors



For COPPER cables	Cable f	Cable formation and conductor cross sections (n° x mm²) 2x 3x 4x					
Product	Т	В	Т	В	Т	В	(mm)
Raycast SPT 35	6 - 35	1,5 - 10	6 - 35	1,5 - 10	6 - 35	1,5 - 10	305 x 155

- T: Through B: Branch
- Joints insulated with *Ray Resin* bicomponent epoxy resin
- For 0.6/1 kV extruded cables







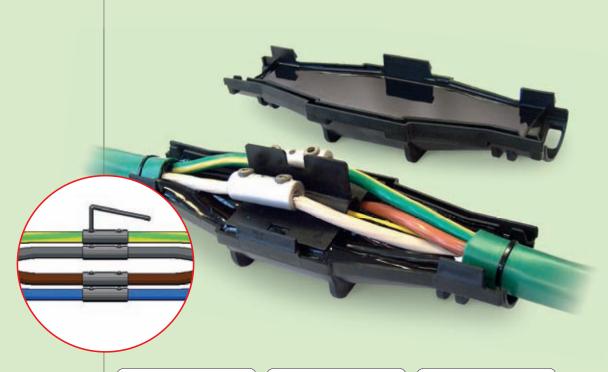
JOINTS
SYSTEM FAST RP

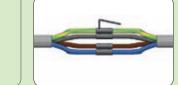


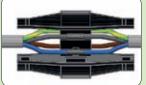
SYSTEM FAST RP

Straight joints with four shear bolt connectors. The reliability of Raytech joints coupled with convenience and ease of installation













SYSTEM FAST **RP**

- No more crimping or single screw connectors
- Screw connections break automatically when correct tightening torque is reached, ensuring perfect connection
- Suitable for copper and aluminium conductors (aluminium conductors with minimum section 10 mm²)

Electrical performance:

CEI EN 50393 • CEI 20-33

(with testing under water head and water between the cable cores)









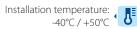


JOINTS SYSTEM FAST RP









Rapid Joint System Fast RP

Straight joint pre-filled with gel



Product	Cable formation from $2x$ to $4x$ $(n^{\circ} x mm^{2})$	Dimensions A x B (mm)
Rapid Joint L 10 RP	1,5 - 10	180 x 60
Rapid Joint L 25 RP	10 - 25	210 x 65
Rapid Joint L 95 RP	35 - 95	320 x 100



Operating temperature 190°

Installation temperature: $-15^{\circ}\text{C} / +55^{\circ}\text{C}$



Magic Power Joint System Fast RP

Straight joint with Magic Power Gel

Product	Cable formation from $2x$ to $4x$ ($n^{\circ} x mm^{2}$)	Dimensions A x B (mm)
Magic P Joint L 35- RP/16	1,5 - 16	232 x 70
Magic P Joint L 35- RP/35	10 - 35	232 x 70
Magic P Joint L 50- RP/50	25 - 50	266 x 72
Magic P Joint L 120- RP/120	35 - 120	365 x 95
Magic P Joint L 240- RP/150	35 - 150	510 x 120



Operating 90° temperature

Installation temperature: $-10^{\circ}\text{C} / +45^{\circ}\text{C}$





Magic Joint System Fast RP

Straight joint with Magic Gel



Product	Cable formation from 2x to 4x (n° x mm²)	Dimensions A x B (mm)
Magic Joint 35- RP/16	1,5 - 16	232 x 70
Magic Joint 35- RP/35	10 - 35	232 x 70
Magic Joint 50- RP/50	25 - 50	266 x 72
Magic Joint 120- RP/120	35 - 120	365 x 95
Magic Joint 240- RP/150	35 - 150	510 x 120



Raycast System Fast RP

Straight joint with Ray Resin epoxy resin



Product	Cable formation from $2x$ to $4x$ ($n^{\circ} x mm^{2}$)	Dimensions A x B (mm)
Raycast L 35- RP/16	1,5 - 16	232 x 70
Raycast L 35- RP/35	10 - 35	232 x 70
Raycast L 50- RP/50	25 - 50	266 x 72
Raycast L 120- RP/120	35 - 120	365 x 95
Raycast L 240- RP/150	35 - 150	510 x 120

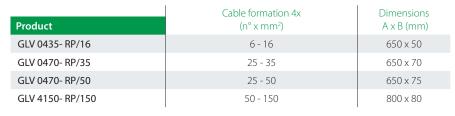






GLV System Fast RP

Straight heat-shrink joint







Installation temperature: -15°C / +45°C

Shear bolt connectors







JOINTS

Electrical performance:

CEI EN 50393 • CEI 20-33 (with testing under water head and water between the cable cores)

No flame propagation:

CEI 20-35 • IEC 60332-1 HD405-1 (as applicable)

> Operating 90° temperature

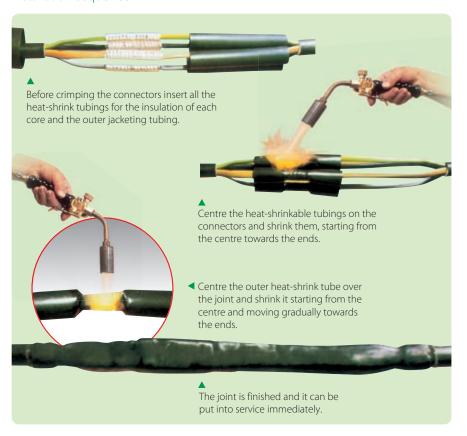


Installation temperature: $-15^{\circ}\text{C} / +45^{\circ}\text{C}$

Heat-shrink



Installation sequence

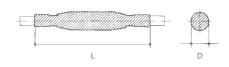




GDL

Joint for single core cables including concentric neutral

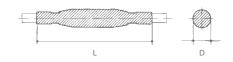
	Conductor o	Dimensions	
Product	from	to	L (mm)
GDL 92 A1	4	10	300
GDL 92 A2	16	150	300
GDL 92 A3	185	400	300
GDL 92 PA	10	50	300



GLV

Joint for multi core cables (also for submersible pumps)

Product	Conductor cros	ss section mm² to	Number of phases	Dime L (mm)	nsions D (mm)
GLV 0306	1,5	6	3	250	18
GLV 0316	10	16	3	400	37
GLV 0335	25	35	3	550	43
GLV 0370	50	70	3	650	52
GLV 3150	95	150	3	800	65
GLV 3300	185	300	3	900	82
GLV 0406	1,5	6	4	250	20
GLV 0416	10	16	4	400	40
GLV 0435	25	35	4	650	45
GLV 0470	50	70	4	650	54
GLV 4150	95	150	4	800	67
GLV 4300	185	300	4	900	84
GLV 2,5 - CP	2,5 complete w	vith connectors	4	300	15



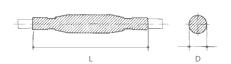
For both copper and aluminium cables. For aerial, underground, submerged installation.

GLV-N

Joint for multi core cables with concentric neutral

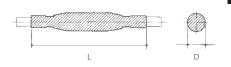
Product	Conductor cros	s section mm² to	Number of phases	Dime L (mm)	nsions D (mm)
GLV 0306 - N	1,5	6	3	250	18
GLV 0316 - N	10	16	3	400	37
GLV 0335 - N	25	35	3	550	43
GLV 0370 - N	50	70	3	650	52
GLV 3150 - N	95	150	3	800	65
GLV 3300 - N	185	300	3	900	82
GLV 0406 - N	1,5	6	4	250	20
GLV 0416 - N	10	16	4	400	40
GLV 0435 - N	25	35	4	650	45
GLV 0470 - N	50	70	4	650	54
GLV 4150 - N	95	150	4	800	67
GLV 4300 - N	185	300	4	900	84

These kits include components for the phase insulation, metallic braiding to replace the neutral and external self-sealing heat-shrinkable tube.



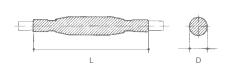






GLV-ARM Joint for armoured multi core cables

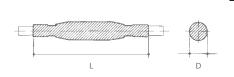
For armoured tape cables	Conductor cross	Dime	Dimensions		
Product	from	to	L (mm)	D (mm)	
GLV 0406-ARM	1,5	6	300	25	
GLV 0416-ARM	6	16	400	40	
GLV 0450-ARM	25	50	800	60	
GLV 4150-ARM	70	150	1000	100	
GLV 4300-ARM	185	300	1000	120	



BOPA

Joint for MV cables for public lighting

Product	Operating voltage kV	Number of phases	Section (mm²)	Dime L (mm)	nsions D (mm)
BOPA 3	3	1	1x10	300	50
BOPA 4	3	2	2x10	450	60
BOPA 5	3	3	3x10	450	70
BOPA 3/2	3,6	1 + concentric neutral	1 x 6 + 6 concentric	700	35
BOPA 4/T transition	3	2	2,5 - 10 paper / 10 - 50 extruded	750	40



LV branch joint

Product		ore cables tion (mm²) Branch	Multi core cross section Through		Dimer L (mm)	nsions D (mm)
DJ01	1 x 4 - 50	1 x 2,5 - 50	4 x 1,5 - 10	2 x 1,5	200	25
DJ02	1 x 50 - 120	1 x 6 - 120	4 x 16 - 25 2 single core cables 1 x 6 - 50	2x1,5 1 two core cable 2 x 2,5	250	40
DJ03	1 x 150 - 300	1 x 6 - 300	4 x 25 - 3,5 x 50	4 x 2,5 - 25	400	70









GLV F/R - GMP F/R

Joint for fire resistant cables

Raytech flame resistant joints are suitable for 0.6/1 kV cables both for **power**, and for **signalling and control**

FOR **POWER** CABLES

UNARMOURED	Cable formation	Dimensions
Product	(n° x mm²)	L (mm)
GLV 4004-F/R	4 x 1,5 - 4	300
GLV 4016-F/R	4 x 6 - 16	300
GLV 4050-F/R	4 x 25 - 50	400
GLV 4150-F/R	4 x 70 - 150	500

ARMOURED	Cable formation	Dimensions
Product	(n° x mm²)	L (mm)
GLV 4004-ARM-F/R	4 x 1,5 - 4	400
GLV 4016-ARM-F/R	4 x 6 - 16	400
GLV 4050-ARM-F/R	4 x 25 - 50	500
GLV 4150-ARM-F/R	4 x 70 - 150	750

FOR **SIGNALLING AND CONTROL** CABLES

UNARMOURED Product	Cable formation (n° x mm²)	Dimensions L (mm)
GMP 007-F/R	4 - 7 x 1,5 - 2,5	300
GMP 014-F/R	10 - 14 x 1,5 - 2,5	300
GMP 030-F/R	16 - 30 x 1,5 - 2,5	400
ARMOURED	Cable formation	Dimensions
Product	(n° x mm²)	L (mm)
GMP 007-ARM-F/R	4 - 7 x 1,5 - 2,5	400
GMP 014-ARM-F/R	10 - 14 x 1,5 - 2,5	400
GMP 030-ARM-F/R	16 - 30 x 1,5 - 2,5	500





Electrical performance: CEI EN 50393

Flame resistance: IEC 60331-21 • CEI 20-36/2-1 (as applicable)

Contact Raytech for information regarding other formations and cable sections

Heat-shrink accessories for automatic locking and imbalance detector cables (FF.SS.)

For operating voltages up to 1 kV

Cable type RG50NR/8 (cat. 803) • Conductor cross section 10-16-25 mm² (automatic locking)

BIPOLAR THREE-POLE

Junction Termination Junction Termination G2BA T2BA G3BA T3BA

Cable cat. 804/211 (imbalance detector) Junction GIRS





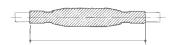


GMP

Joint kits for multi conductor cables for signalling, command and control

NON ARMOURED cable	N° of conductors		Section mm ²		External Ø of cable	
Product	from	to	from	to	min (mm)	max (mm)
GMP 007	4	7	1,0	2,5	8	19
GMP 014	8	14	1,0	2,5	12	22
GMP 021	15	21	1,0	2,5	15	27
GMP 040	22	40	1,0	2,5	20	35
GMP 075	41	75	1,0	2,5	26	44
GMP 100	76	100	1,0	2,5	26	60

ARMOURED cable	N° of cor	nductors	Sectio	n mm²	External &	of cable
Product	from	to	from	to	min (mm)	max (mm)
GMP 007-A	4	7	1,0	2,5	14	23
GMP 014-A	8	14	1,0	2,5	15	26
GMP 021-A	15	21	1,0	2,5	24	35
GMP 040-A	22	40	1,0	2,5	30	45
GMP 075-A	41	75	1,0	2,5	39	55





GMC

Joint kits for multi pair cables for communication, command or control

NON ARMOURED cable	N° of pairs		Section mm ²		External Ø of cable	
Product	from	to	from	to	min (mm)	max (mm)
GMC 010	5	10	2 x 0,6	2 x 1,0	9	14
GMC 020	11	20	2 x 0,6	2 x 1,0	13	20
GMC 030	21	30	2 x 0,6	2 x 1,0	16	24
GMC 050	31	50	2 x 0,6	2 x 1,0	22	29
GMC 100	51	100	2 x 0,6	2 x 1,0	30	40

ARMOURED cable	N° of pairs		Section mm ²		External Ø of cable	
Product	from	to	from	to	min (mm)	max (mm)
GMC 004-A	1	4	2 x 0,6	2 x1,0	15	23
GMC 007-A	5	7	2 x 0,6	2 x 1,0	15	26
GMC 019-A	8	19	2 x 0,6	2 x 1,0	24	35
GMC 037-A	20	37	2 x 0,6	2 x 1,0	30	45
GMC 061-A	38	61	2 x 0,6	2 x 1,0	39	55



Terminals heat-shrink

TLV

Terminations for armoured and non armoured extruded cables up to 1 kV

NON ARMOURED extruded cables	Extruded cables with WIRE ARMOUR	Section cond	ductor mm²	Number
Product	Product	from	to	of phases
TLV 0216	TLV 0216 - AF	4	16	2
TLV 0316	TLV 0316 - AF	4	16	3
TLV 0416	TLV 0416 - AF	4	16	4
TLV 0250	TLV 0250 - AF	25	50	2
TLV 0350	TLV 0350 - AF	25	50	3
TLV 0450	TLV 0450 - AF	25	50	4
TLV 3150	TLV 3150 - AF	70	150	3
TLV 4150	TLV 4150 - AF	70	150	4
TLV 3300	TLV 3300 - AF	185	300	3
TLV 4300	TLV 4300 - AF	185	300	4
	TLV 4500 - AF	50	0	4



Include sheath to cover phases, sealing of the point of divergence of phases and sealing between phase and cable terminal.

TLV 500

Terminations for concentric neutral extruded cables up to 1 kV

Product	Section cond from	uctor mm ² to	Number of phases
TLV 0116 - 500	4	16	1
TLV 0216 - 500	4	16	2
TLV 0316 - 500	4	16	3
TLV 0150 - 500	25	50	1
TLV 0250 - 500	25	50	2
TLV 0350 - 500	25	50	3
TLV 2150 - 500	70	150	2
TLV 3150 - 500	70	150	3
TLV 2300 - 500	185	300	2
TLV 3300 - 500	185	300	3



Include sheath to cover the concentric conductor.







FILLERS

Insulators and sealing for protecting electrical connections



BICOMPONENT CAST

page 64



Magic Power Gel Self-amalgamating bicomponent gel in single bottles



Magic Gel Bicomponent gel in bottles



Magic Fluid
Bicomponent gel
in single dose bags



Ray Gel Bicomponent gel in bottles for telephone and intercom systems



(((()))

Bag Gel Bicomponent gel in bags for telephone and intercom systems

Rubber

BICOMPONENT PASTE/CAST

page 78



Sky Plast
Mouldable bicomponent
rubber

page 80







Resin



Single transparent component



Magic Power Gel

The unique bi-component gel in a single bottle, with superior dielectric, sealing and thermal characteristics, re-enterable and re-usable!

- Very sticky
- Strong self amalgamating characteristics
- Single compact bottle; convenient twin compartment
- Re-usable as well as re-enterable, even after long working periods
- It doesn't give any waste
- Non toxic and safe









LV















• Exceptional sealing properties

• Better resistance to pressure

• Effective even in vertical or ceiling





Self-agglomerating

- Once cross linked it perfectly adheres on itself characteristics to get an homogeneous and compact mass
- It can be therefore applied in multiple

Zero waste

applications

Stickiness

in any condition

- Due to the nature of the product waste is eliminated; even residual product can be saved and used for the next application
- Also any left over product maintains it's high performance characteristics

Single bottle

- Highly useful
- The most compact packaging
- Less space occupied in the toolbox
- Both components in the same packaging

Gel: UL 94-HB

Dielectric strength:

>23 kV/mm

Cross linking time: fast (about 15 min. at 25°C)

Volume resistivity:

>2 . $10^{15}\,\Omega$ cm

Operating temperature: -60°C / +200°C

Overload temperature for short periods:

uo to 250°C

Stabilised for:

mould - UV

Degree of protection:

IP68 (in proper casings)

Magic Power Gel

Product	Colour	Package type	Quantity
Magic Power Gel	•	1 single, bi-component bottle 1 small basin - 1 mixing spoon	1000 ml
Magic Power Gel 500	•	1 single, bi-component bottle 1 small basin - 1 mixing spoon	500 ml
Magic Power Gel 250	•	1 single, bi-component bottle	250 ml







For all types of connections, even in the toughest conditions, for power, telecom and signalling!





Gel: UI 94-HB

Dielectric strength:

>23 kV/mm
Cross linking time:
fast (about 10 min. at 23°C)
Volume resistivity:

>2 . 10¹⁵ Ω cm
Working temperature:

-60°C / +200°C

uo to 250°C **Stabilised for:** mould - UV **Degree of protection:**

IP68 (in proper casings)

Overload temperature for short periods:

Magic Gel

Bicomponent gel with very high dielectric and thermal characteristics, ideal for connection systems (joint shells or enclosures) for power cables

Insulating and sealing gel, when cast in suitable casings, ensures an IP68 degree of protection and is able to replace all types of resins. This is a self-sealing polymer insulation in two practical bottles with cold cross linking. Once poured, the insulation, characterised by very low viscosity, surrounds and envelopes any type of material, cross linking in less than 10 minutes. Completely non-toxic, cross linking with a very low isothermal peak that does not thermally stress the materials it comes into contact with.

- For high temperature applications!
- Quick cross linking (only 10 minutes)
- Re-enterable also after long working periods
- Non-toxic and safe with no shelf life
- Low viscosity















Ray Tech

LV

Examples of use





Problem ENERGY

What does a gel for this type of system have to give?

INSULATION

Elevated voltages (1 kV operating, 4 kV testing)



THERMAL PERFORMANCE

Operating temperature 90°C, overload temperature 130°C, short circuit temperature 250°C



▼ SEALING

Installations also possible in humid environments, flooded wells



V DEGREE OF PROTECTION

Must also work with water between the cores of the cable



CERTIFIED SYSTEMS

The combination of insulation gel + casing must comply with current standards CEI 20-33 and EN 50393

Solution: Magic Gel meets all your Energy system requirements!



Product	Colour	Package type	Total quantity
Magic Gel 300	•	2 bottles	300 ml
Magic Gel 1000	•	2 bottles 1 small basin - 1 mixing spoon	1000 ml
Magic Gel 2000	•	2 bottles 1 small basin - 1 mixing spoon	2000 ml
Magic Gel 10000	•	2 tanks 1 small basin - 1 mixing spoon	10 lt



Magic Fluid

Gel: UL 94-HB

Dielectric strength:

Cross linking time: fast (about 10 min. at 23°C)

Volume resistivity: $>2 \cdot 10^{15} \Omega \text{ cm}$

Operating temperature: $-60^{\circ}\text{C} / +200^{\circ}\text{C}$

Overload temperature for short periods: uo to 250°C

Stabilised for: mould - UV

Degree of protection: IP68 (in proper casings)

Insulating and sealing liquid in bags

Magic Fluid insulating and sealing gel, when cast in suitable casings, ensures an IP 68 degree of protection and is able to replace all types of resins. This is a self-sealing polymer insulation in a bicomponent bag with cold cross linking, with no shelf life. When the separator is removed, the two components mix to trigger the cross linking. Once poured, the insulation, characterised by very low viscosity, surrounds and envelopes any type of material, cross linking in less than 10 minutes. Completely non-toxic, cross linking with a very low isothermal peak that does not thermally stress the materials it comes into contact with. Re-enterable even after long periods of operation.

- For high temperature applications!
- Quick cross linking (only 10 minutes)
- Re-enterable also after long working periods
- Non-toxic and safe with no shelf life
- Low viscosity



LV

General kit box installation sequence



Fix the box and cover thescrews with the caps.



Knock out the pre prepared holes.



Install the cable glands.



Insert the cables and connect the wires.

Horizontal installation sequence



Remove the separator from the Magic Fluid bag.



Mix the 2 components (30 secs. max.).



Pour the Magic Fluid into the box (within 1 min. max.).



Close the box with the cover. Installation complete.

Vertical installation sequence



Knock out the pre prepared holes in the upper side.



Close the box with the cover.



Pour the Magic Fluid into the box (within 1 min. max.).



Close the hole used for pouring with the supplied cap. Installation complete. Wait for complete cross-linking before reopening the box.

Magic Fluid

Product	Colour	Package type	Total quantity
Magic Fluid 90	•	Bicomponent single dose bags	90 gr
Magic Fluid 110	•	Bicomponent single dose bags	110 gr
Magic Fluid 170	•	Bicomponent single dose bags	170 gr
Magic Fluid 210	•	Bicomponent single dose bags	210 gr
Magic Fluid 420	•	Bicomponent single dose bags	420 gr
Magic Fluid 550	•	Bicomponent single dose bags	550 gr



Ray Gel

Gel: UL 94-HB

Dielectric strength: >23 kV/mm

Cross linking time:

fast (about 3 min. at 30°C) Volume resistivity:

>1,5 x $10^{15} \Omega$ cm

Operating temperature: -60°C/+180°C

Thermal conducitivity:

< 0,2 W/m°K Dielectric strength:

> 21 kV/mm

Dielectric constant:

Insulating, sealing, re-enterable fast cross linking bicomponent silicone gel for telephone and intercom systems and for LED and display protection

- Quick cross linking
- Antioxidant protection
- Low temperature resistant
- Non-toxic and safe with no shelf life





LV



RED

- Specially formulated for UV resistance
- Suitable for "surface" installations
- Ideal for intercom systems





GREEN

- Particularly resistant to fungi and mould
- Suitable also for underground installations
- Ideal for telephone connections





TRANSPARENT

- Excellent transparency
- Does not opacify
- · Ideal for protecting printed circuit boards, for sealing displays, for insulating and sealing LEDs



Problem TELECOM

What does a gel for this type of system have to give?



SEALING:

Installations also possible in humid environments, flooded wells



V DEGREE OF PROTECTION:

IP68 in proper casing



▼ PREVENTION FROM OXIDATION:

Contacts in Telecom connections shouldn't give attenuations (low signal currents)



HIGH INSULATION FLUIDITY:

During casting, the the insulation has to fill all interstitial spaces between the cores of the cable



M ANTICRACKING:

Insulation in the permanently cold joint should not crack at low temperatures



INSULATION:

The filler should be an insulating component

Solution: Ray Gel meets all your Telecom system requirements



_			
Product	Colour	Package type	Total quantity
Bag Gel 200-T	0	Bicomponent single dose bags	200 gr
Bag Gel 400-T	0		400 gr
Bag Gel 200-V	•		200 gr
Bag Gel 400-V	•		400 gr
Bag Gel 200-R	•		200 gr
Bag Gel 400-R	•		400 gr
Ray Gel 300-T	0	2 bicomponent bottles	300 gr
Ray Gel 1000-T	0		1000 gr
Ray Gel 300-V	•		300 gr
Ray Gel 1000-V	•		1000 gr
Ray Gel 300-R	•		300 gr
Ray Gel 1000-R	•		1000 gr
Ray Gel 10K-T		2 bicomponent boxes	10 kg
Ray Gel 20K-T		2 Bromponent Boxes	20 kg
Ray Gel 10K-V	•		10 kg
Ray Gel 20K-V	•		20 kg
Ray Gel 10K-R	•		10 kg
Ray Gel 20K-R	•		20 kg









Wonder Gel

Single component insulating gels in cartridge to instantly protect new installations and oversee maintenance of all types of electrical connections

Installer's best friends. Electrical connections, within empty enclosures, are exposed to the risk of short circuit, oxidation and corrosion, at times, resulting in irreparable damages. Without stress and no waiting around, WonderGel and WonderGel Invisible make your job easier, guaranteeing the protection and safety of systems in compliance to best practice rules to provide the highest quality solution, quick and perfect to get the satisfaction of both you and your clients.

• Ready to use! No mixing required! Already cross-linked! No need to wait!



• Eliminate annoying out of service instances caused by moisture

• Protect your systems from the penetration of insects

 Protect your electrical connections from oxidation and corrosion

• Italian Utility Model



VIDEO SURVEILLANCE **SYSTEMS**





CONNECTIONS IN MOIST



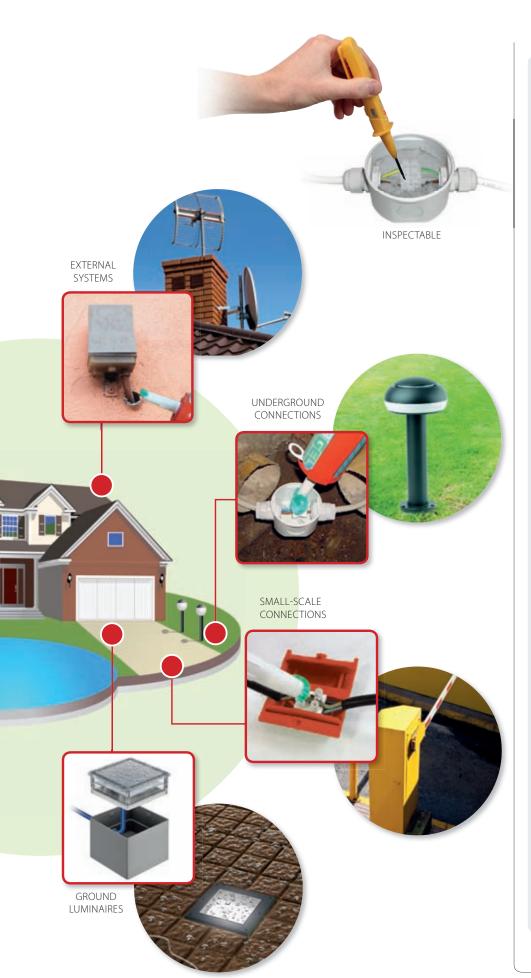
EASY TO APPLY EVEN IN AREAS WHICH ARE **DIFFICULT TO ACCESS!**



UNDERGROUND CONNECTIONS



GEL



WHAT IS GEL WONDER?

- A single component gel
- Extremely sticky
- Stays soft with time
- Never dries
- Non-toxic and safe
- No shelf life



WHAT DOES GUARANTEE?

- · Maximum insulation and sealing
- Effective and stable adhesion with the passing of time
- High resistance to water pressure
- Degree of protection IP68 when dispensed in suitable casings



WHY IS IT IN A CARTRIDGE?

- Always ready to use and at your fingertips
- Can be used with standard guns
- It is measurable
- No waste
- Complete with nozzle
- Extremely rapid to use even in difficult positions
- Compact







Characteristics

- Single component gel which comes already cross-linked in a cartridge
- No mixing, no waiting time
- · Visco-elastic gel which is extremely fluid
- Self-levelling and self-vulcanizing
- Can be applied using standard silicone ratchets
- Easy to measure
- Does not expire and does not harden
- Easy to apply even to inaccessible areas
- Characteristics do not deteriorate with the passing of time
- Re-enterable
- Non-toxic and safe
- Can be applied in all weather conditions, even when raining or in the heat of the summer sun
- Can be applied to powered appliances
- Dielectric strength > 23 kV/mm
- Volume resistivity $> 2.10^{15} \Omega$ cm
- Operating temperature from -60 / +200°C
- Overload temperature for brief periods: 250°C
- Gel UL 94-HB

^{*} Protection degree IP68 in proper casings





Wonder Gel

Product	Colour	Package type	Total quantity
Wonder Gel	•	Cartridge with measuring nozzle	280 ml
Wonder Gel Invisible	0	Cartridge with measuring nozzle	280 ml

LV

Gel technology comparison



- * Poured at -5°C from bottles stored at >10°C.
- ** Poured at -10°C from bottles stored at >20°C.
- *** Poured at -15°C from bottles stored at >25°C (cross linking within 48 hours).

Raytech gels can be used for the filling and sealing of all junction boxes and are ideal to ensure maximum protection if applied in cable jointing systems of our production.

GEL

Gel: UL 94-HB

-60°C/+200°C

-40°C/+110°C

Dielectric strength: > 23 kV/mm

Degree of protection:

IP68 (in proper casings)

Operating temperature:

Installation temperature:



Wonder Fluid

Single component insulation fluid gel cartridge

- Ready-to-use fluid gel
- Created for filling new Raytech joint shells with no-return valves
- Suitable for filling trays
- Does not solidify when opened
- No waste
- No shelf life















Wonder Fluid

Product	Colour	Package type	Total quantity
Wonder Fluid 210	•	Cartridge with measuring nozzle	210 ml
Wonder Fluid 280	•	Cartridge with measuring nozzle	280 ml

LV

Monogel

Single component transparent insulation gel for generic use

- Ready to use
- No shelf life







Monogel

Product	Colour	Package type	Total quantity
Monogel	0	Cartridge with measuring nozzle	300 ml

Gel: UL 94-HB

Operating temperature:

-60°C / +200°C

Installation temperature:

-40°C/+110°C

Dielectric strength:

> 23 kV/mm

Degree of protection:

IP68 (in proper casings)













RUBBER

Sky Plast

Dielectric strength: > 23 kV/mm Degree of protection: IP68 (in proper casings) Bicomponent rubber in insulating, mouldable, selfextinguishing paste with high dielectric characteristics

Thanks to Raytech's constant and careful research and development of new technologies comes Sky Plast, absolute technical innovation for covering, protecting, insulating, finishing and fireproofing any electrical and non-electrical component. Once the 2 components have been blended in a ratio of 1:1 (for max 2 min.) until uniform, it cross links quickly at room temperature in less than 5 minutes. After being wrapped around the component to be protected, Sky Plast quickly transforms into a layer of rubber with high dielectric and self-extinguishing characteristics.

- Mouldable, non-toxic and safe paste
- Low smoke and toxic and corrhosive gases emission
- Able to replace taping, heat-shrinking, resin finishes
- Flexible and elastic
- Quickly ready for use















RUBBER

LV

Installation examples



Cable gland sealing



Creation of LV terminals



Insulation of multiple connections









Cable head protection



Conduit protection



Drop line, bar, transformer through insulation





Edge protection



On-site preparation of braces and supports



Preparation of deflectors, nozzles, flow deviators



Preparation on-site of expanders for inserts



Preparation on-site of small moulds for reliefs



Preparation of bars, washers, round wire insulators



Preparation on-site of seals

Sky Plast

Product	Colour	Package type	Total quantity
Sky Plast	•	2 bicomponent cans	500 gr
Sky Plast 250	•	2 bicomponent cans	250 gr



Cross linking time: 15 minutes at 23°C Volume resistivity:

 $>2 10^{15} \Omega$ cm Dielectric strength:

> 23 kV/mm

Specific weight: 1,22 approx

Degree of protection:

IP68 (in proper casings)

Magic Rubber

Fast cross linking bicomponent rubber

Bicomponent insulating liquid rubber, extremely conformable and fluid, flexible, elastic and re-enterable In just a few minutes, transforms into a rubber with very high dielectric, thermal, mechanical and elastic characteristics.

- For installation up to 1kV
- Low smoke, toxic and corrosive gas emissions
- Ideal also for casts and moulds
- Non toxic and safe



Magic Rubber & Rubber Fluid

Product	Colour	Package type	Total quantity
Magic Rubber 500	•	2 bicomponent bottles 1 measuring cup - 1 mixing palette	500 gr
Magic Rubber 10	•	2 bicomponent tanks 1 measuring cup - 1 mixing palette	10 kg
Rubber Fluid 200	•	Bicomponent single dose bags	200 gr
Rubber Fluid 350	•	Bicomponent single dose bags	350 gr



Mix the 2 components in a ratio of 1:1.



Mix for max 30".



Pour the product into the casing to be filled.



In just a few minutes, the product transforms into rubber.



LV

Rayresin

Bicomponent epoxy resin for installations up to 1 kV

Resin for electrical insulation and for the protection of thermosetting LV and MV accessories. The two components, the base resin and hardener, are mixed in close contact to trigger the cross linking reaction. Excellent bonding to metal, plastic and rubber components.

Ray tech RESINA EPOSSIDICA EPOXY RESIN

Rayresin

Product	Colour	Package type	Total quantity
Rayresin 170	•	Bicomponent single dose bags	170 gr
Rayresin 210	•	Bicomponent single dose bags	210 gr
Rayresin 420	•	Bicomponent single dose bags	420 gr
Rayresin Tan 3,8	•	Tin with mineral charge	3.8 kg



Remove the separator from the Rayresin bag.



Mix the 2 components (30" max).



Pour Rayresin in the tray (1' max).



Installation completed.

Cross linking time:

20 minutes at 20°C

Hardness:

70 Shore D

Dielectric strength:

21 kV/mm

Specific weight:

1,07 kg/dm³

1,7 kg/dm³ for Rayresin Tan 3,8

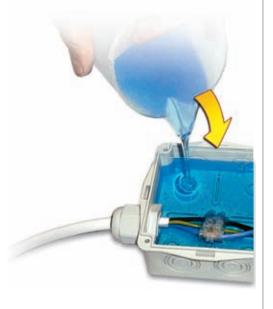
Water absorption:

0,8% max



KIT IP68

Universal kits for branch or straight through connections complete with the appropriate amount of gel



Power Kit IP68 Solution

CONNECTION KIT WITH POWER GEL

page

84





Gel Leader Pack IP68²

CONNECTION KIT WITH POWER GEL AND WONDER GEL







91 Accessories

page 92 Fittings page 93 J-Box - DIY



Gel: UL 94-HB





Operating temperature of the gel $-60^{\circ}\text{C} / +200^{\circ}\text{C}$



Power Kit IP68

The only re-enterable and reusable IP68 kit. Can easily be used for ceiling mounted or recessed applications!

The most versatile, safe solution to fully protect connections in boxes with an IP68 degree of protection. Thanks to Magic Power, the newly developed, fast cross-linking, safe and reliable, extremely sticky self-agglomerating gel with very high dielectric, thermal and elastic characteristics, sealing is guaranteed in all type of installation, including submerged. The Power Kit IP68 solution is the only product of its kind! Not only because the insulation can be used in two different ways, both as a traditional "pour" in the box and as a "cross linked and sticky" product (cross linking first), but also because, thanks to its re-enterability and re-usability, it helps you save time and money!

- Kit complete with perfect IP68 connection
- Insulated with *Magic Power Gel* the innovative self-amalgamating gel

• Can also be used in severe environmental conditions







In pools, tanks, submerged pumps, outdoor lighting systems, underground, port piers, marinas, sewer systems, and with temporary connections such as with lights, street vendors, etc.

HOW DO YOU USE

THE **POWER KIT**?

The insulation can be poured into the box (Pour!) or, for special applications, cross linked in the measuring beaker and applied around the connection (Stick!). Mix the Magic Power gel in a 1:1 ratio in the supplied measuring beaker. The gel will cross link in less than 15 minutes.

NO WASTE

The cross linked gel which remains on the bottom after mixing can be easily removed from the beaker and saved for later use.



Chose the **POUR** or **STICK** method most suited for your needs

POUR



You can use the Magic Power gel supplied in the bicomponent bottle in a 1:1 ratio by simply pouring it after mixing into the box supplied in the kit, to protect and seal internal connections. The gel cross links in just 15 minutes, but the box can be energised immediately.

RE-ENTER AND RE-USE







Thanks to Magic Power Gel, the box can be **re-opened**, **inspected** and **re-insulated** all using the original installed product.

STICK



Pour the components in the measuring beaker, mix and leave to cross link (about 15 minutes). Remove the insulation and position it in small parts around the connection so that it is fully covered. Insulation saved from previous mixes can of course be utilised.



IN A HURRY? ADVERSE WEATHER CONDITIONS? PREPARE YOUR INSULATION BEFORE INSTALLING IT!















WHAT ARE THE **ADVANTAGES TO USING THE**

POWER KIT?

- The insulation is extremely sticky and self-amalgamating, with no shelf life, it is non-toxic and it adheres to everything while leaving your hands clean
- •The kit does not cause waste: insulation left over in themeasuring beaker can be saved for later use.
- · Re-enterable and reusable, saving time and money.
- The supplied box has pre-marked holes.

- Compatible with Magic Gel.
- A slight exothermic reaction (temperature increase of about 3°C) speeds up cross linking in cold weather conditions.
- Even protects boxes mounted on the ceiling to IP68 if using the "stick" method. Could also use left over product from previous installations.
- Insulation can be pre-prepared: at home, at work or in your car and then applying it once cross linked, saving time when you're in a hurry or in adverse weather conditions.

SOME LEFT OVER? SAVE IT!







Left over gel that has already cross linked can be easily removed from the measuring beaker and saved for later use.











Power Kit 120



Product Power Kit 65 Power Kit 80 Power Kit 100

mm Ø 65 x h 35 + 2 cable glands PG16 / caps mm Ø 80 x h 40 + 3 cable glands PG16 / caps mm 100 x 100 x h 50 + 3 cable glands M25 x 1,5 / caps mm 120 x 80 x h 50 1 small basin - 1 mixing spoon + 3 cable glands M25 x 1,5 / caps

Insulating

Single bicomponent bottle 1 small basin - 1 mixing spoon Single bicomponent bottle 1 small basin - 1 mixing spoon Single bicomponent bottle 1 small basin - 1 mixing spoon Single bicomponent bottle

GEL LEADER PACK

Gel Leader Pack IP68² ¹

The two-technology pack that meets every installation requirement

- Kit for complete IP68 connection
- Choose the insulation most suitable for each installation
- Insulation re-enterable even after long periods of operation





Gel Leader Pack IP68²



Magic Power Gel 500

Bi-component gel in a practical and compact mono bottle. Re-enterable and re-usable potting compound. It can also be prepared and applied as a putty. Ideal for new installations.

Wonder Gel

Single component gel in a cartridge dispenser. Ready to use immediately. Nice compact cartridge. An indispensable product for any maintenance.

Box 80

Create your IP68 connection using the supplied 80 mm diameter box and 3 cable glands.

Product

Gel-leader

Box mm Ø 80 x h 40 3 cable glands PG16

Insulating

- Bicomponent single bottle
- Single component cartridge

Electrical performance:

CEI EN 50393 • CEI 20-33 (with testing under water head and water between the cable cores) Class 2 in accordance with CEI 64-8.

Gel: UL 94-HB







Magic Box

Electrical Performance:

CEI EN 50393 • CEI 20-33 (with testing under water head and water between the cable cores) Class 2 in accordance with CEI 64-8. **Gel:** UL 94-HB

Operating temperature < 90°



IP68 Connection kit complete with Magic Fluid insulating gel

Universal IP68 kit without shelf life, mechanically robust, non-toxic, suitable for installation even in the most extreme conditions, re-enterable, meeting all international standards. Protects from water, moisture, dust and accidental contact caused by small animals.

- Re-enterable even after long periods of operation
- Able to absorb external shock without fracturing
- For installations even at high depths
- Also suitable for vertical filling
- No shelf life
- Non toxic and safe



Magic Box is suitable for any kind of installation, even underground or directly submerged!



Magic Box is always re-enterable, even after long working periods!





Kit box installation sequence



Fix the box and cover the screws with the caps.



Knock out the pre prepared holes.



Install the cable glands.



Insert the cables and connect the wires.

Horizontal installation sequence









Vertical installation sequence









Examples of application







NAVAL SECTOR



OUTDOOR - GARDENS



ELECTRIC GATES

Magic Box	Max external Ø housed in input cables	N° and type of	Internal kit dimensions
Product	(mm)	cable glands	(mm)
Magic Box 65	22	3 x PG16	Ø 65 x h 35
Magic Box 80	22	3 x PG16	Ø 80 x h 40
Magic Box 100	20	3 x M25 x 1.5	100 x 100 x h 50
Magic Box 120	20	3 x M25 x 1.5	120 x 80 x h 50
Magic Box 150	26	3 x M25 x 1.5	150 x 110 x h 70
Magic Box 190	26	3 x M25 x 1.5	190 x 140 x h 70
Magic Box 240	26	3 x M25 x 1.5	240 x 190 x h 90

Composition
Kit

Kit complete
with cover
3 cable glands
Series of closing
plugs
Insulating gel
for complete
filling



LV

J-Box

Electrical Performance: CEI 23-48, IEC 60670

Degree of protection:

empty IP55

filled with Gel Raytech IP68

Halogen free: according to CEI EN 50267 2-2

Self-extinguishing and resistant to abnormal

heat and fire:

Glow wire test a +960°C according to EN 60695-2-11

Snap shut closing enclosures with perforated knockouts

Enclosure with snap shut cover and perforated knockouts for faster mounting of cable glands. Very high mechanical and flame retardant properties. Non-toxic, re-enterable only by means of a tool. The screwless design prevents screws rusting over time due to moisture and always allows for easy re-entry. Screw caps are also supplied for the wall mounting screws along with 3 cable glands and a stopping plug for vertical filling.

- · Can be insulated with Magic Power Gel, Magic Gel, Wonder Gel (IP68)
- Re-enterable only with the use of a tool
- Snap-shut closing (without screws)
- Also suitable for vertical filling
- Excellent shock-resistance
- Self-extinguishing
- Halogen Free

Snap-shut closing (without screws)







Pre - drilled walls











J-Box

Enclosures with perforated knockouts

Product	N° max of cables that can be jointed	Ø max predrilling holes (mm)	Ø max possible drilling (mm)	h	dimension oused lands (pass) METRIC	Dimension (mm)
J-BOX 65	4	23	23	16	20	Ø 65 x h 35
J-BOX 80	4	23	23	16	20	Ø 80 x h 40
J-BOX100	8	29	29	21	25	100 x 100 x h 50
J-BOX120	6	25	29	21	25	120 x 80 x h 50
J-BOX150	10	29	37	29	32	150 x 110 x h 70
J-BOX190*	10	37	37	29	32	190 x 140 x h 70
J-BOX240*	12	37	37	29	32	240 x 190 x h 90

J-BOX240* 12 37 37

* Supplied with extractable hinge for opening book type
Note: All boxes include 3 cable glands Ray Pass 16.



Accessories

Ray-PRESS

Cable glands

METRIC pict	Metric	Assembly hole Ø	Cable r	ange Ø	Item
Product	pict	(mm)	min (mm)	max (mm)	packaging
Ray PRESS-16	M16 x 1.5	16	6	10	50
Ray PRESS-20	M20 x 1.5	20	8	13	50
Ray PRESS-25	M25 x 1.5	25	12	18	20
Ray PRESS-32	M32 x 1.5	32	16	20	20

PG pict Product	PG pitch	Assembly hole \varnothing (mm)	Cable r	ange Ø max (mm)	Item packaging
Ray PRESS-PG11	11	19	6	9	50
Ray PRESS-PG13.5	13,5	20	9	12	50
Ray PRESS-PG16	16	23	11	14	50
Ray PRESS-PG21	21	29	14	18	20





Ray-PASS

Rubber flexible grommets

Product	For pipe maximum external Ø (mm)	Assembly hole \varnothing (mm)	Item packaging
Ray PASS 16	20	23	50
Ray PASS 21	23,5	29	50
Ray PASS 29	32	38	50





CONNECTORS

Connectors

Temperature of use: -5°C / +50°C Insulation resistance: > 100 MOhm Reference standards: CELEN 50086-2-1 Self-extinguishing rigid PVC accessories V0 - Standard UL94



Ray RTC

Tube box connectors IP65 grey RAL 7035

Product	Tube ∅ (mm)	ltem packaging
Ray RTC 16	16	50
Ray RTC 20	20	50
Ray RTC 25	25	50
Ray RTC 32	32	25
Ray RTC 40	40	20
Ray RTC 50	50	10



Ray RGC

Box straight connectors IP65 grey RAL 7035

Product	Tube \varnothing (mm)	ltem packaging
Ray RGC 16	16	50
Ray RGC 20	20	50
Ray RGC 25	25	25
Ray RGC 32	32	25
Ray RGC 40	40	20
Ray RGC 50	50	10



Ray CF

Flexible tube box bend IP65 grey RAL 7035

Product	Tube ∅ (mm)	ltem packaging
Ray CF 16	16	70
Ray CF 20	20	60
Ray CF 25	25	50
Ray CF 32	32	30
Ray CF 40	40	20
Ray CF 50	50	10



J-Box KIT IP68 - Do It Yourself

Choose the box, the cable glands and the filler shown in the selection table. In just 3 steps you have a specific IP68 box just for you!



Box type	Dimension (mm)	Type of cable glands to be housed PG and metric pitch M	Insulating filler Magic Fluid*
J-Box 65	Ø 65 x 35	PG: 7 - 9 - 11 -13,5 - 16 M: 12 -16 - 20	1 x Magic Fluid 110
J-Box 80	Ø 80 x 40	PG: 7 - 9 - 11 - 13,5 - 16 M: 12 - 16 - 20	1 x Magic Fluid 210
J-Box 100	100 x 100 x h 50	PG: 7 - 9 - 11 - 13,5 - 16 - 21 M: 12 - 16 - 20 - 25	1 x Magic Fluid 420
J-Box 120	120 x 80 x h 50	PG: 7 - 9 - 11 - 13,5 - 16 - 21 M:12 - 16 - 20 - 25	1 x Magic Fluid 420
J-Box 150	150 x 110 x h 70	PG: 13,5 - 16 - 21 - 29 M: 20 - 25 - 32	2 x Magic Fluid 420
J-Box 190	190 x 140 x h 70	PG: 13,5 - 16 - 21 - 29 M: 20 - 25 - 32	2 x Magic Fluid 420 1 x Magic Fluid 550
J-Box 240	240 x 190 x h 90	PG: 13,5 - 16 - 21 - 29 M: 20 - 25 - 32	4 x Magic Fluid 550 + 2 x Magic Fluid 210

^{*}Note: the indicated quantities are for the complete filling of the box.







SHEATHS

Thin, Medium, Heavy-wall heat shrink supplied in dispensers, coils, bars, wrap around and pieces.







Heat-shrink sheaths

THIN-WALL

page

98



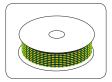
LST-TECSheaths in dispensers for commercial use



RayRoll / MaxiRoll Sheaths in dispensers for industrial use



CGP-TECSheaths in coils or commercial use



DCP-TECSheaths in coils for grounding cables



Colour table

Black

Red

Blue

YellowWhite

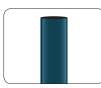
TransparentYellow Green



RDCT-BTubes in bars for general use



RGPO-B Tubes in bars for general use



Ray-Tum Semi-flexible sheath in bars



Thermo Mini Mix
Precut sheath kit

MEDIUM WALL page



MTR

HEAVY WALL



Ray-CSM

WRAP AROUND



Ray-RSMWinding sheath

POLE PROTECTION



WPC / LTPSMSheaths for lighting poles

Moulded parts

CAPS

page 105





TERMINATIONS

page 105







Tensile resistance	14,8 MPa
Elongation	460 %
Tensile resistance after ageing	14,5*
Elongation after ageing	480 %*
Dielectric strength	17 kV/mm*
Flammability	VW1*
Minimum shrinkage temperature	70°C

* (UL 224 test method)

Thin-wall sheaths

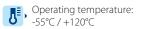
Flexible heat-shrink modified polyolefin sheaths, cross linked by means of radiation. Longitudinal shortening up to 15%. Suitable for insulation and covering of conductors and their connections, bars. etc. Replace self-adhesive, self-amalgamating insulating tapes.





- **D** = Ø min. before
- **d** = Ø max. after free shrinkage
- S = min. rated thickness after free shrinkage







I ST-TFC

Heat-shrink in dispensers for commercial use

Product	Colour	D (mm)	d (mm)	S (mm)	Lenght (m)
LST-TEC 1,6	• •	1,6	0,8	0,50	10
LST-TEC 2,4	• •	2,4	1,2	0,55	10
LST-TEC 3,2	• •	3,2	1,6	0,55	10
LST-TEC 4,8	• •	4,8	2,4	0,55	9
LST-TEC 6,4	• •	6,4	3,2	0,65	8
LST-TEC 9,5	• •	9,5	4,8	0,65	6
LST-TEC 12,7	• •	12,7	6,4	0,65	6
LST-TEC 19,0	• •	19,0	9,5	0,80	5
LST-TEC 25,4	• •	25,4	12,7	0,95	3
LST-TEC-GV 3/1,5	•	3	1,5	0,51	7
LST-TEC-GV 4,8/2,4	•	4,8	2,4	0,55	10
LST-TEC-GV 6/3	•	6	3	0,58	5
LST-TEC-GV 10/5	•	10	5	0,64	4
LST-TEC-GV 12/6	•	12	6	0,65	7
LST-TEC-GV 19/9	0	19	9	0,74	3
LST-TEC-GV 26/13	0	26	16	0,89	2,5



Ray Roll

Heat-shrink in dispensers for industrial use

Product	Colour	D (mm)	d (mm)	S (mm)	Length (m)
Ray Roll 1,6	•	1,6	0,8	0,50	20
Ray Roll 2,4	•	2,4	1,2	0,55	20
Ray Roll 3,2	•	3,2	1,6	0,55	10
Ray Roll 4,8	•	4,8	2,4	0,55	10
Ray Roll 6,4	•	6,4	3,2	0,65	10
Ray Roll 9,5	•	9,5	4,8	0,65	10
Ray Roll 12,7	•	12,7	6,4	0,65	10
Ray Roll 19,0	•	19,0	9,5	0,80	5
Ray Roll 25,4	•	25,4	12,7	0,95	5





Maxi Roll

Heat-shrink in maxi dispensers for industrial use

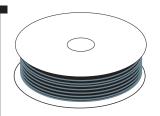
Product	Colour	D (mm)	d (mm)	S (mm)	Lenght (m)
Maxi Roll 1,6	•	1,6	0,8	0,50	300
Maxi Roll 2,4	•	2,4	1,2	0,55	300
Maxi Roll 3,2	•	3,2	1,6	0,55	300
Maxi Roll 4,8	•	4,8	2,4	0,55	150
Maxi Roll 6,4	•	6,4	3,2	0,65	75
Maxi Roll 9,5	•	9,5	4,8	0,65	150
Maxi Roll 12,7	•	12,7	6,4	0,65	150
Maxi Roll 19,0	•	19,0	9,5	0,80	75
Maxi Roll 25,4	•	25,4	12,7	0,95	60



CGP-TEC

Sheath for commercial use

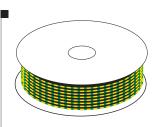
Product	Colour	D (mm)	d (mm)	S (mm)	Spool (m)
CGP-TEC 1,2/0,6	••••	1,2	0,6	0,45	600
CGP-TEC 1,6/0,8		1,6	0,8	0,45	300
CGP-TEC 2,4/1,2	••••	2,4	1,2	0,50	300
CGP-TEC 3,2/1,6	••••	3,2	1,6	0,50	300
CGP-TEC 4,8/2,4		4,8	2,4	0,50	150
CGP-TEC 6,4/3,2	••••	6,4	3,2	0,65	75
CGP-TEC 9,5/4,8	••••	9,5	4,8	0,65	150
CGP-TEC 12,7/6,4	••••	12,7	6,4	0,65	150
CGP-TEC 19/9,5		19,0	9,5	0,75	75
CGP-TEC 25,4/12,7	••••	25,4	12,7	0,90	60
CGP-TEC 38/19		38,0	19,0	1,00	60
CGP-TEC 51/26		51,0	26	1,15	30
CGP-TEC 76/38	••••	76,0	38,0	1,27	15
CGP-TEC 102/51	••••	102,0	51,0	1,40	15



DCP-TEC

Sheath suitable for coating grounding cables

Product	Colour	D (mm)	d (mm)	S (mm)	Spool (m)
DCP-TEC 3/1,5	9	3,0	1,5	0,51	150
DCP-TEC 6/3	•	6,0	3,0	0,58	75
DCP-TEC 8/4	•	8,0	4,0	0,64	75
DCP-TEC 10/5	>	10,0	5,0	0,64	75
DCP-TEC 12/6	•	12,0	6,0	0,64	75
DCP-TEC 19/9	•	19,0	9,0	0,74	75
DCP-TEC 26/13	•	26,0	13,0	0,89	30
DCP-TEC 38/19	•	38,0	19,0	1,00	30







Minimum shrinkage temperature



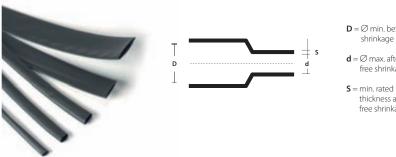
Operating temperature: -55°C / +125°C

Tensile resistance	14,8 MPa
Elongation	460 %
Tensile resistance after ageing	14,5*
Elongation after ageing	480 %*
Dielectric strength	17 kV/mm*
Flammability	VW1*
Minimum shrinkage temperature	70°C

* (UL 224 test method)

Sheaths in bars

Flexible heat-shrink modified polyolefin sheaths, cross linked by means of radiation. Longitudinal shortening up to 15%. Suitable for insulation and covering of conductors and their connections, bars. etc. Replace self-adhesive, self-amalgamating insulating tapes.



$\mathbf{D} = \emptyset$ min. before

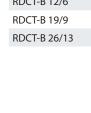
- $\mathbf{d} = \emptyset$ max. after free shrinkage
- thickness after free shrinkage



RDCT-B

Yellow green tube for general use in bars

Product	Colour	D (mm)	d (mm)	S (mm)	Bars (m)
RDCT-B 3/1,5	•	3,0	1,5	0,51	1,2
RDCT-B 6/3	•	6,0	3,0	0,58	1,2
RDCT-B 8/4	•	8,0	4,0	0,64	1,2
RDCT-B10/5	•	10,0	5,0	0,64	1,2
RDCT-B 12/6	•	12,0	6,0	0,64	1,2
RDCT-B 19/9	•	19,0	9,0	0,74	1,2
RDCT-B 26/13	•	26,0	13,0	0,89	1,2



RGPO-B

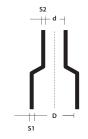
Tube for general use in bars

Product	Colour	D (mm)	d (mm)	S (mm)	Bars (m)
RGPO-B 2,4/1,2	••••	2,4	1,2	0,50	1,2
RGPO-B 3,2/1,6	• • • O T	3,2	1,6	0,50	1,2
RGPO-B 4,8/2,4	••••	4,8	2,4	0,50	1,2
RGPO-B 6,4/3,2	••••	6,4	3,2	0,65	1,2
RGPO-B 9,5/4,8		9,5	4,8	0,65	1,2
RGPO-B 12,7/6,4	• • • O T	12,7	6,4	0,65	1,2
RGPO-B 19/9,5	••••	19,0	9,5	0,75	1,2
RGPO-B 25,4/12,7	••••	25,4	12,7	0,90	1,2
RGPO-B 38/19	••••	38,0	19,0	1,00	1,2
RGPO-B 51/26	• • • O T	51,0	26	1,15	1,2





Ray-TUM Sheaths in bars

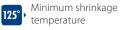


- $\mathbf{D}=\varnothing$ min. before
- shrinkage $\mathbf{d} = \emptyset$ max. after free shrinkage
- **S1** = rated thickness as supplied
- **S2** = min. rated thickness after free shrinkage

Shrinkage ratio 3:1		D	d	S	S,	Bars
Product	Colour	(mm)	(mm)	(mm)	(mm)	(m)
Ray-TUM-3/1-0	•	3	1	1,00	0,5	1,2
Ray-TUM-6/2-0	•	6	2	1,00	0,5	1,2
Ray-TUM-9/3-0	•	9	3	1,40	0,6	1,2
Ray-TUM-12/4-0	•	12	4	1,75	0,7	1,2
Ray-TUM-19/6-0	•	19	6	2,25	0,8	1,2
Ray-TUM-24/8-0	•	24	8	2,50	1,0	1,2
Ray-TUM-40/13-0	•	40	13	2,50	1,0	1,2

Shrinkage ratio 4:1	Colour	(mm)	(mm)	(mm)	(mm)	(m)
Ray-TUM-4/1-0	•	4	1	1,00	0,5	1,2
Ray-TUM-8/2-0	•	8	2	1,00	0,5	1,2
Ray-TUM-12/3-0	•	12	3	1,40	0,6	1,2
Ray-TUM-16/4-0	•	16	4	1,75	0,7	1,2
Ray-TUM-24/6-0	•	24	6	2,25	0,8	1,2
Ray-TUM-32/8-0	•	32	8	2,50	1,0	1,2
Ray-TUM-52/13-0	•	52	13	2,50	1,0	1,2







Tensile resistance	ISO 37	9 MPa (min)
Elongation	ISO 37	300 % (min)
Internal wall adhesion	-	60 N x 25 mm (min)
Thermal shock	4 h at 225°C	No-drip No breaking
Thermal ageing	168 h at 225°C	No-drip No breaking
Flexibility at low temperature	4 h at -55°C	No breaking
Dielectric strength	IEC 243	12 MV/m (min)
Resistance to fluids (lubricant oil, hydraulic fluid, diesel)	ISO 37 24 h at 23°C	Tensile resistance 7 Mpa (min) Elionagtion: 300% (min) Adhesion to int. walls: 60 N x 25 mm (min)

Thermo Mini Mix

Pre-cut heat-shrink sheaths kit

Ready-for-installation heat-shrink sheaths in a practical, convenient kit sub-divided by diameter. Indispensable for Electrical systems, as a replacement for taped insulation, wiring of all types, switchboards, Hi-Fi, hobbies, DIY.

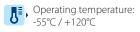
- Wide range of diameters and colours
- Always ready, quick application
- Flexible



MIXED COLOURS	Ø before and after	Length	Pieces
Product	shrinkage (mm)	of sheath (mm)	in the kit
ermo Mini Mix-N Thermo Mini Mix-MC	1,0 / 0,5	97	60
	2,0 / 1,0	97	40
	3,0 / 1,5	97	30
	4,5 / 2,25	97	20
	6,0 / 3,0	97	10
	9,0 / 4,5	97	10
		1,0 / 0,5 2,0 / 1,0 3,0 / 1,5 4,5 / 2,25 6,0 / 3,0	1,0 / 0,5 97 2,0 / 1,0 97 3,0 / 1,5 97 4,5 / 2,25 97 6,0 / 3,0 97











MEDIUM-WALL SHEATHS



Minimum shrinkage temperature 125°



Operating temperature: -55°C / +125°C

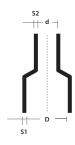


Tensile resistance	14,8 MPa
Elongation	460 %
Tensile resistance after ageing	14,5*
Elongation after ageing	480 %*
Dielectric strength	17 kV/mm*
Flammability	VW1*
Minimum shrinkage temperature	70°C

* (UL 224 test method)

Medium-wall sheaths

Heat-shrink modified polyolefin sheaths, cross linked by means of radiation for insulation, sealing and LV component protection. It is in fact used for restoring insulation and for the outer covering of LV cables and wherever optimal mechanical characteristics are required for resistance to impact, abrasion, general weathering including UV radiation, or for use in under water environments. Used for the insulation of bars or naked LV connections with optimal mechanical resistance for sealing, especially if used with hot-melt adhesive, and for anti-corrosion protection. Also replaces self-adhesive and self-amalgamating tapes.



- $\mathbf{D} = \emptyset$ min. before shrinkage
- $\mathbf{d} = \emptyset$ max. after free shrinkage
- **S1** = rated thickness as supplied
- S2 = min. rated thickness after free shrinkage

MTR

WITH ADHESIVE Product	Applications b	oy diameters to (mm)	D (mm)	d (mm)	S ₁ (mm)	S ₂ (mm)
MTR 10/3*	3,5	9,0	10	3	0,3	1,0
MTR 16/5*	5,5	14,0	16	5	0,3	1,4
MTR 25/8*	8,5	22,0	25	8	0,4	2,0
MTR 35/12*	13,0	32,0	35	12	0,4	2,0
MTR 50/16*	17,5	45,0	50	16	0,5	2,0
MTR 63/19*	21,0	57,0	63	19	0,6	2,4
MTR 75/22*	24,0	68,0	75	22	0,6	2,7
MTR 85/25*	28,0	77,0	85	25	0,6	2,8
MTR 95/29*	32,0	86,0	95	29	0,7	3,1
MTR 115/34*	37,0	104,0	115	34	0,7	3,1
MTR 140/42*	46,0	126,0	140	42	0,7	3,1
MTR 160/55*	55,0	144,0	160	55	0,7	3,2
MTR 180/60*	66,0	162,0	180	60	0,7	3,2

WITHOUT ADHESIVE	Applications b	oy diameters	D	d	S ₁	S_2
Product	from (mm)	to (mm)	(mm)	(mm)	(mm)	(mm)
MTR 10/3*/U	3,5	9,0	10	3	0,3	1,0
MTR 16/5*/U	5,5	14,0	16	5	0,3	1,4
MTR 25/8*/U	8,5	22,0	25	8	0,4	2,0
MTR 35/12*/U	13,0	32,0	35	12	0,4	2,0
MTR 50/16*/U	17,5	45,0	50	16	0,5	2,0
MTR 63/19*/U	21,0	57,0	63	19	0,6	2,4
MTR 75/22*/U	24,0	68,0	75	22	0,6	2,7
MTR 85/25*/U	28,0	77,0	85	25	0,6	2,8
MTR 95/29*/U	32,0	86,0	95	29	0,7	3,1
MTR 115/34*/U	37,0	104,0	115	34	0,7	3,1
MTR 140/42*/U	46,0	126,0	140	42	0,7	3,1
MTR 160/55*/U	55,0	144,0	160	55	0,7	3,2
MTR 180/60*/U	66,0	162,0	180	60	0,7	3,2

^{*} Complete the item code adding the length (in mm).



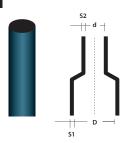
Heavy-wall sheaths

RAY-CSM heat-shrink tubular sheath is very thick and has been designed for uses requiring exceptional mechanical characteristics. Its ideal field of application is in underwater or directly underground environments, or where exceptional resistance to abrasion and impact is required, but also outstanding resistance to weathering, including UV radiation, for sealing, especially if used with hot-melt adhesive, and for anti-corrosion protection.

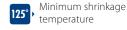
Ray-CSM

Product	Applications b	by diameters to (mm)	D (mm)	d (mm)	S ₁ (mm)	S ₂ (mm)
Floduct	110111 (111111)	to (IIIII)	(mm)	(mm)	(111111)	(111111)
Ray-CSM 12/3*	3,5	10	12	3	0,8	2,0
Ray-CSM 16/4*	4,5	14	16	4	0,9	2,4
Ray-CSM 24/6*	6,5	22	24	6	1,0	2,7
Ray-CSM 34/8*	9	31	34	8	1,3	4,0
Ray-CSM 48/12*	13	44	48	12	1,5	4,5
Ray-CSM 56/16*	17,5	50	56	16	1,5	4,4
Ray-CSM 70/21*	22	63	70	21	1,4	4,4
Ray-CSM 90/25*	27	81	90	25	1,3	4,3
Ray-CSM 110/30*	33	100	110	30	1,2	4,3
Ray-CSM 130/36*	38	118	130	36	1,2	4,3
Ray-CSM 160/50*	55	144	160	50	1,0	4,3
Ray-CSM 180/50*	55	162	180	50	1,0	4,3

^{*} Complete the item code adding the length (mm), adhesive (/172) or not adhesive (/U).



- $\mathbf{D} = \emptyset$ min. before shrinkage
- **d** = Ø max. after free shrinkage
- S1 = rated thickness as supplied
- **S2** = min. rated thickness after free shrinkage





Tensile resistance	ISO 37	12 MPa (min)
Elongation	ISO 37	350 % (min)
Thermal duration	IEC 60216	120°C
Dielectric	IFC 60243	1 mm wall 180 kV/cm
strength	IEC 00243	3.5 mm wall 120 kV/cm
Min. shrinkage temperature	-	70°C

Wrap Around

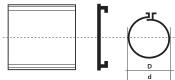
Winding heat-shrink sheath for repairing plastic or metal cable sheaths. It combines the previously seen mechanical, protective and sealing properties of tubular junctions with easy of application and closing. Indispensable when cable cutting is not possible. Does not require pre-insertion, reducing the space necessary for its application.

Ray-RSM

	Ø ca	able	D	d
Product	from (mm)	to (mm)	(mm)	(mm)
Ray-RSM 34/10*	12	21	34	10
Ray-RSM 53/13*	15	32	53	13
Ray-RSM 84/20*	23	50	84	20
Ray-RSM 107/29*	34	65	107	29
Ray-RSM 143/36*	42	86	143	36
Ray-RSM 198/55*	62	120	198	55
Ray-RSM 250/98*	111	150	250	98

^{*} Complete the item code adding the length (mm) and adhesive (/232).

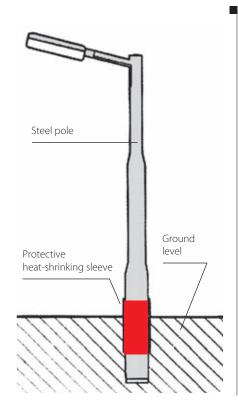




- $\mathbf{D} = \emptyset$ minimum before shrinkage $\mathbf{d} = \emptyset$ maximum after free shrinkage
- Tensile ISO 37 17 MPa (min) resistance 350 % (min) Elongation ISO 37 Density ISO 1183 1,0-1,2 g/cm³ 50-70 Shore D Hardness ISO 868 Thermal duration IEC 60216 120°C Flexibility at low 4 h at -40°C Non-cracking ASTM D2671 temperature 1 mm wall 180 kV/cm Dielectric IEC 60243 strength 3.5 mm wall 120 kV/cm



POLE PROTECTION



Anti-corrosion pole protection

On installed poles, the most section vulnerable to corrosion is right above and below ground. This section is attacked by corrosive agents that cause a rapid decay of the metal with a significant reduction of the operating life of the pole. Special heat-shrinking sheaths are suitable for the rust protection of public lighting and electric traction poles, traffic lights and traffic signs. They are composed of very thick cross linked polyolefin. The inside of the tubes and the ends are covered in a suitable thermal fuse adhesive that ensures perfect sealing without allowing moisture to enter.

- Ultra adhesive
- Excellent electrical properties
- Good chemical resistance
- Resistant to mould and micro-organisms
- Constant protection against stray electrical currents
- Easy application
- · Long-term stability of all properties



WPC

Open ends complete with closing pieces for already installed poles

	End height	Package roll		osing piece diameter
Product	(mm)	(m)	Up to 450 mm	Over 450 mm
WPC 65M17	450	30	WPCP IV 100 x 450	WPCP IV 150 x 450
WPC 65M24	600	30	WPCP IV 100 x 600	WPCP IV 150 x 600



LTPSM

Tubular sleeve for poles for installation

	Sleeve length
Product	(mm)
LTPSM 115/80-450/87	450
LTPSM 155/100-450/87	450
LTPSM 190/125-450/87	450
LTPSM 115/80-600/87	600
LTPSM 155/100-600/87	600
LTPSM 190/125-600/87	600

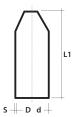


CAPS AND TERMINALS

Self-sealing cap

Heat-shrink cap for the termination of cable ends. It combines the previously seen mechanical, protective and sealing properties of tubular junctions with easy of application and closing. Indispensable when cable cutting is not possible. Does not require pre-insertion, reducing the space necessary for its application.

	Ø cable		D	d	S	L1
Product	from (mm)	to (mm)	(mm)	(mm)	(±20% mm)	(±10% mm)
RayL011	4	8	12	4,0	2,0	40
RayL022	8	17	20	6	2,3	55
RayL033	17	30	35	16	3,0	83
RayL044	30	45	55	26	3,3	103
RayL048	45	65	75	36	3,3	120
RayL055	65	95	100	52	3,8	140
RayL066	95	115	120	60	3,8	150





- $\mathbf{D} = \emptyset$ min. before shrinkage
- $\mathbf{d} = \emptyset$ max. after free shrinkage
- S-L1 = min. rated size after free shrinkage

Tensile resistance	ISO 37	12 MPa (min)		
Elongation	ISO 37	200 % (min)		
Density	ISO 1183	0,9-1,2 g/cm ³		
Hardness	ISO 868	50-70 Shore D		
Accelerated ageing	Tensile resistance ISO 37	12 Mpa (min)		
(7 days at 150°C) ISO 188	Ultimate elongation ISO 37	200% (min)		
Flexibility at low temperature	4 h at -40°C ASTM D2671	Non-cracking		
Water absorption	ISO 62	0,5% max after 24 h at 23°C		

Self-sealing termination •

	LV ca		D1	d1	\$1 ±20%	D2	d2	S2 ±20%	L1 ±10%	L2 ±10%
Product	from	to	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
RayK333	4	16	22	8	2	9	3,5	2	55	18
RayK224	25	70	40	16	2	15	7,5	2	125	35
RayK466	95	185	60	23	2,5	25	7,5	2,5	155	45

	LV ca conduct		D1	d1	S1 ±20%	D2	d2	S2 ±20%	L1 ±10%	L2 ±10%
Product	from	to	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
RayW533	4	35	38	17	2,7	14	4,5	2,5	98	23
RayW516	50	150	60	25	3	25	8	2,5	165	50
RayW526	185	300	80	38	3,5	35	11	3,5	185	55
RayW248	185	500	110	50	4,0	46	17,5	3,5	250	65

	LV ca conduct		D1	d1	S1 ±20%	D2	d2	\$2 ±20%	L1 ±10%	L2 ±10%
Product	from	to	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
RayK033	4	35	42	15	2,3	14	3,5	1,9	105	26
RayK046	50	70	55	21	3,1	20	5	2,5	150	40
RayK016	95	150	65	26	3,5	26	7	2,9	175	45
RayK026	185	300	102	47	3,9	98	12	3	198	58

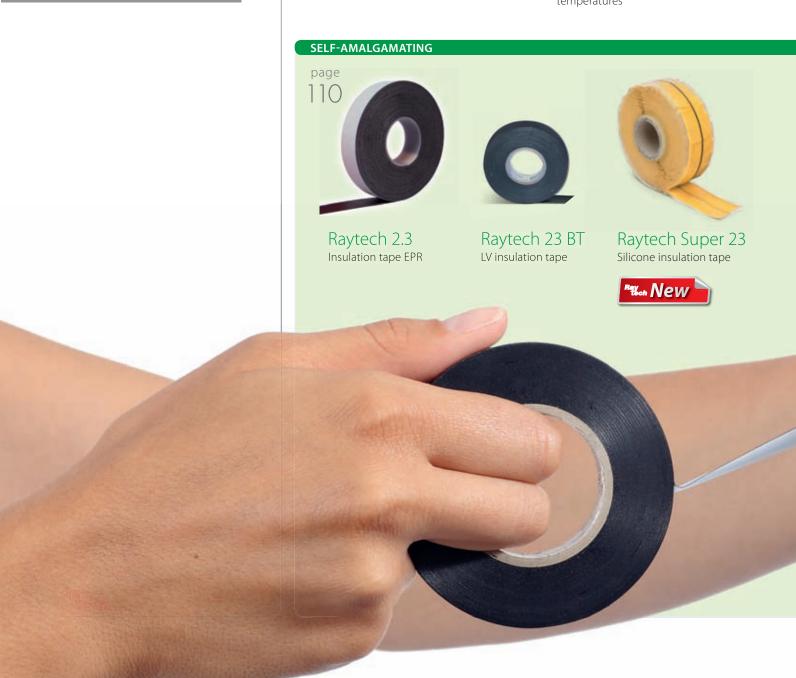


Tensile resistance	ISO 37	10,5 MPa (min)
Elongation	ISO 37	300 % (min)
Density	ISO 1183	10-1,3 g/cm ³
Hardness	ISO 868	50-70 Shore D
Accelerated ageing	Tensile resistance ISO 37	8,5 Mpa (min)
(7 days at 150°C) ISO 188	Ultimate elongation ISO 37	100% (min)
Flexibility at low temperature	4 h at -40°C ASTM D2671	Non-cracking
Water absorption	ISO 62	0,5% max after14 days at 23°C















PVC



Approvals

Complies with standardsUL 510 • CEI 15-15
CEI 60454 (EN60454)

VDE marking

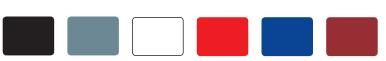


Rayteam

Self-adhesive for general use

PVC adhesive tape for electrical applications and mechanical protection for general use. Recommended for insulating low-voltage joints and for covering cables, accessories and products in general. It is self-extinguishing and does not propagate fire. Excellent resistance to ageing, exposure to weather conditions, hydrocarbons and chemical solvents in general.

0,13 mm			
Product	Width	Thickness	Length
Rayteam 1925/13	19 mm	0,13 mm	25 m
Rayteam 1510/13	15 mm	0,13 mm	10 m
	•		
0,15 mm			
Rayteam 1925	19 mm	0,15 mm	25 m
Rayteam 1510	15 mm	0,15 mm	10 m
Rayteam 2525*	25 mm	0,15 mm	25 m
Rayteam 1525	15 mm	0,15 mm	25 m
	'		



Available colours: black, grey, white, red, blue, brown, yellow/green.

 $[\]mbox{\ensuremath{^{\ast}}}$ only black, white and grey. Contact Raytech for other sizes and thicknesses.

Property	Test method	Typical values
Breaking Strength (tensile)	ASTM-D-1000	65N/25 mm width min
Elongation at break	ASTM-D-1000	> 200 %
Adhesion to steel	ASTM-D-1000	6 N/25 mm width
Adhesion to backing	ASTM-D-1000	6 N/25 mm width
Self-extinguishing	ASTM-D-1000	self ext. 4 max
Operating temperature	UL 510	-5°C / 85°C
Electric strength after exposure to damp environment	ASTM-D-1000	40 kV/mm min



Raytech Super 3-3

Self-adhesive for use at low and high temperatures

PVC adhesive tape with excellent electrical and mechanical properties for a wide range of working temperatures. This tape is particularly suitable for use at low temperatures and in all weather conditions, including the most extreme. The tape is flame retardant and selfextinguishing. It is recommended as the primary insulation for joints up to 0.6/1 kV, and as the outer covering for joints and other products, and for all applications at low temperatures.

Product	Colour	Width	Thickness	Length
Raytech Super 3-3	•	19 mm	0,18 mm	20 m

Property	Test method	Typical values
Breaking Strength (tensile)	ASTM-D-1000	80N/25 mm width min
Elongation at break	ASTM-D-1000	240% min
Adhesion to steel	ASTM-D-1000	>7 N/25 mm width
Adhesion to backing	ASTM-D-1000	>7 N/25 mm width
Adhesion to backing at -7°C	ASTM-D-1000	>18 N/25 mm width
Self-extinguishing	ASTM-D-1000	self ext. 4 max
Operating temperature	CSA-22.2	-18°C / 105°C
Electric Strength after exposure to damp environment	ASTM-D-1000	51 kV/mm min



Approvals UL 510

CSA 22.2 ASTMD-3005 HH-I-595C CEI15-15 CEI 60454 (EN60454)

Raytech 2-2

Product

Raytech Super 2-2

Heavy duty thickness auto-adhesive

Colour

PVC adhesive tape for electrical and mechanical purposes even in the most severe conditions (0.25 mm. thick). Particularly suitable for insulating and protecting cables, accessories and other products against adverse weather conditions and industrial solvents, and as a primary low voltage joint insulation. It is self-extinguishing and non flame-propagating. It has excellent wear resistance, even when it is installed and working under very severe conditions.

Width

19 mm

Thickness

0,25 mm

Length

20 m

Property	Test method	Typical values
Breaking Strength (tensile)	ASTM-D-1000	125N/25 mm width min
Elongation at break	ASTM-D-1000	>200 %
Adhesion to steel	ASTM-D-1000	>6 N/25 mm width
Adhesion to backing	ASTM-D-1000	>6 N/25 mm width
Self-extinguishing	ASTM-D-1000	self ext. 4 max
Working temperature maximum	CSA-22.2	105°C
Operating temperature	UL 510	-10°C
Electric strength after exposure to damp environment	ASTM-D-1000	40 kV/mm min



Approvals

UL 510 CSA 22.2 ASTM-D-2301 MIL-I-7798A CEI 15-15 CEI 60454 (EN60454)



SELF-AMALGAMATING



Approvals ASTM-D-4388 HH-I-553C/Grade A MIL-I-3825 B

Raytech 2.3

EPR Self-amalgamating low and high voltage tape

This ethylene-propylene (EPR) self-amalgamating tape is used for insulating and sealing high voltage electrical joints for voltages up to Um 72 kV. It amalgamates rapidly, adapting itself to the product underneath, forming a solid unit without air bubbles. It is particularly resistant to partial discharges (corona), with the characteristics remaining unchanged with time. Joints must be protected with a PVC tape or similar.

Product	Colour	Width	Thickness	Length	
Raytech 2.3	•	19 mm	0,76 mm	9 m	
Property		Test method	Typical values		
Breaking Strength (tensile)	ASTM-D-4325	2.8 MPa min		
Elongation at break		ASTM-D-4325	800% min		
Amalgamation ability		ASTM-D-4325	2,0 mm		
Overload temperature		ASTM-D-4388	130°C		
Operating temperature		ASTM-D-4388	90°C		
Dielectric strength		ASTM-D-4325	35 kV/mm min		
Relative dielectric constan	nt	ASTM-D-4325	2.7		
Volume resistivity		ASTM-D-4325	$10^{15}\Omega$ cm min		
Resistance to ozone		ASTM-D-4325	Positive		
Resistance to U.V.		ASTM-D-4325	Positive		



Approvals
UL 510

Raytech 23 BT

Low voltage Self-amalgamating tape

This rubber self-amalgamating low voltage tape (0.6/1 kV)is used for insulating and sealing low voltage electrical joints. It amalgamates rapidly, adapting itself to the product underneath, forming a solid unit. The joints must be protected with a PVC tape. The characteristics remain unchanged with time.

Product	Colour	Width	Thickness	Length
Raytech 23 BT	•	19 mm	0,76 mm	6,7 m

Property	Test method	Typical values
Breaking Strength (tensile)	ASTM-D-4325	1.8 MPa min
Elongation at break	ASTM-D-4325	300 % min
Amalgamation ability	ASTM-D-4325	2,0 mm
Overload temperature	ASTM-D-4388	100°C
Operating temperature	ASTM-D-4388	90°C
Dielectric strength	ASTM-D-4325	20 kV/mm min



LV

SELF-AMALGAMATING

Raytech Super 23

Self-amalgamating insulation tape for harsh applications

Raytech Super 23 tape is an elastomeric tape that self-amalgamates to a single mass at room temperature: the layers merge simply upon contact to create a solid mass with excellent physical, thermal and electrical characteristics. Thanks to its distinct characteristics of water repellency, it is ideal for the isolation and protection of electrical components, even in the presence of moisture or when exposed to weathering. Simply clean the surfaces to be coated and apply the tape, pulling it slightly, eliminating the separator.

Product	Colour	Width	Thickness	Length
Raytech Super 23	•	25 mm	0,5 mm	5 m

Property	Test method	Typical values
Density	-	1,21
Hardness	-	60 Shore A (±5)
Tensile strength	ASTM-D-4325	≥5,9 N/mm²
Elongation at break	ASTM-D-4325	≥450%
Dielectric strength	ASTM-D-4325	≥25 kV/mm
Relative dielectric constant	ASTM-D-4325	2,8 ÷ 3
Loss factor (tan ∂)	ASTM-D-4325	$1.1 \times 10^3 \div 2.5 \times 10^3$
Volume resistivity	ASTM-D-4325	$3 \times 10^{15} \div 1 \times 10^{16} \Omega$ cm

- Waterproof and water-repellent
- Excellent resistance to ageing
- Self-amalgamates to a single mass
- Highly conformable
- Once applied maintains characteristics over time







HOME REPAIRS



SELF-AMALGAMATING



Approvals MIL-I-17695 A

Raytefill

Thick low voltage Self-amalgamating tape

This self-amalgamating thick-wall (3.2mm) has been specially designed for the rapid reconstruction of low-voltage cable insulation, to cover complex shapes (insulating and covering joints between busbars and relative bolts, clamps, etc.) and to seal against possible penetration of humidity. Once applied it becomes a solid, absolutely non-porous mass, with first class electrical qualities and ageing resistance, perfectly suited to the product it is covering.

Product	Colour	Width	Thickness	Length
Raytefill	•	38 mm	3,2 mm	1,5 m
Property		Test method	Typical values	
Ultimate elongation		ASTM-D-4325	>1000 %	
Amalgamation ability		ASTM-D-4325	2,0 mm	
Operating temperature: C	ontinuous	ASTM-D-4388	90℃	
Operating temperature: O	verload	ASTM-D-4388	95°C	
Dielectric strength		ASTM-D-4325	23,0 kV/mm	



Approvals ASTM-D-2148 MIL-I-46852A

Raytech 7-0

Product

Self-amalgamating silicone rubber tape

Colour

This self-amalgamating silicone rubber tape is used for covering medium and high voltage terminations on extruded cables up to Um 72 kV, because of its first-rate performance for electrical installations in damp or polluted environments, against corrosion, corona and against ageing. It is used as an insulation up to 180°C due to its excellent heat properties. It can be perfectly adapted to all the shapes to be covered.

Width

Thickness

Length

Raytech 7-0	•	25 mm	0,51 mm	9,1 m	
Property		Test method	Typical values		
Elongation at break		ASTM-D-1000	>500%		
Resistance to U.V.		ASTM-D-4325	Positive		
Resistance to ozone		ASTM-D-4325	Positive		
Working temperature max	kimum	ASTM-D-4388	180°C		
Dielectric strength		ASTM-D-4325	>35 kV/mm		

Raycopper

Tinned copper mesh tape for electrical screening

Product	Colour	Width	Thickness	Length
Raycopper 1000	Silver	60 mm	0,3 mm	1 m
Raycopper 2000	Silver	60 mm	0,3 mm	2 m
Raycopper 3000	Silver	60 mm	0,3 mm	3 m
Raycopper 5000	Silver	60 mm	0,3 mm	5 m
Raycopper 6000	Silver	60 mm	0,3 mm	6 m

|--|--|--|

Property	Typical values		
Material	Tinned copper mesh tape with high flexibility		
Elongation at break	70% min		
Breaking Strength (tensile)	35 N/10 mm		
Volume resistivity	0,3 cm		

MCA-FV

Fiberglass adhesive tape

Self-adhesive mono-directional fibreglass tape with polypropylene support. Suitable for cable fixing on pipes (i.e.: Raytech MCA... cables for electrical tracing), and for any kind of strong fixing. Inextensible, it is suitable for temperatures up to 130°C.

Product	Colour	Width	Thickness	Length	
MCA-FV	white	12 mm	0,13 mm	50 m	
Property		Test method	Typical values		
Breaking Strength (tensile)	AFERA 4004	130 N/cm min		
Ultimate elongation		AFERA 4005	5%		
Adhesion to steel		AFERA 4001	4 N/cm min		
Adhesion to backing		AFERA 4001	3 N/cm min		



MCA-ALL

Product

Self-adhesive aluminium tape

Colour

Self-adhesive adhesive aluminium tape suitable for fixing on flat surfaces (i.e.: for heating cable fixing on tanks outer surfaces); used also for holes or abrasion repairs on metallic or plastic surfaces. Strong adhesion.

Width

Thickness

Length

MCA-ALL 25	Aluminium	25 mm	0,06 mm	50 m	
MCA-ALL 75	Aluminium	75 mm	0,06 mm	50 m	
Property	Typical values				
Breaking Strength (tensile	e)	1,2 da N/cm min			
Elongation at break		5% min			
Adhesion to steel		4 N/cm min			
Adhesion to backing		4,5 N/cm min			
Flame resistance BS476-7	,	Class 1			





Speedy Line

Raytech, leader in the field of cable accessories, has always based its research and product line on the quality. This is why, also in the field of the pulling tapes and lubricants, it is today offering systems of extremely high reliability and quality, always over the conventional types offered by the market:

- These fixed head, interchangeable nylon fishtapes are constructed with very high mechanical characteristic, long-lasting materials. Speedy Sonda tapes are made of PERLON, a practically non-deformable nylon, protecting the installer from unexpected elongation or breakage of the probe in ducts.
- "Twisted" polyester tapes, self-lubricated, extremely flexible and light, with exceptional mechanical characteristics, able to be inserted into long cable ducts, avoid the need of intermediate cable boxes; allowable bending radius is very small and, once bent, they do not break and released they come back to their original shape.
- Fibreglass tapes, thanks to their "nervous" elasticity together with their strength, are easy to use in any type of conduit.
- Nylon-steel tapes, when an exceptional strength is required.
- The widest range of accessories for all the types.
- Raytech offers the widest range of high sliding, non-toxic lubricants that are easily removable from cables. Choose from lubricant oil, lubricant gel (non-drip, allowing for a savings of up to 3 times compared to conventional types) or lubricant spray (easy application directly into the cable ducts, non-drip and dramatically reducing friction and traction force).



Characteristics	✓		\ominus
Product	Positioning	Ease of bending	Pulling resistance
Speedy Nylon and Speedy Sonda	Good	Good	Very good
Polyester Speedy Helix	Very good	Very good	Very good
Fibreglass Speedy Glass	Excellent	Good	Good
Nylon-Steel Speedy Steel	Very good	Excellent	Excellent





Speedy NylonFixed head Nylon probes



Speedy Sonda 3 Fixed head or interchangeable Nylon Perlon® Ø 3 mm



Speedy Sonda 4
Fixed head or interchangeable Nylon
Perlon® Ø 4 mm



Speedy Helix 5Polyester Ø 5 mm
with eyelet and fixed flexible head



Speedy Wire Oil - Speedy Wire Gel -Speedy Wire Spray

Non-toxic lubricants for threading any kind of cable, power, telecom and optical fibre in ducts, smooth or corrugated piping, etc. With a very high lubrication power, especially when compared to products for similar uses, these are easily removable from cables, and require very low installation strenght, even in the case of bent conduits.

Speedy Wire Oil is a standard, fluid and low viscosity lubricant.

Speedy Wire Gel, thanks to its consistency, allows for savings of up to 3 times the amount used compared to other solutions.

Speedy Wire Spray, thanks to its canister and dispensing nozzle, allows for suitable guiding of the lubricant, including inside piping and ducts, greatly facilitating application.

Product	Package	Wrapping	Appearance	PH	Density
Speedy Wire Oil	1 L bottle	12-piece pack	Transparent gel	6-8	About 1
Speedy Wire Gel	1 L bottle	12-piece pack	Milky liquid	6 - 8	About 1
Speedy Wire Spray	400 ml canister	12-piece pack	White foam	8,5 - 9	About 1,04



Non-toxic

Speedy Nylon

Fixed head Nylon transparent cable pullers

Product	Ø (mm)	Length (m)	Package
Speedy Nylon 3/5-F	3	5	50
Speedy Nylon 3/10-F	3	10	50
Speedy Nylon 3/15-F	3	15	50
Speedy Nylon 3/20-F	3	20	50
Speedy Nylon 3/25-F	3	25	50
Speedy Nylon 4/5-F	4	5	30
Speedy Nylon 4/10-F	4	10	20
Speedy Nylon 4/15-F	4	15	20
Speedy Nylon 4/20-F	4	20	10
Speedy Nylon 4/25-F	4	25	10





Speedy Helix 4Polyester Ø 4 mm
with eyelet and fixed flexible head



Speedy Glass Interchangeable head fibreglass probe Ø 3 mm



Speedy Steel Nylon-steel probe Ø 6 mm



Accessories









Speedy Sonda 3

Nylon tape PERLON® Ø 3 mm with fixed or interchangeable head*

Fixed head	I	I Ø	Length	Item
Product	Colour	(mm)	(m)	packaging
Speedy Sonda 3/5 -F		3	5	50
Speedy Sonda 3/10 -F		3	10	50
Speedy Sonda 3/15 -F	Transparent	3	15	50
Speedy Sonda 3/20 -F		3	20	50
Interc. head				
Speedy Sonda 3/5 -I		3	5	30
Speedy Sonda 3/10 -I		3	10	20
Speedy Sonda 3/15 -I	Transparent	3	15	20
Speedy Sonda 3/20 -I		3	20	10

Other dimensions available on request





Speedy Sonda 4 Nylon tape PERLON® Ø 4 mm with fixed or interchangeable head*

Fixed head		l Ø	Length	ltem
Product	Colour	(mm)	(m)	packaging
Speedy Sonda 4/5-F		4	5	30
Speedy Sonda 4/10-F	Transparent	4	10	20
Speedy Sonda 4/15-F	Harispalerit	4	15	20
Speedy Sonda 4/20-F	Black **	4	20	10
Speedy Sonda 4/25-F		4	25	10

Interc. head				
Speedy Sonda 4/5-I		4	5	30
Speedy Sonda 4/10-I	Transparent	4	10	20
Speedy Sonda 4/15-I	Transparent	4	15	20
Speedy Sonda 4/20-I	Black **	4	20	10
Speedy Sonda 4/25-I		4	25	10

Other dimensions available on request

^{*} Supplied with flexible head curve guide and pulling eyelet

^{*} Supplied with flexible head curve guide and pulling eyelet

^{**} For the colour black **add N** to the code

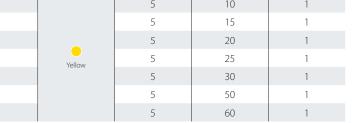


Speedy Helix 5

Polyester tape Ø 5 mm with fixed eyelet and flexible interchangeable head

Twisted tapes, very strong, extremely flexible and light. They pass the "4 curves test" on both rigid and corrugated pipes, but they can also avoid to have an intermediate box, and even if bent on themselves they do not break.

Product	Colour	Ø (mm)	Length (m)	ltem packaging
Speedy Helix 5/10	Yellow	5	10	1
Speedy Helix 5/15		5	15	1
Speedy Helix 5/20		5	20	1
Speedy Helix 5/25		5	25	1
Speedy Helix 5/30		5	30	1
Speedy Helix 5/50		5	50	1
Speedy Helix 5/60		5	60	1







Other dimensions available on request

Speedy Helix 4

Polyester tape Ø 4 mm with interchangeable eyelet and head*

Twisted tapes, very strong, extremely flexible and light. They pass the "4 curves test" on both rigid and corrugated pipes, but they can also avoid to have an intermediate box, and even if bent on themselves they do not break.

Product	Colour	Ø (mm)	Length (m)	ltem packaging
Speedy Helix 4/10		4	10	1
Speedy Helix 4/15	Orange	4	15	1
Speedy Helix 4/20		4	20	1
Speedy Helix 4/30		4	30	1

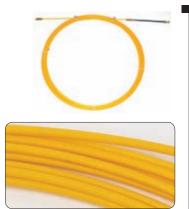
Other dimensions available on request





^{*} Supplied with flexible head curve guide and pulling eyelet





The tape is complete of repairing kit

Speedy Glass

Interchangeable head "self-starting" fibreglass Ø 3 mm cable pullers*

Suitable for light use, even on long lengths, easy to use thanks to their "nervous" elasticity which makes easier their positioning in pipes and conduits.

Interc. head		l Ø	Length	Item
Product	Colour	(mm)	(m)	packaging
Speedy Glass 3/10		3	10	10
Speedy Glass 3/15	Yellow	3	15	10
Speedy Glass 3/20		3	20	10
Speedy Glass 3/25		3	25	10
Speedy Glass 3/30		3	30	10

Other dimensions available on request





Speedy Steel

Nylon-steel tape Ø 6 mm complete of all accessories

Nylon-steel tapes are extremely robust, and are made of an internal core $4 \times 1,5$ mm steel made, coated with a nylon layer. Particularly suitable for industrial use with heavy duty. Use in installations without voltage.

Product	Colour	Ø (mm)	Length (m)	ltem packaging
Speedy Steel 6/20		6	20	1
Speedy Steel 6/25		6	25	1
Speedy Steel 6/30	•	6	30	1
Speedy Steel 6/40	Green	6	40	1
Speedy Steel 6/50		6	50	1
Speedy Steel 6/60		6	60	1

Other dimensions available on request

^{*} Supplied with flexible head curve guide and pulling eyelet



Accessories

For Speedy Sonda and Speedy Helix cable pullers

		Item	
Product	Description	packaging	
Speedy TFG	Flexible head curve guide	3	
Speedy TFC	Flexible head with sheave	3	
Speedy OTL	Long pulling eyelet	3	
Speedy OTC	Short pulling eyelet	3	
Speedy BU	Joint bush for fishtapes	3	_
Speedy PN	Pin M4 (for tape Ø 4 mm)	3	-
Speedy AT	Pulling slot	3	
Speedy CA	Accessories kit	1	

For Speedy Glass cable pullers

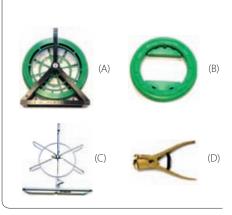
Product	Description	Item packaging	
Speedy REP	Repairing kit	3	000
Speedy TFG	Flexible head curve guide	3	
Speedy TFC	Flexible head with sheave	3	
Speedy OTL	Long pulling eyelet	3	
Speedy OTC	Short pulling eyelet	3	
Speedy BU	Joint bush for fishtapes	3	
Speedy PNG	Pin for Speedy Glass tape	3	≅−
Speedy AT	Pulling slot	3	
Speedy CA	Accessories kit	1	

For Speedy Steel cable pullers

Product	Description	Item packaging	
Speedy MO	Snap link	3	
Speedy TS	Flexible head curve guide	3	
Speedy OL	Clamping device	3	0
Speedy RS	Sliding wheel device	3	-

Available upon request

		Item	
Product	Description	packaging	Image
Speedy AS	Reels with support	1	(see A)
Speedy AF	Reels on frame	1	(see B)
Speedy AFS	Steel reels on frame	1	(see C)
Speedy PR Glass	Repairing pliers for Speedy Glass tapes	1	(see D)







Fire Stop-Bag Fire stop barrier using intumescent bags



Fire Stop Panel Fire stop barrier panels



Fire Stop Collar Fire stop pipe transit collar for plastic pipes



FSM Fire stop barriers using incombustible plaster



FSCP Fire stop cover for fluorescent fittings



FSCF Fire stop cover for spot lights







Fire Stop Tape Fire stop barriers using intumescent tape for plastic pipes



Fire Stop Seal Fire stop barrier with intumescent sealing mastic



Fire Stop Foam
Fire stop barrier
expanding foam



FSCI Fire stop barrier for switchgear covering



FSCC Fire stop cover for boxes



FSCO T110 Metal pipe insulating mat protective barrier







Approval

Class El 120 Non toxic and asbestos free

In compliance with standard EN 1366-3

Fire Stop Bag

Fire stop barrier in an intumescent bag

Intumescent incombustible bags which stop the passage of fire through openings in walls. They are available in different sizes and they have to be placed to seal the openings, both in walls and floor slabs. At a temperature of 200°C the material starts to compact sealing the gaps thus avoiding the passage of the flames.

- Made from a fireproof fabric
- Contains intumescent putty seal inside

Product	Bag dimensions (mm)
FSB-11	250 x 100 x 25
FSB-12	250 x 200 x 35
FSB-13	250 x 300 x 35



INSTALLATION

Finish and opening then lay, the bags as bricks, staggered and overlapped.

For the application on plasterboard walls please contact Raytech.



Approval

Class El 120 Non toxic, asbestos and solvent free

In compliance with standard EN 1366-3

Fire Stop Panel

Fire stop barriers in panels

Incombustible panels treated on the surface with intumescent paint to stop the passage of fire through openings in walls. This product allows for the sealing of cavities in walls safely and cost effectively.

- Manufactured from Rockwool
- Coated with intumescent putty
- Resistant to mould and bacteria

Product	Dimension (mm)
FSP-11	600 x 500 x 52



INSTALLATION

Finish and clean the opening edges then cut the panels with a cutters and position them in the opening. The edges and the jointing lines, as well as the interstices among the cables, are sealed and covered with FIRE STOP SEAL FSS sealant..

For the application on plasterboard walls please contact Raytech.



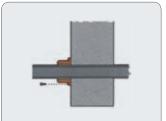
Fire Stop Collar

Fire stop transit collar for plastic pipes

Fire stop barrier transit collar for plastic pipes (minimum wall thickness 200mm). Available in a wide range of dimensions to surround pipes that pass through walls.

- Stainless steel outer band
- Contains intumescent putty seal inside

	Ø
Product	(mm)
FSC 11	from 50 to 110
FSC 12	from 110 to 160
FSC 13	200
FSC 14	250



INSTALLATION

No special care is required: the collar, when opened, is positioned around the cable duct, closed and fastened by means of inserts

For other dimensions and installation please contact Raytech.



Approval

Class El 120

Non toxic and asbestos free

In compliance with standard EN 1366-3

Fire Stop Tape

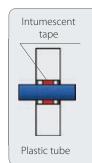
Fire stop barrier in an intumescent transit tape for plastic tubes

Preformed intumescent transit tape with high expansion properties for plastic pipes (PVC, PE, PP, etc). The heat from a fire causes the tape to expand and fill voids thereby preventing fire propagation.

Product	Range of diameters on the tube (mm)	Length (m)
FST 250/40/1000	da 40 a 250	1



The solution is 1m long, and it can be cut at the required length, saving the remaining parts for a future application.



INSTALLATION

They do not need particular care; the tape is applied around the plastic tube, according to the diameter, between the tube and the hole in the wall. It can be useful to seal the edges of the hole with FIRE STOP SEAL FSS sealant.



Approval

Class El 120

Non toxic and asbestos free

In compliance with standard EN 1366-3







Approval

Class El 120 Non toxic and asbestos free Does not emit toxis gases and dense fumes

In compliance with standard EN 1366-3

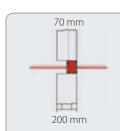
Fire Stop Seal

Fire stop barrier in intumescent sealing mastic

Intumescent mastic to seal and close small voids in walls, also in addition to other types of barriers. It is applied to seal a void or to provide a barrier in a cable duct.

- A polymer compound with fireproof fibres and intumescent in an aqueous solution
- Non-hygroscopic and thixotropic
- Can be applied with a spatula

Product	Package
FSS 310	0,3 kg cartridge
FSS 7,5	Spatula type, 7,5 kg drum



INSTALLATION

Once the edges of the opening have been finished and cleaned, the sealant putty is put in place with a spatula in the case of boxed product, or with a spatula or silicone gun for cartridge product.

For other dimensions or the application on plasterboard walls please contact Raytech.



Approval

Class EI 120 Non toxic and asbestos free Does not emit toxis gases and dense fumes

In compliance with standard EN 1366-3

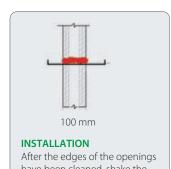
Fire Stop Foam

Fire stop barriers in expanding foam

Sealing and expanding, one-component foam for the sealing of small openings in walls with a thickness of at least 100 mm. The expanded volume of every can is about 20 lt.

- Made from a fire resistant polyurethane based foam
- Graphite fortified
- Hardens upon contact with air
- Suitable for the protection of plasterboard walls or slabs

Product	Packago
Product	Package
FSF 750	Spray can of 750 ml



After the edges of the openings have been cleaned, shake the can for at least 30 seconds, then turn upside down and spray the product.





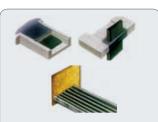
FSM

Fire stop barriers in incombustible plaster

Protective coating to seal and prevent fire propagation in wall cavities; it can be applied manually or sprayed. It can be easily mixed in big quantities with suitable mixer (e.g. concrete mixer).

- Made from mineral fibres
- Simply mix with water and with or without cement mixes
- Resistant to moisture once installed

Product	Package
FSM 20	20 kg bag



INSTALLATION

After the edges of the openings have been finished and cleaned, the incombustible plaster is mixed with water, than applied manually, with a trowel or a pump, and left to dry in air. Water quantity: about 0,85 lt/kg (volume 1 kg = about 2,5 dm³).

For other applications please contact Raytech.



Approval

Class El 180 Non toxic and asbestos free Does not emit toxis gases and dense fumes

In compliance with standard EN 1366-3

FSCP

Fire stop barriers for ceiling lights

Fireproof barriers for fluorescent lights in suspended ceilings. Maintains conditions of fire resistance of ceilings and suspended ceilings. Slightly reduces the temperature in the space between the ceiling and the ceiling panel.

- Made from non-toxic mineral fibres
- Prevents propagation
- · Flexible, light and self-supporting, easy to install and to remove

Product	Dimension (mm)	Weight (kg)
FSCP 600	720 x 750 x 150	1,7 about
FSCP 1200	1330 x 720 x 140	3,5 about



INSTALLATION

No special care is required. The protection must be placed on the ceiling light grid adhering to the



Approval

Class El 120 Non toxic and in compliance with standard EN 1365-2 • 1363-1













Approval

Class El 120 Non toxic It expands up to 5 times

In compliance with standard EN 1365-2 • 1363-1

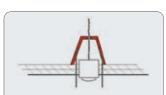
FSCF

Fire stop hoods for downlighters

Fireproof dome shaped hood for downlighters in suspended ceilings. Maintains conditions of fire resistance of ceilings and suspended ceilings. Prevents fire propagation and slightly reduces the temperature in the void between the ceiling and the suspended ceiling.

- Made from non-toxic mineral fibres
- Resistant to fire and expandable compounds
- Prevents lamp overheating
- Flexible, light and self-supporting
- Easy to install and to remove

	Dimension	
Product	(mm)	Type
FSCF 250	250 x 280	Cone-shaped
FSCF 350	350 x 230	Dome-shaped



INSTALLATION

No special care is required. The protection must be placed on the spotlight, adhering to the panel.

For other dimensions please contact Raytech.



Approval

Class El 120 Non toxic

In compliance with standard EN 1364-1

FSCI

Fire stop barrier to cover switchgear

Intumescent, fireproof barrier to cover switches and to maintain the fire resistance of walls. Compatible with standard enclosures. Reduces the temperature of cavities within plaster-board walls.

- Made with fireproof fibres and intumescent materials
- Protects from fire propagation

Product	Dimension (mm)
FSCI 150	150 x 150



FSCC

Fire stop barriers for covering enclosures

Fire protection system for electrical enclosures and junction boxes. These protect plasterboard wall compartments from heat and fire propagation.

- Made from calcium silicate
- Contains enclosure

Product	External dimension (mm)	Internal dimension (mm)
FSCC 150	150 x 120 x 75	110 x 80 x 55





Approval

Class El 120 Non toxic and asbestos free Does not emit toxis gases and dense fumes

In compliance with standard EN 1364-1

FSCOT110

Metal pipe insulating mat protective barrier

The FSCO T110 barrier is made up a flexible and easily conformable, highly fire resistant insulating mat. It is clad with an aluminium sheet and protects insulated or noninsulated metal piping in wall crossings. The product is cut and modelled with ease, wrapped in a single layer around the pipe, and then closed with aluminised tape. Protects metal piping crossing walls or slabs, preventing longitudinal transmission of heat and fusion of any insulating material.

- Composed of fibres free of any resins or organic binders
- For wall thicknesses of at least 125 mm

Product	Colour	Width	Thickness	Length
FSCO T110	Aluminium	1 m	20 mm	15 m





Approval

Class El 120 Non toxic and asbestos free

In compliance with standard EN 1366-1 • EN 1366-3 • EN 1366-5



SPECIALS



Galactic Line

KITS FOR THE CONNECTION, MAINTENANCE AND PROTECTION OF ELECTRICAL SYSTEMS



Galactic Mammut Security Straight joint pre-filled with gel



Galactic Protection Bicomponent rubber for printed circuit protection against animal intrusion



Galactic Animal Barrier Mouldable rubber paste to prevent animal intrusion

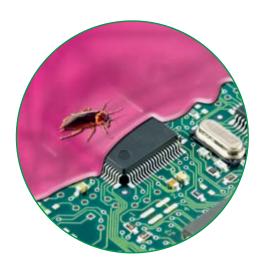


Galactic Water Stop Ready to use single component gel for generic use

Rubber Line









Low Voltage



Galactic **Rubber Connection** Connection kit with rubber insulation



Galactic Gel Connection Connection kit with gel insulation



Galactic Nano Joint Straight and derived single pole joint complete with pre-filled gel snap connector



Galactic Separator Spacer and connector kit



Galactic Cleaner Professional Extraordinary detergent for all types of use

Indispensable



Shiny Solar Solution for solar and photovoltaic panel maintenance





Galactic Mammut Security

Straight joint pre-filled with gel

Galactic Mammut Security is an extremely compact accessory that is suitable for resolving insulation and sealing problems. Make reliable strip connector connections using the components found within the kit. Supplied with connectors for up to 3 core 4mm cables. Suitable for all types of domestic and industrial uses. Make safe temporary or uninsulated connections already in place. For quick repairs of damaged cable and extension cords. Suitable for outdoor use, in panels, within the kitchen etc. Non-toxic, no shelf life, easily re-enterable. Once closed the internal connectors are immediately protected. Galactic Mammut is essential in any area where water is present.

- No more tangled wires or uncovered connectors!
- A safe, reliable and quick solution



Product

Galactic Mammut Security

Cable formation

Cables 3 x 1 to 4 mm² 3 insulated conductors with ground from 1 to 4 mm²

Dimension $A \times B \times C (mm)$

61 x 35 x 28

Package: 3-piece blister pack

Electrical Performance: CEI EN 50393 • CEI 20-33 Class 2 in accordance with CEI 64-8 (with testing under water head and water









BEFORE







AFTER









Galactic Protection

Bicomponent rubber for printed circuit protection including against animal intrusion

Protection for printed circuits which are especially exposed to dust, animal intrusion (insects, snails, snakes, etc., e.g. in automatic gate trays). Opaque but slightly translucent allows cover forming a protective film. It can be removed (adheres without sticking) even on a small area to access the underlying component. The replaced component is then covered with new filler material which adheres perfectly to the previous material. Composed of non-toxic, safe bicomponent rubber with no shelf life and insulating and resistant to UV rays and ageing.

		Rubber	Total quantity
Product	Description	colour	(ml)
Galactic Protection	bicompenent rubber	•	300

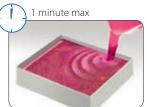
Installation sequence

















Kit composition: 2 vials bicomponent product



GALACTIC LINE





Kit composition: 2 cans (bicomponent)

Galactic Animal Barrier

Mouldable bicomponent rubber paste to prevent animal intrusion

Galactic Animal Barrier is a non-toxic bicomponent paste with no shelf life that can be easily be moulded before cross linking is complete. It can be applied to entries to protect against intrusion (conduits, cable ducts and pipes etc). It cross links quickly to form an effective barrier against small insects however it is easily removable. Ideal for electric gate type installations.

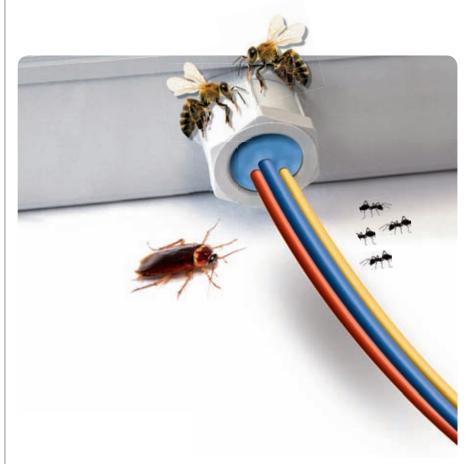
Product	Description	Rubbe colour	Total quantity (g)
Galactic Animal Barrier	bicompenent rubber	•	250

Installation sequence









Galactic Water Stop

Ready to use single component gel

The Galactic Water Stop single component gel is a soft, extremely sticky product supplied in convenient, ready to use packages: just tear open the quantity needed and place it at the entry point to protect from infiltration. Thanks to its stickiness, it provides stable and effective sealing over time. Easily removable and re-enterable, allowing repeated access to the protected component without leaving traces. Non-drip so it can also be installed vertically or on the ceiling. Highly sealant, lends itself to the insulation of small connections, or for the protection of particularly exposed connections (connections to external car battery terminals, etc.). This product can be applied wherever there may be leakages from pipes, corrugated pipes, channels, etc., or where there is a need for rapid and efficient insulation.

		Gel	Package
Product	Description	colour	(g)
Galactic Water Stop	single component gel	transparent	2 x 100

Application example



Corrugated pipe entry protection















Kit composition: 2 cans, 100 g each

GALACTIC LINE



Galactic Rubber connection 6

- 1 wrap-around separator (red) for connections up to 5 conductors
- 5 x 6 mm² screw connectors
- 2 bottles bicomponent rubber

Galactic Rubber

connection 16

- 1 wrap-around separator (grey) for connections up to 5 conductors
- 5 x 16 mm² screw connectors
- 2 bottles bicomponent rubber

Galactic Rubber Connection

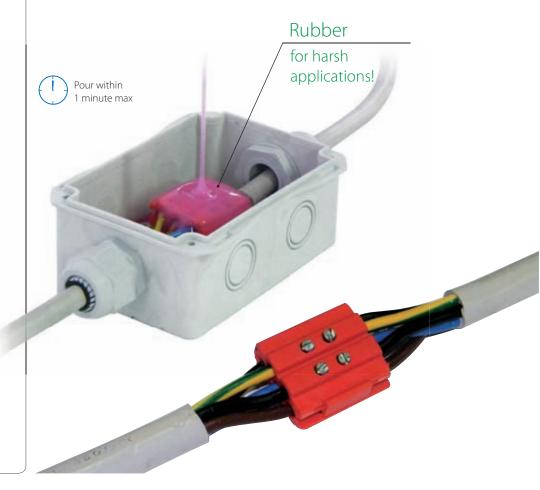
Connection kit with rubber insulation

Galactic Rubber connection is an accessory for straight through 5 core insulated jointing connections with a bicomponent rubber sealant suitable for filling any type of enclosure. The kit consists of 5 screw connectors, an innovative wrap around insulator for cable separation and a bicomponent rubber compound for increased mechanical resistance. The rubber compound is non-toxic, inert, has no shelf life and quickly cross links with no exothermic reaction.

Product	Maximum conductor cross section (n° x mm²)	Rubber colour	Total quantity (ml)
Galactic Rubber connection 6	5 x 1 a 6	•	300
Galactic Rubber connection 16	5 x 2,5 a 16	•	300

Installation sequence







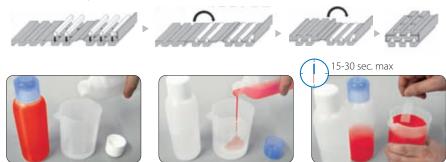
Galactic Gel Connection

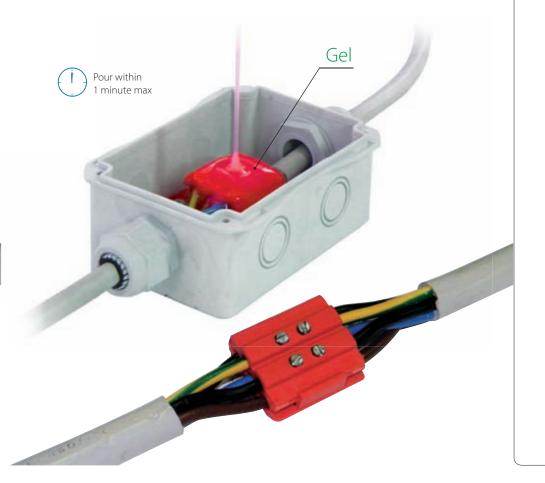
Connection kit with gel insulation

Galactic Gel connection is an accessory for straight through 5 core insulated jointing connections with a bicomponent gel sealant suitable for filling any type of enclosure. The kit consists of 5 screw connectors, an innovative wrap around insulator for cable separation and a bicomponent gel compound. The gel compound is non-toxic, inert, has no shelf life and quickly cross links with no exothermic reaction.

Product	Maximum conductor cross section (n° x mm²)	Gel colour	Total quantity (ml)
Galactic Gel connection 6	5 x 1 a 6	•	300
Galactic Gel connection 16	5 x 2,5 a 16	•	300

Installation sequence







Galactic Gel connection 6

- 1 wrap-around separator (red) for connections up to 5 conductors
- 5 x 6 mm² screw connectors
- 2 bottles bicomponent gel

Galactic Gel connection 16

- 1 wrap-around separator (grey) for connections up to 5 conductors
- 5 x 16 mm² screw connectors
- 2 bottles bicomponent gel





Galactic Nano Joint

Pre-filled straight and branch single pole joint complete with lever arm connector

Single core gel joint for straight and branch connection for insulated cables and conductors up to 4 mm², complete with snap connector: simply strip the conductor and close the casing.

- Safe, quick, non-toxic, re-enterable
- For submersible use
- Connector with voltage detection window
- Connections without crimping or screws



Product	Cable formation (n° x mm²)	Dimension A x B x C (mm)
Galactic Nano Joint 4	1 x 0,08 - 4	61 x 35 x 28

Kit composition:

3 complete Galactic NanoJoint

Electrical Performance:

CEI EN 50393 e CEI 20-33 In Class 2 according to standard CEI 64-8 (with testing under water head and water between the cable cores)























LV

GALACTIC LINE

Galactic Separator

Spacer and connector kit

Kit includes 5 pole separators, 5 screw connectors and a roll of insulation tape. Once installed the connectors are separated by the wrap around casing. They can then be used in any enclosure which can be filled with Magic Gel, Ray Gel, Magic Rubber or Ray RTV.

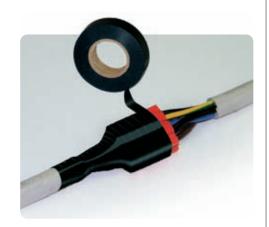
Product	Maximum conductor cross section (n° x mm²)
Galactic Separator 6	5 x 1 a 6
Galactic Separator 16	5 x 2,5 a 16

















Galactic Separator 6:

• 6 wrap-around separators (red) for connections up to 5 conductors

- 30 x 6 mm² screw connectors
- 1 Rayteam tape

Galactic Separator 16:

- · 3 wrap-around separators (grey) for connections up to 5 conductors
- 15 x 16 mm² screw connectors
- 1 Rayteam tape

Galactic Cleaner

Extraordinary detergent for all types of use

Non-toxic, eco-friendly, extremely effective, able to remove grease, encrustations and smog without damaging the surfaces on which it is applied. Wipe glass with a dry cloth. Do not apply to painted sheet metal.

- For many applications, cleans, de-greases, protects
- With excellent results even in impossible conditions

Product	Description	Quantity (ml)
Galactic Cleaner	Spray bottle	750











Mode of use:

spray the product, leave a few minutes, rinse or remove with a cloth.



Ray RTV

Density: about 1.24 gr/cm³ (black) 1.05 gr/cm³ (pink)
Cross linking: (pot life) at + 30°C: <8 minutes
Viscosity: 4000-6000 max MPas
Elongation at break: 350 %
Tensile strength: 2,8 MPa
Operating temperature: -60°C / +200°C
Overload temperature: +250°C
Thermal conductivity: 0,2 W/m°K
Dielectric strength: >21 kV/mm
Volume resistivity: >1,5 x 10 exp 15 Ω cm

Fast cross linking bicomponent silicone rubber with high mechanical, thermal and elastic characteristics

Ray-RTV cross links quickly at room temperature, transforming into a rubber with high mechanical, thermal and elastic characteristics. Available in single dose bags, bottles, tanks and boxes, in standard 30 Shore A hardness for black and 15 Shore A for pink. Fast cross linking (less than 8 minutes at 30°C) and easily re-enterable

- Highly resistant, non-stick, insulating and sealing
- Non-toxic and no shelf life



RUBBER LINE

Installation sequence











Applications Examples







Pit sealing



Rubber mats



Profile reliefs



Extruded profiles



Rubber gaskets



Anti-corrosion protection



Moulds for making models and for industry

Product	Colour	Weight	Shore A hardness	Package type
Bag-RTV 200-N	•	200 g	30	
Bag-RTV 350-N	•	350 g	30	Single dose bag
Bag-RTV 200-R	•	200 g	15	
Bag-RTV 350-R	•	350 g	15	
Ray-RTV 1000-N	•	1000 g	30	Cans
Ray-RTV 1000-R	•	1000 g	15	
Ray-RTV 10K-N	•	10 kg	30	
Ray-RTV 20K-N	•	20 kg	30	Boxes
Ray-RTV 400K-N	•	400 kg	30	
Ray-RTV 10K-R	•	10 kg	15	
Ray-RTV 20K-R	•	20 kg	15	
Ray-RTV 400K-R	•	400 kg	15	

Other colours, hardness and cross linking times (pot life) are available upon request for tanks of 400 Kg. Ray-RTV is available in bags up to 600 g.



RUBBER LINE



Kit composition

1 mould for elastic washers, insulating gaskets and rubber profiles 2 bottles of two-component liquid rubber

Advantages

Use directly on site, usable in all weather conditions, easy installation, easy separation from the moulds

Note: max thickness: 3 mm



Side A



Side B



Gasket Kit

Kit to produce rubber gaskets and profiles

Kit for the assembly of elastic washers, insulating gaskets and rubber profiles, UV resistant and anti-aging, with working temperature up to 200°C and 30 Shore A hardness, suitable for any electrical, plumbing, or sealing work. The articles produced are suitable for the sealing of outdoor lamps, for the sealing and insulation of screwed and bolted components, for any maintenance, replacement or shimming work. Easy to use, the liquid component is poured and the pieces are ready in minutes, at room temperature and with no exothermic reaction. Easily removed from the mould. Rapid cross-linking at room temperature (<15 min). Elevated dielectric, mechanical, elastic and thermal properties.

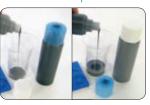
- Non toxic and safe, no shelf life, re-enterable
- Low emission of smoke and toxic and corrosive gases
- Flexible and elastic over time

Product	Description	Rubber colour	Package (g)
Gasket Kit	Mould + Bicomponent liquid rubber	•	360

FLAT G	ASKETS	RODS	PROFILES
Ø External (mm)	Ø Internal (mm)	Ø (mm)	L x L (mm)
30	22	30	130 x 6
25,5	17	25	130 x 5
24	18	20	130 x 4
22	16,5	15	130 x 3
21	15	10	130 x 2
18	12		
14	8		
11	6		
10	7		
0	4		

GASKETS	FOR TAPS	ANTISLIP	CORRUGATED
Ø External (mm)	Ø Internal (mm)	L x L (mm)	L x L Ø - hole (mm)
22	4,5	30 x 30	30 x 30 - Ø hole 4,5
15,8	4,5	25 x 25	
14	4,5	20 x 20	
		15 x 15	
		10 x 10	

Installation sequence



Pour the 2 components in a 1:1 ratio in a beaker and mix.



Pour the product into the desired mould (30 sec max).



Remove the object from the mould.

INDISPENSABLE

Shiny Solar

Solution for solar and photovoltaic panel maintenance

Shiny Solar is a non-toxic, safe product for photovoltaic and solar module maintenance, for easy removal of grease, limestone and crystallised deposits, dust, smog, excrement, etc. A photovoltaic panel can reduce generated power by up to 15% for non-polluted areas and 25% for highly polluted areas, Regular use of Solar Shiny keeps systems running efficiently. Extremely effective and easy to apply, with no shelf life. To maintain system efficiency, proceed with 2-3 applications/year for medium-polluted areas. The degreasing and anti-static protection contained in the product allows excellent results even with rinsing with hard water (even higher than 30°f). Rapid application: treatment of a 6 kW system (approximately 50 m²), thanks to the fact that degreasing, cleaning and application of the anti-static protection are all part of one single operation, requires less than 20 minutes. Shiny Solar respects panel components, the aluminium frame, gaskets and protective glass. A single package of Shiny Solar can treat installed photovoltaic panel power from 10 to 15 kW, equal to a surface of about 80-120 m². The order data table shows the power and surfaces which can be treated with different packages.

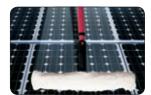
- For easy removal of grease, limestone and crystallised deposits, dust, smog, excrement, etc.
- Contains anti-static protection

	Product	Efficiency (kW/ surface	es treated per package)
Product	contents	Power in kW	Surfaces (m²)
Shiny Solar	750 ml	10 - 15	80 - 120
Shiny Solar 5	5 lt	70 - 100	530 - 800
Shiny Solar 1000	1000 lt	14.000 - 20.000	106.000 - 160.000
Shiny Brush SB4	brush microfiber		

Application example



Spray the product evenly on the solar or photovoltaic panel or on the surface to be cleaned and protected.



Let stand for a few minutes. depending on the level of dirt to be cleaned, then wipe with a soft, non-abrasive, slightly damp pad or sponge.



Rinse with water or remove product with a paper towel. Repeat for especially dirty surfaces.





The 750 ml and 5 lt kits are supplied together with a professional sprayer, with an adjustable spray jet nozzle with a range in the latter case of up to 3 m.

For proper application of the product even in hard to reach areas, a microfiber brush mounted on a telescopic arm which projects up to 4 m is available



Shiny Brush





INDISPENSABLE



Self extinguishing according to UL94

Halogen free Excellent resistance to basis, oils, fats, hydrocarbons, chemicals, chlorinated solvents

Operating temperature: -40°C/ +85°C







Cable ties

Tilted tip for easy insertion into clamping head. Rounded corners for greater safety. Quick sliding thanks to a low material friction coefficient. Good UV resistance thanks to it's black colour.

Essential for:

- Electrical installations
- Industrial applications
- Panels
- Special applications

Colour White	Colour Black	l Width	Length	l Applid	iameter	Stren	iath
Product	Product	(mm)	(mm)	min	max	(Kg)	(n)
Ray-fasc B 22/75	Ray-fasc N 22/75	2,2	75	0.75	15	6.12	60
Ray-fasc B 25/98	Ray-fasc N 25/98	2,5	98	1	21	8.16	80
Ray-fasc B 25/135	Ray-fasc N 25/135	2,5	135	1	32	8.16	80
Ray-fasc B 26/160	Ray-fasc N 26/160	2,6	160	1	40	8.16	80
Ray-fasc B 26/200	Ray-fasc N 26/200	2,6	200	2	52	8.16	80
Ray-fasc B 36/140	Ray-fasc N 36/140	3,6	140	2	35	13.26	130
Ray-fasc B 36/200	Ray-fasc N 36/200	3,6	200	2	50	13.26	130
Ray-fasc B 36/290	Ray-fasc N 36/290	3,6	290	2	80	13.26	130
Ray-fasc B 36/370	Ray-fasc N 36/370	3,6	370	2	103	13.26	130
Ray-fasc B 48/178	Ray-fasc N 48/178	4,8	178	2	45	22.44	220
Ray-fasc B 48/200	Ray-fasc N 48/200	4,8	200	3	50	22.44	220
Ray-fasc B 48/250	Ray-fasc N 48/250	4,8	250	3	68	22.44	220
Ray-fasc B 48/290	Ray-fasc N 48/290	4,8	290	3.5	79	22.44	220
Ray-fasc B 48/360	Ray-fasc N 48/360	4,8	360	3.5	103	22.44	220
Ray-fasc B 48/390	Ray-fasc N 48/390	4,8	390	3.5	106	22.44	220
Ray-fasc B 48/430	Ray-fasc N 48/430	4,8	430	3.5	115	22.44	220
Ray-fasc B 78/180	Ray-fasc N 78/180	7,8	180	3.5	45	55.08	540
Ray-fasc B 78/240	Ray-fasc N 78/240	7,8	240	3.5	63	55.08	540
Ray-fasc B 78/300	Ray-fasc N 78/300	7,8	300	4	80	55.08	540
Ray-fasc B 78/365	Ray-fasc N 78/365	7,8	365	8	100	55.08	540
Ray-fasc B 78/450	Ray-fasc N 78/450	7,8	450	35	130	55.08	540
Ray-fasc B 78/540	Ray-fasc N 78/540	7,8	540	35	158	55.08	540
Ray-fasc B 78/750	Ray-fasc N 78/750	7,8	750	35	220	55.08	540

100-piece pack

Cable tie support

Fastening with standard inserts for cable ties with widths up to 9 mm. UV resistant.

	Dimension (mm)				
Product	А	В	C	D	
Ray-fasc S	22	75	0,75	15	

100-piece pack

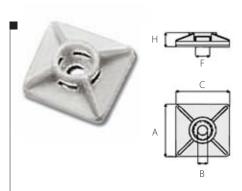


Bi-Directional adhesive fixing device

Self adhesive, can be used on all materials. Suitable for cable ties up to 4.8 mm. Made from ABS with rubber based adhesive foam. UV resistant.

Colour White	Colour Black	Tie width	Dimension (mm)				
Product	Product	(mm)	Α	В	C	F	Н
Ray-fasc BBA36	Ray-fasc NBA36	3,6	19	19	4,1	4	5
Ray-fasc BBA48	Ray-fasc NBA48	4,8	4,8	27	4,8	6	6,5

100-piece pack

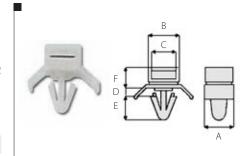


Bayonet-Joint support

Push fit support for cable ties up to 7.8mm. Can be used on sheet surfaces with up to 3.2 mm thick. 6.2mm O/D hole required. Polyamide 6.6.

		Dimension (mm)					
Product	Α	(mm)					
Ray-fasc SI	10	10,6	8,1	3,2	8	7,1	6,2

100-piece pack











Medium Voltage







COLD-SHRINK



Terminations

COLD-SHRINK FOR INDOOR AND OUTDOOR USE

page 150



Terminations for **indoor use**

For extruded cables up to 2/20 kV (Um 24 kV)



Terminations for **outdoor use**

For extruded cables up to 12/20 kV (Um 24 kV)



Terminations for indoor/outdoor use

For extruded cables up to 18/30 kV (Um 36 kV)

Joints







Electrical performance: CEI 20-24 • CEI 20-62/1 • HD 629-1

Ranges of application: For single core cables type



Extruded wire



Extruded tube AL

For voltages from 6/10 kV (Umax 12 kV) to 12/20 kV (Umax 24 kV)

Cold-shrink terminations for **indoor use**

Silicone rubber terminations with electric field control. For extruded cables up to 12/20 kV (Um 24 kV)

Cold-shrink technology is based on pre-dilated insulating sheaths on a removable spiral support, which is removed without tools during installation to allow for complete covering of the cable insulation. The Raytech silicone sheath, supplied pre-expanded, is flame retardant, is highly anti-tracking, has very high elastic characteristics, is able to maintain pressure on the cable during operation, is water-repellent and is extremely sturdy. Raytech terminations are suitable for indoor, very compact applications, with a smooth structure and complete with all components. Each kit contains 3 single core indoor terminations. The components are cold-installed without tools, unwinding the pigtail wire.

- Rapid installation for lower labour costs
- Highly reliable and safe for operators
- Installing without heating and without tools

For cables (A)RG7H1R insulation thickness FULL	Nominal voltage Umax	Ø on insulation	Ø on external sheath	Conductor cross section	Length without cable lug
Product	(kV)	(mm)	(mm)	(mm²)	(mm)
AUTO 10 / 120-I		15,3 - 20,2	24,6 - 29,6	50 - 120	320
AUTO 10 / 240-I	12	18,7 - 25,6	28,0 - 35,8	95 - 240	320
AUTO 10 / 630-I		28,2 - 37,8	38,5 - 49,4	300 - 630	320
AUTO 15 / 70-I		16,3 - 19,2	25,6 - 28,7	35 - 70	320
AUTO 15 / 240-I	17,5	19,2 - 27,8	28,7 - 38,1	70 - 240	320
AUTO 15 / 630-I		27,8 - 40,0	38,1 - 52,1	240 - 630	320
AUTO 20 / 50-I		17,3 - 19,5	27,8 - 29,0	25 - 50	320
AUTO 20 / 185-I	24	19,5 - 27,4	29,0 - 37,8	50 - 185	320
AUTO 20 / 630-I		29,8 - 42,0	40,2 - 54,2	240 - 630	320

For cables RG7H1M1 insulation thickness LOW Product	Nominal voltage Umax (kV)	Ø on insulation (mm)	Ø on external sheath (mm)	Conductor cross section (mm²)	Length without cable lug (mm)
AUTO 20 / 50-I		17,0 - 19,0	23,3 - 25,3	25 - 70	320
AUTO 20 / 185-I	24	21,0 - 28,0	26,7 - 34,5	95 - 240	320
AUTO 20 / 630-I		28,0 - 41,0	34,6 - 48,3	240 - 630	320



Cold-shrink terminations for **outdoor use**

Silicone rubber outdoor terminations with electric field control and bell-shaped insulators. For extruded cables up to 12/20 kV (Um 24 kV)

The Raytech silicone sheath, supplied pre-expanded, is flame retardant, is highly anti-tracking, has very high elastic characteristics, is able to maintain pressure on the cable during operation, is water-repellent and is extremely sturdy. With pre-dilated silicone fins on a spiral support for modular installation of the outdoor accessory for upside-down installation. Raytech terminations are suitable for external, very compact applications, complete with all components. Each kit contains 3 single core outdoor terminations. The components are cold-installed without tools, unwinding the pigtail wire.

- Rapid installation for lower labour costs
- Highly reliable and safe for operators
- Installing without heating and without tools

For cables (A)RG7H1R insulation thickness FULL	Nominal voltage Umax	Ø on insulation	Ø on external sheath	Conductor cross section	Length without cable lug
Product	(kV)	(mm)	(mm)	(mm²)	(mm)
AUTO 10 / 120-E		15,3 - 20,2	24,6 - 29,6	50 - 120	410
AUTO 10 / 240-E	12	18,7 - 25,6	28,0 - 35,8	95 - 240	410
AUTO 10 / 300-E	12	23,3 - 28,3	33,4 - 38,5	185 - 300	410
AUTO 10 / 630-E		31,0 - 37,8	40,9 - 49,4	400 - 630	420
AUTO 15 / 70-E		16,3 - 19,2	25,6 - 28,7	35 - 70	410
AUTO 15 / 240-E	17,5	19,2 - 27,8	28,7 - 38,1	70 - 240	410
AUTO 15 / 300-E	(7,5	23,7 - 30,4	33,9 - 40,8	150 - 300	410
AUTO 15 / 630-E		30,4 - 40,0	40,2 - 52,1	300 - 630	420
AUTO 20 / 50-E		17,3 - 19,5	27,8 - 29,0	25 - 50	410
AUTO 20 / 185-E	24	19,5 - 27,4	29,0 - 37,8	50 - 185	410
AUTO 20 / 240-E	24	24,4 - 29,8	34,6 - 40,2	120 - 240	410
AUTO 20 / 630-E		32,4 - 42,0	42,9 - 54,2	300 - 630	420

For cables RG7H1M1 insulation thickness LOW	Nominal voltage Umax	Ø on insulation	Ø on external sheath	Conductor cross section	Length without cable lug
Product	(kV)	(mm)	(mm)	(mm²)	(mm)
AUTO 20 / 50-E		17,0 - 19,0	23,3 - 25,3	25 - 70	410
AUTO 20 / 185-E	24	21,0 - 28,0	26,7 - 34,5	95 - 240	410
AUTO 20 / 240-E	24	23,7 - 30,4	33,9 - 40,8	150 - 300	410
AUTO 20 / 630-E		33,0 - 41,0	40,3 - 48,3	400 - 630	420





Electrical performance: CEI 20-24 • CEI 20-62/1 • HD 629-1

Ranges of application: For single core cables type



Extruded wire



Extruded tube AL

For voltages from 6/10 kV (Umax 12 kV) to 12/20 kV (Umax 24 kV)







Electrical performance: CEI 20-24 • CEI 20-62/1 • HD 629-1

Ranges of application: For single core cables type



Extruded wire



Extruded tube AL

For voltages up to 18/30 kV (Umax 36 kV)

Cold-shrink terminations for **indoor/outdoor use**

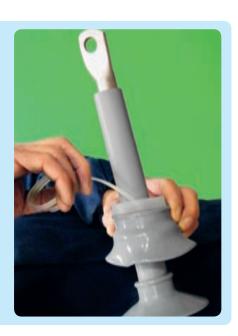
Silicone rubber terminations with electric field control. For extruded cables up to 18/30 kV (Um 36 kV)

The Raytech silicone sheath, supplied pre-expanded, is flame retardant, is highly anti-tracking, has very high elastic characteristics, is able to maintain pressure on the cable during operation, is water-repellent and is extremely sturdy. With pre-dilated silicone fins on a spiral support for modular installation of the accessory, for upside-down installation. Suitable for outdoor and indoor, very compact applications, complete with all components. Each kit contains 3 single core indoor terminations. The components are cold-installed without tools, unwinding the pigtail wire.

- Rapid installation for lower labour costs
- Highly reliable and safe for operators
- Installing without heating and without tools

INSTALLATION TIPS:

- Follow the dimensions stated in the installation instructions.
- Be careful not to cut through the insulation on the primary cable when removing the semi-conductive.
- The semiconductor cable must not have spikes or irregular profiles in the cutting zone.
- Carefully clean cable insulation.
- Install the correct cable terminal.

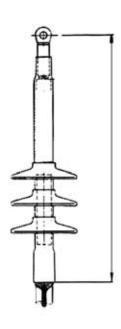




FOR INDOOR USE

For cables (A)RG7H1R insulation thickness FULL	Nominal voltage Umax	Ø on insulation	Ø on external sheath	Conductor cross section	Terminal length with cable lug
Product	(kV)	(mm)	(mm)	(mm²)	(mm)
AUTO 30/95-I		22,3 - 27,9	33,5 - 38,5	25 - 95	410
AUTO 30/120-I	36	23,3 - 29,4	34,6 - 39,8	35 - 120	410
AUTO 30/400-I		30,7 - 40,3	41,2 - 51,3	150 - 400	410

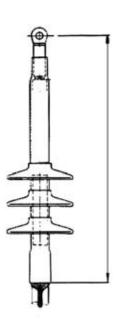
For cables RG7H1M1 insulation thickness LOW	Nominal voltage Umax	Ø on insulation	Ø on external sheath	Conductor cross section	Terminal length with cable lug	
Product	(kV)	(mm)	(mm)	(mm²)	(mm)	
AUTO 30/95-I		25,0 - 27,0	31,2 - 33,4	50 - 120	410	
AUTO 30/120-I	36	26,0 - 29,0	32,5 - 35,8	95 - 185	410	
AUTO 30/400-I		31,0 - 40,0	38,4 - 47,9	240 - 500	420	



FOR OUTDOOR USE

For cables (A)RG7H1R insulation thickness FULL	Nominal voltage Umax	Ø on insulation	Ø on external sheath	Conductor cross section	Terminal length with cable lug
Product	(kV)	(mm)	(mm)	(mm²)	(mm)
AUTO 30/95-E		22,3 - 27,9	33,5 - 38,5	25 - 95	680
AUTO 30/120-E	36	23,3 - 29,4	34,6 - 39,8	35 - 120	680
AUTO 30/400-E		30,7 - 40,3	41,2 - 51,3	150 - 400	680

For cables RG7H1M1 insulation thickness LOW	Nominal voltage Umax (kV)	Ø on insulation (mm)	Ø on external sheath (mm)	Conductor cross section (mm²)	Terminal length with cable lug (mm)
AUTO 30/95-E		25,0 - 27,0	31,2 - 33,4	50 - 120	680
AUTO 30/120-E	36	26,0 - 29,0	32,5 - 35,8	95 - 185	680
AUTO 30/400-E		31,0 - 40,0	38,4 - 47,9	240 - 500	680







Electrical performance:

CEI 20-24 • CEI 20-62/1 • HD 629-1

Ranges of application

For single core cables type



Extruded wire



Extruded tapes

For voltages from 6/10 kV (Umax 12 kV) to 12/20 kV (Umax 24 kV)



Junction kit composition:

Pre-expanded, co-extruded sheath on a spiral support, which includes the internal electric field control layer, the intermediate insulation layer and the external semi-conductive layer to fully restore the cable components

Components for shield continuity

External pre-expanded sheath on a spiral support covering the accessory, with very fast installation without the use of any tools

Single core cold-shrink joints

Joints for extruded cables up to 12/20 kV (Um 24 kV)

Suitable for outdoor, underground and even underwater applications. Very compact and complete with all components. Each kit contains 1 single core joint. Each joint component is pre-dilated on a spiral support and is extremely easy to remove for fast, safe installation without the use of any tools or heating.

For cables (A)RG7H1R insulation thickness FULL	Nominal voltage	Ø on insulation	Ø on external sheath	Conductor cross section	Length
Product	Umax (kV)	(mm)	(mm)	(mm²)	(mm)
JAUTO 20 / 50-1	12	17,0 - 18,7	26,4 - 28,0	70 - 95	600
JAUTO 20 / 240-1	12	20,2 - 28,2	29,6 - 38,5	120 - 300	700
JAUTO 20 / 50-1	17 5	17,5 - 19,2	26,9 - 28,7	50 - 70	600
JAUTO 20 / 240-1	17,5	20,9 - 30,4	30,3 - 40,8	95 - 300	700
JAUTO 20 / 50-1	24	17,3 - 19,5	27,8 - 29,0	25 - 50	600
JAUTO 20 / 240-1	24	21,2 - 29,8	31,0 - 40,2	70 - 240	700

For cables RG7H1M1 insulation thickness LOW	Nominal voltage	Ø on insulation	Ø on external sheath	Conductor cross section	Length
Product	Umax (kV)	(mm)	(mm)	(mm²)	(mm)
JAUTO 20 / 50-1	24	17,0 - 19,0	23,3 - 25,3	25 - 70	600
JAUTO 20 / 240-1	24	21,0 - 28,0	26,7 - 34,6	95 - 240	700

Installation sequence























Medium voltage testing details for terminals and joints up to 36 kV

TEST	TEST METHOD (VOLTAGES IN kV)	MA	MAXIMUM VOLTAGE PER CABLE UM (kV)			RESULTS	
	(10211022111111)	7,2	12	17,5	24	36	
	a) 1 min. (dry)	27	35	45	55	75	
INDUSTRIAL FREQUENCY AC	b) 1 min. (in the rain)	27	35	45	55	75	Neither perforations nor discharges
	c) 4 h.	14	24	36	48	73	
	PE, XLPE, EPR, PVC	4,5	7,5	10,9	15	22,5	< 3 pC
PARTIAL DISCHARGES	(voltages in kV)	7,2	12	17,5	24	-	< 20 pC
IMPULSE	a) 10 positive 10 negative 1,2/50 μ s (voltages in kV)	60	75	95	125	170	Neither perforations
IMPOLSE	b) 10 positive 10 negative 1,2/50 μ s (voltages in kV)	70	95	110	150	200	nor discharges
	a) 63 cycles of 5 h. of heating, 3 h. of air cooling	-	-	-	-	-	
THERMAL CYCLES WITH APPLIED VOLTAGE	b) 63 cycles of 5 h. of heating, 3 h. of water cooling (1m of water head)	-	-	-	-	-	
	Extruded cable and non-migrant mixture paper cable	9	15	22	30	45	Neither perforations
	Migrant mixture paper cable	6,5	11	15	22	32	nor discharges
THERMAL	a) short-circuit of 1s f/f at maximum temperature specified for the cable	-	-	-	-	-	Na vicible damage
SHORT-CIRCUIT TEST	b) short-circuit of 1s f/t at maximum temperature specified for the cable	-	-	-	-	-	- No visible damage
DIRECT CURRENT	30 min	28	48	72	96	144	Neither perforations nor discharges
MOISTURE TEST WITH	a) 100 h. in saturated air	4,5	7,5	10,9	15	22,5	Neither perforations nor discharges, nor
APPLIED VOLTAGE	b) 1000 h. in saturated air	4,5	7,5	10,9	15	22,5	visible carbonisation nor erosion
DYNAMIC	63 kA - Standard	-	-	-	-	-	No visible
SHORT-CIRCUIT TEST	125 kA - High Current	-	-	-	-	-	damage
IMPACT	Fall from a height of 2 m at a weight of 4 kg, 6 times (only reinforced joints)	-	-	-	-	-	
SALT SPRAY WITH APPLIED VOLTAGE	1h of sealing salinity 224 kg/m³ (voltages in kV)	4,5	7,5	10,9	15	22,5	No discharge

TESTING SEQUENCE

Indoor terminations 1a,2,3a, 4a,2,5, 4a, 1c, 3a,6,7a, 8

Outdoor terminations 1b, 2, 3b, 4a,2, 5,4a, 2, 1c,3b, 6,7b, 8, 10

Joints 9, 1a,2,3b,4a,2,5, 4b,2,5, 4b,2,1c,3b, 6,8



HEAT-SHRINK

Terminations

HEAT-SHRINK FOR INDOOR AND OUTDOOR USE

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Single core terminations for **indoor use**For extruded cables

up to 36 kV

Single core terminations for **outdoor use**

For extruded cables up to 36 kV



Three-core terminations for **indoor/outdoor use**

For extruded cables up to 36 kV



enel certified terminations

Joints

HEAT-SHRINK

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Single core joints

Three-core joints

Transition joints

ENEL **certified** joints





Three-core extruded cable (A) RG7H10R



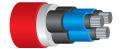
Three-core paper cable (A) RC1HLOR(X)



Single core extruded cable (A) RG7H1R(X)



Single core paper cable (A) RC1HLR(X)











Heat-shrink terminations

Indoor and outdoor use terminations for single core, three-core armoured and non armoured cables

Heat-shrink terminations are immediately energizable, fast to package and reliable. High shrinkage ratios serve to broaden the ranges of application and reduce the number of kits to be put into stock.

The first problem to solve with medium voltage accessories is avoiding the concentration of voltage on the shield cutting line. The use of polymers charged with metal oxides with in non-linear characteristics has allowed for optimal distribution of the electrical field without enlarging the terminal. The field control element can be a sheath to be applied directly on the cable head or an extruded layer made with external covering sheath.

Extremely simple

WITHOUT FIELD CONTROL

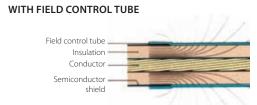
- Do not require special labour
- Can be installed in all conditions
- No shelf life

Insulation

Conductor

shield

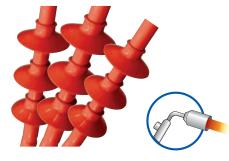
Semiconductor





Accessory	Abbrev	iation to add to the pr	oduct code	Example	
Grounding braid for aluminium tube shields	/H5			THVE 20/A-RC/H5	
Grounding braid with roll spring (only for single core)	/24 /25 /26 /27	For cables (mm²) up to 25 from 35 to 95 from 120 to 300 from 400 to 630	Ø on the shield (mm) 12 - 20 17 - 28 25 - 40 36 - 60	THVE 20/A-RC/24 THVE 20/B-RC/25 THVE 20/C-RC/26 THVE 20/C-RC/27	
Copper cable terminal	-C	+ Conductor cross s	ection	THVE 20/A-RC-C50	
Aluminium cable terminal	-CA	+ Conductor cross s	ection	THVE 20/A-RC-CA50	
Predetermined breakaway cable	-CPR	+ Conductor cross s	ection	THVE 20/A-RC-CPR50	
Multiple choice	With ca	ble lug and grounding	g accessory,	THVE 20/A-RC/24-C50	

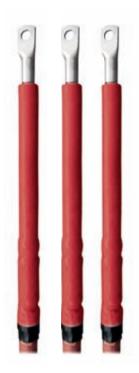












Electrical performance: CEI 20-24 • CEI 20-62/1

Kit composition:

Three single core terminations



Single core cable extruded wires



Single core cable extruded tapes

Heat-shrink terminations for **indoor use**

Terminations for **SINGLE CORE** extruded cables up to $36\ kV$

FOR NON ARMOURED CABLES

For cables (A)RG7H1R insulation thickness FULL Product	Voltage Umax (kV)	Conductor cross section (mm²)	Length without cable lug (mm)
THVE 6/A-RC	(KV)	25 - 120	210
THVE 6/B-RC	7,2	150 - 400	210
THVE 6/C-RC		500 - 630	210
THVE 15/A-RC		25 - 95	320
THVE 15/B-RC	12	120 - 300	320
THVE 15/C-RC		400 - 630	320
THVE 15/A-RC		25 - 50	320
THVE 15/B-RC	17,5	70 - 300	320
THVE 15/C-RC		400 - 800	320
THVE 20/A-RC		25 - 50	320
THVE 20/B-RC	24	70 - 240	320
THVE 20/C-RC		240 - 630	320
THVE 30/A-RC		35 - 95	430
THVE 30/B-RC	36	120 - 185	430
THVE 30/C-RC		240 - 500	430

For shielded aluminium tube cables, add terminal abbreviation ${\bf H5}$

For cables RG7H1M1Afumex insulation thickness LOW	Voltage Umax	Conductor cross section	Length without cable lug
Product	(kV)	(mm²)	(mm)
THVE 20/A-RC		25 - 120	320
THVE 20/B-RC	24	95 - 300	320
THVE 20/C-RC		240 - 630	320
THVE 30/A-RC		50 - 185	430
THVE 30/B-RC	36	120 - 240	430
THVE 30/C-RC		240 - 630	430



FOR CABLES ARMOURED WITH WIRES OR ALUMINIUM TAPE

For Umax cables 7,2 kV	Voltage Umax	Conductor cross section	Length without cable lug	
Product	(kV)	(mm²)	(mm)	
THVI 6/0-ARM	7,2	25 - 70	460	
THVI 6/A-ARM		95 - 120	460	
THVI 6/B-ARM		150 - 400	460	
THVI 6/C-ARM		500 - 630	460	

For Umax cables from 12 to 24 kV Product	Umax 12 kV sect. (mm²)	Umax 17,5 kV sect. (mm²)	Thickness FULL Umax 24 kV sect. (mm²)	Thickness LOW Umax 24 kV sect. (mm²)	Length without cable lug (mm)
THVI 20/A-ARM	25 - 95	25 - 50	25 - 50	25 - 120	600
THVI 20/B-ARM	120 - 300	70 - 300	70 - 240	95 - 300	600
THVI 20/C-ARM	400 - 800	400 - 800	240 - 630	240 - 630	600

For shielded aluminium tube cables, add terminal abbreviation **H5**











Electrical performance: CEI 20-24 • CEI 20-62/1

Kit composition:

Three single core terminations



Single core cable extruded wires



Single core cable extruded tapes

Heat-shrink terminations for **outdoor use**

Terminations for **SINGLE CORE** extruded cables up to 36~kV

FOR NON ARMOURED CABLES

For cables (A)RG7H1R insulation thickness FULL	Voltage Umax	Conductor cross section	Length without cable lug
Product	(kV)	(mm²)	(mm)
THVE 6/120-E		25 - 120	340
THVE 6/400-E	7,2	150 - 400	340
THVE 6/630-E		500 - 630	340
THVE 15/50-E		25 - 95	450
THVE 15/300-E	12	120 - 300	450
THVE 15/800-E		400 - 630	450
THVE 15/50-E		25 - 50	450
THVE 15/300-E	17,5	70 - 300	450
THVE 15/800-E		400 - 800	450
THVE 20/25-E		25 - 50	520
THVE 20/240-E	24	70 - 240	520
THVE 20/630-E		240 - 630	520
THVE 30/95-E		35 - 95	720
THVE 30/185-E	36	120 - 185	720
THVE 30/500-E		240 - 500	720

For shielded aluminium tube cables, add terminal abbreviation H5

For cables RG7H1M1Afumex insulation thickness LOW	Voltage Umax	Conductor cross section	Length without cable lug
Product	(kV)	(mm²)	(mm)
THVE 20/25-E		25 - 120	520
THVE 20/240-E	24	95 - 300	520
THVE 20/630-E		240 - 630	520
THVE 30/95-E		50 - 185	720
THVE 30/185-E	36	120 - 240	720
THVE 30/500-E		240 - 630	720



FOR CABLES ARMOURED WITH WIRES OR ALUMINIUM TAPE

For Umax cables 7,2 kV	Voltage Umax	Conductor cross section	Length without cable lug
Product	(kV)	(mm²)	(mm)
THVO 6/70-ARM	7,2	25 - 70	600
THVO 6/120-ARM		95 - 120	600
THVO 6/400-ARM		150 - 400	600
THVO 6/630-ARM		500 - 630	600

For Umax cables from 12 to 24 kV Product	Umax 12 kV sect. (mm²)	Umax 17,5 kV sez. (mm²)	Thickness FULL Umax 24 kV sect. (mm²)	Thickness LOW Umax 24 kV sect. (mm²)	Length without cable lug (mm)
THVO 20/25-ARM	25 - 95	25 - 50	25 - 50	25 - 120	800
THVO 20/240-ARM	120 - 300	70 - 300	70 - 240	95 - 300	800
THVO 20/630-ARM	400 - 800	400 - 800	240 - 630	240 - 630	800

For shielded aluminium tube cables, add terminal abbreviation **H5**











Electrical performance: CEI 20-24 • HD 629-1

Note: contact Raytech regarding smaller cable insulation thickness



Three-core cable extruded wires



Three-core cable extruded tapes

Three-core heat-shrink terminations for **indoor/outdoor use**

Terminations for armoured and non armoured extruded cables up to **24 kV**

FOR INDOOR USE

For NON ARMOURED cables	For ARMOURED cables	Voltage Umax	Conductor cross section (mm²)	
Product	Product	(kV)		
THVI 6/0-3	THVI 6/0-3-ARM		25 - 35	
THVI 6/A-3	THVI 6/A-3-ARM	7.2	50 - 120	
THVI 6/B-3	THVI 6/B-3-ARM	/,2	150 - 400	
THVI 6/C-3	THVI 6/C-3-ARM		500	

For NON ARMOURED cables	For ARMOURED cables	Umax 12 kV	Umax 17,5 kV	Umax 24 kV
Product	Product	sect. (mm²)	sect. (mm²)	sect. (mm²)
THVI 20/A-3	THVI 20/A-3-ARM	25 - 95	25 - 50	25 - 50
THVI 20/B-3	THVI 20/B-3-ARM	120 - 300	70 - 300	70 - 240
THVI 20/C-3	THVI 20/C-3-ARM	400 - 500	400	300

FOR OUTDOOR USE

For NON ARMOURED cables	For ARMOURED cables	Voltage Umax	Conductor cross section (mm²)	
Product	Product	(kV)		
THVO 6/35-3	THVO 6/35-3-ARM		25 - 35	
THVO 6/120-3	THVO 6/120-3-ARM	7,2	50 - 120	
THVO 6/400-3	THVO 6/400-3-ARM	/,2	150 - 400	
THVO 6/500-3	THVO 6/500-3-ARM		500	
For NON ADMOUDED	For ADMOUDED	ı		

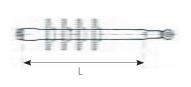
For NON ARMOURED cables	For ARMOURED cables	Umax 12 kV	Umax 17,5 kV	Umax 24 kV
Product	Product	sect. (mm²)	sect. (mm²)	sect. (mm²)
THVO 20/25-3	THVO 20/25-3-ARM	25 - 95	25 - 50	25 - 50
THVO 20/240-3	THVO 20/240-3-ARM	120 - 300	70 - 300	70 - 240
THVO 20/630-3	THVO 20/630-3-ARM	400 - 500	400	300





ENEL certified heat-shrink terminations

For single core type indoor and outdoor use



Elicord type extruded cable (ARG7H5EXY 12/20 kV)

Product	Туре	ENEL serial number	Conductor cross section (mm²)	L (mm)
THVE 20/150-I/U	With 2 INTERNAL sheaths	273047	35 ÷150	365
IXSU-F-5131-IT02	Single INTERNAL tube	273047	35 ÷150	365
THVE 20/150-E/U	With 2 EXTERNAL sheaths	273066	35 ÷150	450
OXSU-F-5131-IT02	Single EXTERNAL tube	273066	35 ÷150	450

Electrical performance:

CEI 20-24 • CEI 20-62/1 ENEL tables: DJ 4456/3 • DJ 4476/2 ENEL certification: DJ 4853 • DJ 4854



Single core cable AL extruded tube

Extruded cable for underground installation ([A] RG7H1R 12/20 kV)

Product	Туре	ENEL serial number	Conductor cross section (mm²)	L (mm)
IXSU-F-5121-IT01	Single INTERNAL tube	273045	25	360
THVE 20/185-I/U	With 2 INTERNAL sheaths	273046	50 -185	360
IXSU-F-5131-IT01	Single INTERNAL tube	273046	50 -185	360
THVE 20/240-I/U	With 2 INTERNAL sheaths	273048	240	360
IXSU-F-5151-IT01	Single INTERNAL tube	273049	400 - 630	360
THVE 20/185-E/U	With 2 EXTERNAL sheaths	273065	50 -185	450
OXSU-F-5131-IT01	Single EXTERNAL tube	273065	50 -185	450

Electrical performance:

CEI 20-24 • CEI 20-62/1 ENEL tables: DJ 4456 ENEL certification: DJ 4853 • DJ 4854



Single core cable extruded wires

Insulated cable made of paper impregnated with stabilised mixture ([A] RC 1HLRX 12/20 kV)

Product	Туре	ENEL serial number	Conductor cross section (mm²)	L (mm)
THVP 20/240-I/U	INTERNAL	273042	50 - 240	370
THVP 20/240-E/U-N1	EXTERNAL	273083	50 - 240	600

Electrical performance:

CEI 20-24 • CEI 20-62/1 ENEL tables: DJ 4453 • DJ 4473 ENEL certification: DJ 4854 • DJ 4851



Single core cable paper lead

Extruded cable for underground installation with aluminium tube shield (ARE4H5EX 12/20 kV)

			Conductor		(mm)	
	_	ENEL	cross section	insu	lation	L
Product	Type	serial number	(mm²)	min	max	(mm)
IXSU-F-5131-IT04	INTERNAL	273040	70 - 185	19	27	350
OXSU-F-5131-IT03	EXTERNAL	273064	70 - 185	19	27	450

Electrical performance:

CEI 20-24 • CEI 20-62/1 ENEL tables: DJ4456/6 • DJ4476/7 ENEL certification: DJ4853



Cavo unipolare estruso tubo AL



630 mm²



Identification da	ata of appropriate	termination	9 9
TERMINATION			
For indoor use	Single core	Copper conductor	+++
For external use	Three-core	Aluminium conductor	333
NOMINAL VOLTAGE	CABLE INSULATION	ARMOUR	SHIELD
6 kV (Umax 7,2)	Extruded Full O Low	Non armoured	Copper wire
10 kV (Umax 12)	Low insulation thickness	Armoured wire	Copper tapes
15 kV (Umax 17)	Belted cable	Armoured tape	Aluminium tube
20 kV (Umax 24)	3 lead paper		Lead sheath
30 kV (Umax 36)	1 lead paper with shielded phases		
CABLE SECTION		INCLUDES	INCLUDES
25 mm ²	TYPE	GROUNDING BRAID	CABLETERMINAL
35 mm ²	Self-shrinking	Yes	Yes
50 mm ² 70 mm ²	Heat-shrink	No	No
95 mm ²			
120 mm ²			
150 mm ²			
185 mm ²			
240 mm ²			
300 mm ²			Rav
400 mm ²			Ray Tech
500 mm ²			

www.raytech.it



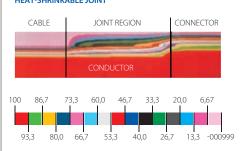
Heat-shrink joints

The preparation of cables and the installation techniques for medium voltage joints are identical to those for terminations. Even cable made with paper impregnated with non-migrant mixture up to 36 kV uses the same basic design. In this way, the heat-shrink system sets new standards regarding the effectiveness, reliability and simplicity of cable installation. The performance and ease of installation of heat-shrink materials are not affected by stocking, even if long and in adverse environmental conditions. A low number of "kits" per cable type covers the entire range of sections, allowing use with any type of connector, regardless of the type of conductor (round or sectoral) and different shields.

Electrical field distribution

When the cable shield is cut, the electrical field is controlled by a material that has already been experimented in terminations: the electrical gradient control tube. This tube is made of non-linear impedance insulating material that is able to control the electrical field both at the end of the cable shield and on the metal connector. As with the terminations, thanks to the heat-shrink components, the range of joints includes practically all the configurations of the existing cables, as well as the joints mixed between different types of cable. The kit references that appear on the selection tables are those that are most used by national installers for cable applications up to 36 kV. In the described cases, please contact Raytech regardless of the type of cable.

VOLTAGE DISTRIBUTION (PERCENT) HEAT-SHRINKABLE JOINT



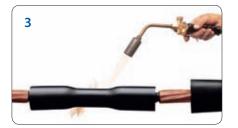
HOW TO IDENTIFY AND ORDER COMPLEMENTARY ACCESSORIES

Accessory	Abbreviation to add to the product code	Example
Copper connectors	-C + Conductor cross section	GHVE 20/185-C95
Aluminium connectors	-CA + Conductor cross section	GHVE 20/185-CA95
Predetermined breakaway cable	-CPR + conductor cross section	GHVE 20/185-CPR95

Installation sequence













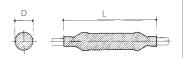






Single core heat-shrink joints

High reliability and superior electrical, mechanical and sealing properties make these joints the ideal solution for all types of cables and installation.



Electrical performance: CEI 20-24 • HD 629-1

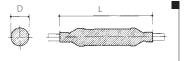




Single core heat-shrink joints for extruded insulation cables with copper wire shield

type (A)RG7H1R(X), (A)RE4H1E(X), (A)RG7H1M1(X)

Product	Voltage Umax (kV)	Conductor c from (mm²)	ross section to (mm²)	L max (mm)	D max (mm)
GHVE 15/50-1	7,2 - 17,5	25	50	700	75
GHVE 15/300-1	7,2 - 17,5	70	300	700	80
GHVE 15/630-1	7,2 - 17,5	400	630	1000	100
GHVE 20/240-1	24	25	240	700	80
GHVE 20/630-1	24	240	630	1000	100
GHVE 30/240-1	36	50	240	1000	90
GHVE 30/500-1	36	300	500	1000	100



Electrical performance: CEI 20-24 • HD 629-1

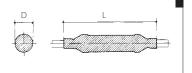




Single core heat-shrink joints for extruded insulation cables with aluminium tube shield

type (A)RG7H5R(X), (A)RE4H5E(X), (A)RG7H5M1(X)

Product	Voltage Umax (kV)	Conductor c from (mm²)	ross section to (mm²)	L max (mm)	D max (mm)
GHVE 15/50-1-H5	17,5	25	50	700	75
GHVE 15/300-1-H5	17,5	50	300	700	80
GHVE 15/630-1-H5	17,5	400	630	1000	100
GHVE 20/240-1-H5	24	25	240	700	80
GHVE 20/630-1-H5	24	240	630	1000	100
GHVE 30/240-1-H5	36	50	240	1000	90
GHVE 30/500-1-H5	36	300	500	1000	100



Electrical performance: CEI 20-24 • HD 629-2





Single core heat-shrink joints for insulated cables made of paper impregnated with mixture type (A)RC1HLR(X)

Product	Voltage Umax (kV)	Conductor c from (mm ²)	ross section to (mm²)	L max (mm)	D max (mm)
GHVP 20/70-1	24	35	70	1000	75
GHVP 20/240-1	24	50	240	1000	75
GHVP 20/400-1	24	300	400	1000	80

Supplies do not include connectors which must be requested separately





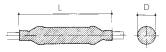
Three core heat-shrink joints

High reliability and superior electrical, mechanical and sealing properties make these joints the ideal solution for all types of cables and installation.



Three core heat-shrink joints for extruded insulation cables type (A)RG7H1OR, (A)RE4H1OR

Product	Voltage Umax (kV)	Conductor c from (mm ²)	ross section to (mm²)	L max (mm)	D max (mm)
GHVE 15/50-3	7,2 - 17,5	25	50	1500	105
GHVE 15/300-3	7,2 - 17,5	70	300	1500	110
GHVE 15/630-3	7,2 - 17,5	400	630	1600	130
GHVE 20/240-3	24	25	240	1500	110
GHVE 20/630-3	24	300	630	1600	140





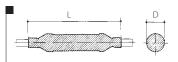




Three core heat-shrink joints for insulated armoured cables with galvanic continuity of armour

Product	Voltage Umax (kV)	Conductor c from (mm ²)	ross section to (mm²)	L max (mm)	D max (mm)
GHVE 15/50-ARM	7,2 - 17,5	25	50	1500	75
GHVE 15/300-ARM	7,2 - 17,5	70	300	1500	110
GHVE 15/630-ARM	7,2 - 17,5	400	630	1600	130
GHVE 20/240-ARM	24	25	240	1500	110
GHVE 20/630-ARM	24	300	630	1600	140

Supplies do not include connectors which must be requested separately Note: contact Raytech for three core armoured cables with low insulation thickness



Electrical performance: CEI 20-24 • HD 629-1

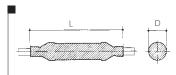




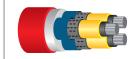
Three core heat-shrink joints for insulated cables made of paper impregnated with mixture **type (A)RC1HLOR (3 lead)**

Product	Voltage Umax (kV)	Conductor c from (mm²)	ross section to (mm²)	L max (mm)	D max (mm)
GHVP 20/70-3	24	35	70	1600	130
GHVP 20/240-3	24	95	240	1600	140
GHVP 20/400-3	24	300	400	1600	150

Supplies do not include connectors which must be requested separately



Electrical performance: CEI 20-24 • CEI 20-62/2









Transition joints between single **core cables**



Transition joints between **single core** paper insulated cable and extruded cable

respectively type (A)RG7H1R(X) and single pole cable made of paper impregnated with mixture type (A)RC1HLRX

	Voltage	Conductor cro	ENEL	
Product	Umax (kV)	paper cable	extruded cable	serial number
GHVE 20/25-1-T	24		-	
GHVE 20/240-1-T	24	50 - 240	35 - 185	271074
GHVE 20/400-1-T	24	240	- 400	-

Supplies do not include connectors which must be requested separately



Electrical performance: CEI 20-24 • CEI 20-62/2

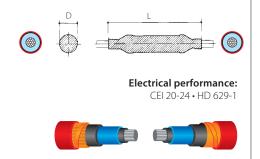




Transition joints between **single core** paper insulated cable and extruded cable with aluminium sheet screen

type (A)RC1HLRX and type ARG7H5EXY

Product	Voltage	Conductor cros	ss section (mm²)	ENEL
	Umax (kV)	paper cable	extruded cable	serial number
GHVE 20/240-1-TE	24	50 - 240	35 - 150	270118



Transition joints between **single core** extruded cable with wire screen and extruded cable with aluminium foil screen

type (A)RG/H1R(X) or (A)RG7H1M1 and extruded single core cable type ARG7H5EXY

Product	Voltage Umax (kV)	Conductor cross section from (mm²) to (mm²)		L max (mm)	D max (mm)
GHVE 20/240-1X-TE	24	25	240	1000	75





Transition joints between **multi core** cables

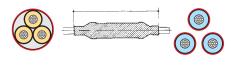
Transition joints between **3-core** paper insulated cable and **3 single core** extruded cables

respectively type (A) RC1HLOR and (A) RG7H1R(X)

	Voltage Umax	Conductor cro	oss section (mm²)
Product	(kV)	paper cable	extruded cable
GHVT 20/25-1X-3H	24	25	25
GHVT 20/240-1X-3H	24	50 - 240	35 - 185
GHVT 20/400-1X-3H	24	300 - 400	240 - 400

Supplies do not include connectors which must be requested separately





Electrical performance:

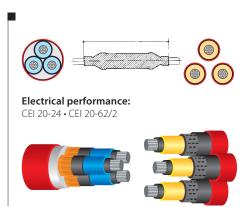
CEI 20-24 • CEI 20-62/2



Transition joints between **3-core** extruded cable and **3 single core** paper insulated cables

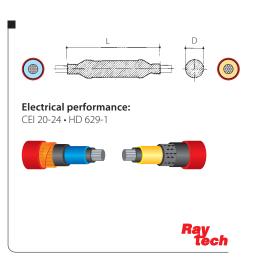
respectively type (A) RG7H10R and (A) RC1HLRX

	Voltage Umax	Conductor	cross section
Product	(kV)	from (mm²)	to (mm²)
GHVT 20/25-3X-1H	24	25	25
GHVT 20/70-3X-1H	24	35	70
GHVT 20/240-3X-1H	24	95	240
GHVT 20/400-3X-1H	24	300	400



Single core plastic or paper insulated cable joint with screen interruption

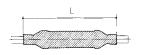
Product	Type of cable	Voltage Umax (kV)	Conductor c from (mm²)	ross section to (mm²)	L max (mm)	D max (mm)
GHVP 20/240-1-IS	(A)RC4HLR(X)	24	50	240	1000	75
GHVE 20/240-1-IS	(A)GR7H1R(X)	24	50	240	1000	75
GHVE 20/150-1-IS	ARG7H5EXY	24	35	150	1000	75







ENEL certified heat-shrink



Electrical performance: CEI 20-24 • CEI 20-62/1 Tabelle Enel: DJ 4376

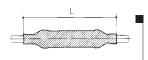
ENEL certification: DJ 4853 • DJ 4854



Single core joints for extruded insulation cables

Type (A)RG7H1RX 12/20 kV (copper wire shield - external PVC sheath)

0.1.4	_	Conductor co		L max	ENEL
Product	Umax (kV)	from (mm²)	to (mm²)	(mm)	serial number
GHVE 20/185 - 1/U	24	50	185	700	271071



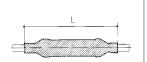
Electrical performance: CEI 20-24 • CEI 20-62/1 Tabelle Enel: DJ 4376 ENEL certification: DJ 4853 • DJ 4854



Single core joints for wire carrying overhead cables

Type ARG7H5EXY 12/20 kV (aluminium tube shield - external PE sheath)

Product		Conductor co		L max (mm)	ENEL serial number
GHVE 20/150 - 1/U	24	35	150	700	271072



Electrical performance: CEI 20-24 • CEI 20-62/2 Tabelle Enel: DJ 4373 ENEL certification: DJ 4851 • DJ 4854



Single core joints for insulated cables with impregnated paper

Type RC4HLRX with copper conductors from 50 to 150 mm² and ARC4HLRX with aluminium conductors from 95 to 240 mm²

Product		Conductor c from (mm²)		L max (mm)	ENEL serial number
GHVP 20/150 - 1/U	17,5 e 24	50	150	1000	-
GHVP 20/240 - 1/U	17,5 e 24	95	240	1000	271042

Supplies do not include connectors which must be requested separately.

D

Prestazioni elettriche:CEI 20-24 • CEI 20-62/1 Tabelle Enel: DJ 4387/2 Omologazione Enel: DJ 4853



Extruded cable for underground installation with aluminium tube shield (ARE4H5EX 12/20 kV)

	Voltage			L	D	
	Umax	Conductor c	ross section	max	insulation	ENEL
Product	(kV)	from (mm ²)	to (mm²)	(mm)	\emptyset (mm)	serial number
GHVE 20/185-1X-H5	24	70	185	1000	19-30	271021

Supplies do not include connectors which must be requested separately.





Identification data of appropriate junction					
CABLE DATA				www.raytech.it	
6 kV (Umax 7,2)	10 kV (Umax 12)	15 kV (Umax 17)	20 kV (Umax 24)	30 kV (Umax 36)	
CABLE DATA 1		CABLE	DATA 2		
CABLE	CONDUCTOR	CABLE	CC	NDUCTOR	
Single core	Copper	_ s	ingle core	Copper	
Three-core	Aluminium	От	Three-core	Aluminium	
CABLE INSULATION	ARMOUR	CABLE	INSULATION AR	MOUR	
Extruded cable	Non armoured	E	extruded cable	Non armoured	
Belted cable	Armoured wire	ОВ	Selted cable	Armoured wire	
3 lead paper	Armoured tape	3	lead paper	Armoured tape	
1 lead paper with shielded phases			lead paper with hielded phases		
CABLE SECTION	SHIELD	CABLE	SECTION SH	IELD	
25 mm ²	Copper wire	<u> </u>	25 mm ²	Copper wire	
35 mm ²	Copper tapes	<u> </u>	85 mm ²	Copper tapes	
50 mm ²	Aluminium tub	e 5	60 mm ²	Aluminium tube	
70 mm ²	Lead sheath	7	70 mm ²	Lead sheath	
95 mm ²		<u> </u>	95 mm²		
120 mm ²	INCLUDES	<u> </u>	20 mm ²	CLUDES	
150 mm ²	CONNECTOR	<u> </u>		NNECTOR	
185 mm ²	Yes	<u> </u>	85 mm ²	Yes	
240 mm ²	No	2	240 mm²	No	
300 mm ²		<u> </u>	300 mm ²		
400 mm ²	TYPE	<u> </u>	100 mm² TYI	PE	
500 mm ²	Cold-shrink		600 mm ²	Cold-shrink	
630 mm ²	Heat-shrink	<u> </u>	330 mm²	Heat-shrink	



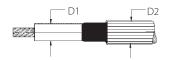




Heat-shrink terminations for **high voltage** 72 kV

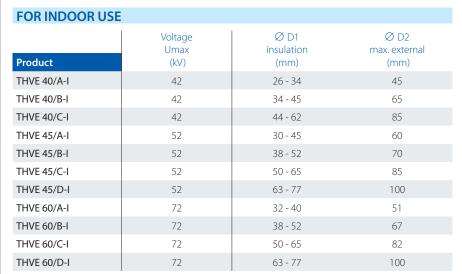
Kit contains a limited number of components with unlimited shelf life at normal storage conditions. Three basic kits cover all possible cable sections, with the advantage of keeping a reduced and effective stock. The lightness and limited volume of the kits facilitate their handling and transport. No special additional training is required. Simple installation for reliable results. Terminations are in compliance with international specifications (for example IEEE 48, IEC 840, SEN 241434, ESI 09-16, EdF HN-62/5448/2, KEMA S10, CEI 20.24) all included in internal certification testing.

Currently available in 3 classes of HV terminations Uo/U=23/40 kV (U max 42 kV) Uo/U=26/45 kV (U max 52 kV) Uo/U=36/60 kV (U max 72 kV).









FOR INDOOR USE						
Product	Voltage Umax (kV)	Ø D1 insulation (mm)	Ø D2 max. esterno (mm)			
THVE 40/A-E	42	26 - 34	45			
THVE 40/B-E	42	34 - 45	65			
THVE 40/C-E	42	44 - 62	85			
THVE 45/A-E	52	30 - 45	60			
THVE 45/B-E	52	38 - 52	70			
THVE 45/C-E	52	50 - 65	85			
THVE 45/D-E	52	63 - 77	100			
THVE 60/A-E	72	32 - 40	51			
THVE 60/B-E	72	38 - 52	67			
THVE 60/C-E	72	50 - 65	82			
THVE 60/D-E	72	63 - 77	100			



Add ${\sf SF}$ to code for wire shielded, ${\sf SN}$ for belt shielded or lead sub-sheath.

Contact Raytech to choose the most suitable joint.

Heat-shrink joints for **high voltage** 72 kV

RELIABILITY

The simplicity and lightness of heat-shrink joints for high voltage make these a highly reliable accessory.

SCREW CONNECTORS

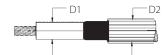
These joints are provided with a special screw connector that allows you to splice large section conductors without special tools and without heat treatment. Screws have a predetermined breakaway head which ensures perfect electrical connection.

ELECTRICAL FIELD CONTROL

Apply a sheath with electric field control properties of the above the connector and the ends of the cable semiconductor. This heat-shrink tube is rendered conductive at the centre to shield the connector (Faraday system). The field control tube, which covers the cable dielectric, accompanies the expansion due to load cycles.

ADVANCED TECHNOLOGY

Insulation and shielding are obtained with two double wall heat-shrink elastomeric tubes. The internal tube is formed by two walls co-extruded in insulating material (red). The external tube is formed by a co-extruded insulating wall (red) with a black conductor part which acts as the joint shield. The external wall of the co-extruded wall is heat-shrink, while the internal wall is an elastomer maintained in expanded form thanks to close union with the external part. The application of heat to the external part causes this to contract up to a predetermined diameter, at the same time allowing the internal part to perfectly adapt to the underlying layer.



Product	Voltage Umax (kV)	Ø D1 insulation (mm)	Ø D2 max. external (mm)
GEHV 40/A	42	23 - 28	40
GEHV 40/B	42	28 - 40	52
GEHV 40/C	42	38 - 55	68
GEHV 45/A	52	28 - 45	52
GEHV 45/B	52	41 - 61	72
GEHV 45/C	52	53 - 73	83
GEHV 60/A	72	34 - 45	51
GEHV 60/B	72	43 - 60	72
GEHV 60/C	72	52 - 65	77
GEHV 60/D	72	63 - 77	97

















Contact Raytech to choose the most suitable joint.





Complies with standards CEI 20-62/1 Cenelec HD 629.1 S2

Single core separable connectors

with external cone with contact plug In=250 A

Separable connectors for MV cables with extruded radial field for voltages up to 19/33 (36) kV

Single core separable connectors with contact plug In=250 A, elbow or straight for extruded cables. External coating in semi-conductive rubber protects personnel from electrocution. Each termination is factory tested before delivery with dielectric strength testing and measurements of partial discharges.



Contact Raytech for aluminium shield cables



Kit available for tape screen. Add "A" to the end of the "Product



Connection kit for wire shield included



Contact Raytech for information regarding other types of cable



Kit available for three core cables. Order kit "TK.." See table



Contact Raytech for different armour grounding systems available



Different types of cable lugs available



Contact Raytech about different shield grounding systems available

160 mm

_	
<u>M</u>	100 mm
- III	
- (*)	

SEPARABLE INTERFACE "A" TERMINATION 24KV - 250 A

ELBOW	Voltage	Cable insulation diameter range	Copper/aluminium mechanical conductor cross section range			
Product	Umax (kV)	(mm)	(mm²)			
250 RTS-20/A	24	14,6 - 18,7				
250 RTS-20/B	24	17,5 - 20,2				
250 RTS-20/C	24	18,4 - 21,2	25 - 95			
250 RTS-20/D	24	19,7 - 22,5	23 - 93			
250 RTS-20/E	24	21,0 - 23,8				
250 RTS-20/F	24	23,6 - 26,4				

STRAIGHT	Voltage	Cable insulation diameter range	Copper/aluminium mechanical conductor cross section range			
Product	Umax (kV)	(mm)	(mm²)			
250 RTD-20/A	24	14,6 - 18,7				
250 RTD-20/B	24	17,5 - 20,2				
250 RTD-20/C	24	18,4 - 21,2	25 - 95			
250 RTD-20/D	24	19,7 - 22,5	25 - 95			
250 RTD-20/E	24	21,0 - 23,8				
250 RTD-20/F	24	23,6 - 26,4				

Single core separable connectors

with external cone with contact screw In=630/800/1250 A

Separable connectors for MV cables with extruded radial field, for voltages up to 19/33 (36) kV

Single core separable connectors with contact screw, for extruded cables. External coating in semi-conductive rubber protects personnel from electrocution. Each termination is factory tested before delivery with dielectric strength testing and measurements of partial discharges.



Kit available for tape screen. Add "A" to the end of the "Product



Connection kit for wire shield included



Kit available for three core cables. Order kit "TK.." See table



For use in potentially explosive areas (12kV max.) Order: -/ATEX



Different types of cable lugs available



Contact Raytech for different shield grounding systems available

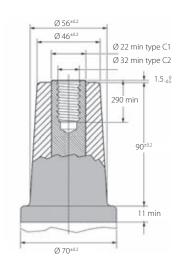


When installed on the appropriate bushing: 1250A continuous



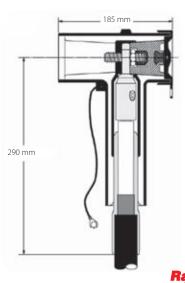
When installed on the appropriate bushing: 800A continuous

Complies with standards CEI 20-62/1 Cenelec HD 629 .1 S2



SEPARABLE TEE INTERFACE "C" TERMINATION 24/36KV - 630 A

Product	Voltage Umax (kV)	Cable insulation diameter range (mm)	Copper/aluminium mechanical conductor cross section range (mm²)
630 RTT-20/A-C95	24	16,0 - 22,0	16 - 95
630 RTT-20/B-C150	24	20,0 - 26,5	50 - 150
630 RTT-20/C-C240	24	23,5 - 31,0	95 - 240
630 RTT-20/D-C240	24	26,5 - 32,5	95 - 240
630 RTT-20/E-C300	24	28,5 - 37,5	120 - 300
630 RTT-30/A-C95	36	16,0 - 22,0	16 - 95
630 RTT-30/B-C150	36	20,0 - 26,5	50 - 150
630 RTT-30/C-C240	36	23,5 - 31,0	95 - 240
630 RTT-30/D-C240	36	26,5 - 32,5	95 - 240
630 RTT-30/E-C300	36	28,5 - 37,5	120 - 300
630 RTO-20/A-C400	24	28,5 - 37,5	185 - 400
630 RTO-20/B-C400	24	34,0 - 42,5	185 - 400
630 RTO-20/C-C630	24	39,0 - 48,5	400 - 630
630 RTO-20/D-C630	24	45,5 - 56,0	400 - 630
630 RTO-30/A-C400	36	28,5 - 37,5	185 - 400
630 RTO-30/B-C400	36	34,0 - 42,5	185 - 400
630 RTO-30/C-C630	36	39,0 - 48,5	400 - 630
630 RTO-30/D-C630	36	45,5 - 56,0	400 - 630







Heat-shrink sheaths

Sheaths for insulating bars inside electrical cabinets or outdoors in primary or secondary cabinets

APPLICATION

Primary (HV-MV) and secondary (MV-LV) electrical up to 36 kV today come in very compact sizes. Bars need to be insulated to prevent surface discharges and accidental short-circuits that are essentially caused by animal intrusion.

Heat-shrink shrink sheaths for MV can be used on round and rectangular copper or aluminium bars. They are flexible and elastic, can be installed on previously bent bars without any risks of tearing or rippling.

DESCRIPTION

Sheaths utilise a special elastomer cross-linked by irradiation, with an exceptional insulating power and excellent seal over time, even in case of continuous use at high temperature. They do not contain halogens and therefore there is no risk of emission of toxic or corrosive substances in case of fire. They are resistant to solvents, UV radiation, exposure to weather, impact and tear, and therefore are fully suitable for use outdoors.

INSTALLATION

Sheaths for MV can be easily factory installed, when dealing with mass production, using an oven for heat-shrink. In situ, shrinking can be carried out with the aid of a torch or a hot air torch. Heat the sheath to over 120°C and it will shrink on the bar without risk of damage because the material is cross-linked and very resistant to high temperatures. The great elasticity of the sheaths allows, if necessary, for being of the bars during assembly of the electric cabinet with the sheath already installed.





- $\mathbf{D} = \emptyset$ minimum before shrinkage
- $\mathbf{d} = \emptyset$ maximum after free shrinkage
- 51 = nominal thickness as supplied52 = minimum nominal thickness after free shrinkage

BBT

Flexible, heavy duty heat-shrink sheath

Suitable for reducing overhead distances in MV panels up to 36 kV. Phase-to-phase distance reduced to approximately 1/3

	Size of bus bars (mm) A+B C			Heat-shrink sheath (mm)				
Product	from	to	from	to	D	d	S_1	S ₂
BBT 40/16-A/U	28	45	18	32	40	16	1,6	3,8
BBT 65/25-A/U	44	69	28	47	65	25	1,6	3,9
BBT 100/40-A/U	69	102	44	72	100	40	1,6	4,0
BBT 150/60-A/U	102	148	65	105	150	60	1,6	4,0





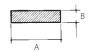
INSULATION UP TO 36 KV

BPM

Flexible, medium wall heat-shrink sheath

Suitable for optimising space in MV panels and for protection from discharges and accidental contact for systems up to 24 kV. Phase-to-phase distance reduced to approximately 1/2

	Size of bus bars (mm) A+B C			Heat-shrink sheath (mm)				
Product	from	to	from	to	D	ď	, S ₁	S ₂
BPM 15/6-A/U	12	20	6,5	12	15	6	1,1	2
BPM 30/12-A/U	20	38	13,5	25	30	12	1,1	2,2
BPM 50/20-A/U	36	65	22	43	50	20	1,1	2,4
BPM 75/30-A/U	55	95	33	63	75	30	1,1	2,4
BPM 120/50-A/U	90	165	55	105	120	50	1,3	2,8





DISTANCES ALLOWED IN BAR SYSTEMS

Phase/phase and phase/bus bars distances recommended with insulated bars with sheaths for MV. Studies and testing carried out on insulated bars have shown that it is possible to significantly reduce space with respect to those used in the case of air insulation. The minimum permitted space is defined by the absence of partial discharges at the time of testing in alternating current and by the seal upon impulse. The values shown can be applied to round or rectangular bars installed inside standard cabinets. Shapes with sharp edges or bar parallels of more than 5 m require larger spaces.

Round bus bars Rectangular bus bars Voltage Um (kV) Voltage Um (kV) 12 120 12 120 160 17,5 160 220 320 220 24 24 100/160 140/190 320 36 Spacing in air Insulation Insulation with BPM or HVBT according to IEC 71-2 with BBT phase / phase (mm) with overlap of 2/3 phase / bus bars (mm)

For more information on different possible applications please contact Raytech.





- \varnothing minimum before shrinkage
- $\mathbf{d} = \emptyset$ maximum after free shrinkage
- S1 = nominal thickness as supplied
- **S2** = minimum nominal thickness after free shrinkage



INSULATION UP TO 36 KV





- $\mathbf{D} = \emptyset$ minimum before shrinkage
- d = Ø maximum after free shrinkage
 S1 = nominal thickness as supplied
- **S2** = minimum nominal thickness
- after free shrinkage

BPTM

Flexible, medium wall heat-shrink sheath

Suitable for optimising space in MV panels and for protection from discharges and accidental contact for systems up to 24 kV. Phase-to-phase distance reduced to approximately 1/2

	Size of bus bars (mm) A+B C				Heat-s	ath		
Product	from	to	from to		D	(m d	S,	S ₂
BPTM 15/6-A/U	12	20	6,5	12	15	6	1,1	1,9
BPTM 30/12-A/U	20	38	13,5	25	30	12	1,1	2,2
BPTM 50/20-A/U	36	65	22	43	50	20	1,1	2,35
BPTM 75/30-A/U	55	95	33	63	75	30	1,1	2,35
BPTM 100/40-A/U	70	130	44	86	100	40	1,1	2,35
BPTM 120/50-A/U	90	165	55	105	120	50	1,3	2,8
BPTM 175/70-A/U	125	235	80	150	175	70	1,3	2,8
BPTM 205/110-A/U	200	276	127	190	205	110	1,3	2,8









- $\mathbf{D} = \emptyset$ minimum before shrinkage
- d = Ø maximum after free shrinkageS1 = nominal thickness as supplied
- **S2** = minimum nominal thickness after free shrinkage

BBIT

Flexible, **heavy duty** heat-shrink sheath

Suitable for reducing overhead distances in MV panels up to 36 kV. Phase-to-phase distance reduced to approximately 1/3

	Size of bus bars (mm) A+B C				she	shrink eath m)		
Product	from	to	from	to	D	d	S ₁	S ₂
BBIT 25/10-A/U	17	28	11	20	25	10	1,6	3,6
BBIT 40/16-A/U	28	45	18	32	40	16	1,6	3,6
BBIT 65/25-A/U	44	69	28	47	65	25	1,6	3,6
BBIT 100/40-A/U	69	102	44	72	100	40	1,6	3,6
BBIT 150/60-A/U	102	148	65	105	150	60	1,6	3,6
BBIT 175/80-A/U	133	196	85	125	175	80	1,6	3,6





INSULATION UP TO 36 KV

Heat-shrink tapes

HVBT heat-shrink tape coated in hot melt adhesive for MV

APPLICATION

HVBT tape is part of the bar insulation product range. It is a heat-shrink tape coated with a hot melt adhesive on one side.

INSTALLATION

HVBT is installed wrapping it moderately taut on the bar with overlap equal to 2/3. When heated, it shrinks and adheres to the underlying layer. At the same time, the layers of this tape amalgamate to create a continuous insulation sheath.

INSULATION DISTANCE

Refer to the table on page 179 (BPM values) to determine the distances between the bars and toward grounding. HVBT tape is sold in 4 different widths and is coated with adhesive on the outer part. Fibreglass tape used to stop taping is provided with each roll.





HVBT

Self-sealing heat-shrink tape for MV bar insulation

Product	Width (mm)	Length (m)
HVBT 12-A	25	10
HVBT 14-A	50	10
HVBT 15-A	75	10
HVBT 16-A	100	10









DOMESTIC USE



ANTI-FREEZE FOR PIPING ANTI-FREEZE FOR RAMPS ANTI-FREEZE FOR GUTTERS

page

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Heating Cables



INDUSTRIAL USE



MCA MCA-I-GF MCA-I-FF

201

HOME COMFORT USE



FOR FLOORING REAR-MIRROR FOR CEILINGS

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Heating cables

Heating cables are used for frost protection of pipes, tanks, ramps and walkways, gutters, etc., or for maintaining process temperatures, especially in industrial environments.

There are 2 types:

- **CONSTANT POWER CABLES,** in which the heating element is the conductor through which the current passes, and serves as filament.
- **SELF-REGULATING CABLES,** whose heating element is the conductive core, powered by 2 conductors.

CONSTANT POWER CABLES

Raytech cables are composed of 2 conductors that are shielded and in the case of Stop Ice (see pg. 190) are supplied with a suitable thermostat for anti-freeze maintenance.



- Ready for use, without requiring the installation of accessories.
- Already equipped with a thermostat, in the case of Stop Ice.
- Completely reliable.

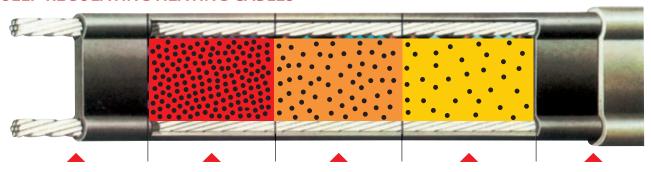








SELF-REGULATING HEATING CABLES



The cable will never become overheated and burn, as it is self-protecting. There is also no need for a thermostat. Almost all the contacts are interrupted by microscopic dilatation of the core at very high temperatures. The electrical resistance becomes very high and energy output is virtually nil.

The core dilates microscopically in the hotter parts, breaking some of the electrical contacts. As the electrical resistance increases energy output is reduced until a thermal balance is reached between heat loss in the pipes and the heat produced by the cable.

The core contracts microscopically when the heating cable is cold and the graphite forms numerous joints between the conductors.

The passage of the current generates heat.

The graphite particles form numerous parallel joints between the two copper conductors.

The self-regulation technology and the parallel circuit present the following advantages:

- The heating cables can be cut at the right length, jointed and terminated on site.
- They can be supplied at 230 V without transformers.
- They can be overlapped without over heating risks.
- They reduce automatically their power output as the required temperature is reached.
- They are easy designed and can be easily handled on site.

ADVANTAGES

SELF-REGULATING HEATING CABLES

- A reduction in overall installation costs
- Reduction in operating cost
- Very easy to install
- Simple design
- Uniform temperature
- Complete reliability

DOMESTIC USE

Anti-freeze for Piping

CONSTANT POWER



Stop Ice Constant power anti-freeze kit complete with thermostat and plug



Linus Self-adhesive thermal insulating tape



Constant power anti-freeze kit complete with thermostat, connection plug and insulation tape

Anti-freeze for Ramps

CONSTANT POWER

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Heating mat



MCA Ramp

Self-regulating heating cable for tracing ramps and stairways







SELF-REGULATING



Ice Killer

Cut and install self-regulating cable kit, complete with connection side and termination kit



Heating Cables

MCA

Self-regulating cable for antifreeze use or for maintaining temperatures for general use



MCA Compact

Compact size self-regulating cables for use as anti-freeze or to maintain temperature

Anti-freeze for Gutters

CONSTANT POWER

page 198





Easy Frost Constant power heating cable for roofs, gutters and downpipes

SELF-REGULATING



MCA8 Self-regulating cable for tracking roofs, gutters and/or downpipes



ANTI-FREEZE FOR PIPING Constant power

ANTI-FREEZE FOR PIPING

To keep pipes, tanks, basins, valves and taps, meters, etc. from freezing. Available both in the constant power and in the self-regulating versions.

STOP STOP STOP

Power: 12 W/m
Power supply: 230 V – 50 Hz
Cable dimensions: ~ 5x7 mm
Min. installation temperature: +5°C
Max. working temperature: +70°C
Heating cable type:

Protection degree: IP X7
Marking: CE



Integrated Bimetal Thermostat (ON + 3°C - OFF +10°C)



Complete Connections and power cord (1,5 m - 3 x 0,75 mm²)

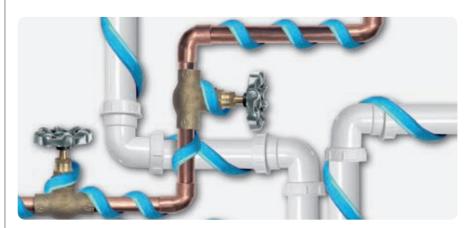
Stop Ice Constant power anti-freeze kit complete with t

Constant power anti-freeze kit complete with thermostat and plug

Raytech Stop Ice is an innovative pre-assembled kit consisting of a constant wattage heating cable of 12 W/m, complete with contact thermostat (installed on the end of the heating cable) and power cable with plug. Stop-Ice is particularly suitable for frost protection, and prevention of possible damages caused by low temperatures on pipes, valves, faucets, water meters, troughs, bowls and small tanks.

- Easy and quick to install
- No need for any external temperature control system, thanks to its built-in thermostat
- Low energy consumption

Product	Power (W/kit)	Specific power (W/m)	Length (m)
Stop Ice 2/12	24	12	2
Stop Ice 5/12	60	12	5
Stop Ice 10/12	120	12	10
Stop Ice 18/12	216	12	18









ANTI-FREEZE FOR PIPING

Constant power

Linus

Self-adhesive thermal insulating tape

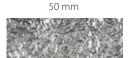
To offer a complete solution in the field of electrical tracking, Raytech has developed a new product, LINUS, an insulation tape to maintain temperature. The product is a closed-cell expanded synthetic rubber, low thermal conductivity and extremely flexible tape. The rubber tape is coupled with an aluminium sheet to protect against tearing, for greater resistance to perforation and higher tensile resistance. It also protects very well against UV radiation. The tape is self-adhesive for easy application on tracked pipes. The closed cells and the special material type give the tape very high insulating properties and optimal behaviour in the presence of condensation.

	Width	Thickness	Length
Product	(mm)	(mm)	(m)
LINUS	50	3	10

	Pipe ∅	Pipe Ø	Pipe ∅
	¾" (DN 20)	1"(DN 25)	1 ¼" (DN 32)
LENGHT OF PIPE I can insulate with 1 LINUS tape 50% overlapped	2,2 m	1,9 m	1,6 m







3 mm

Density: 0,7

Temperature range: $-50^{\circ}\text{C} - 105^{\circ}\text{C}$ Coefficient of thermal conductivity (λ):

0,039 W/mK a 50°C **Flame resistance:** Bs3-dO (DIN EN 13501-1)

Installation:

LINUS tape is for laying on piping that has been cleaned, degreased and tracked with heating cable, with a 50% overlap, removing the separating film during application.

Provide a protective coating for outdoor installation.



Heating Cables

ANTI-FREEZE FOR PIPING

Constant power



CABLE

Specific power: 12 W/m Power supply: 230 V- 50Hz Cold cable: 3 x 0,75 mm² - L = 1,5 m Temperature control: integrated bimetallic thermostat ON / OFF: +3°C / +10°C

INSULATION TAPE

Temperature range: -50 / +105°C Coefficient of thermal conductivity (λ): 0,039 W/mK a 50°C

Dimensions: 50 mm x 3 mm x L10 m



Stop Ice Plus

Constant power anti-freeze kit complete with thermostat, connection plug and insulation tape

Stop Ice Plus is an innovative kit which combines the flexibility and reliability of the constant power Stop Ice heating cable with the practicality of the LINUS insulation tape. The installer can find everything necessary for tracking inside this kit:

- Stop Ice 12 W/m constant power cable, complete with connection plug and thermostat
- 3 mm LINUS insulation tape, for application on already tracked piping with a cable with 50% overlap

As an example, with a 10 m long LINUS tape, about 2.2 m of ¾", traced with the Stop Ice cable, can be insulated.

	Power	Cable length
Product	(W/kit)	(m)
Stop Ice Plus 2	24	2
Stop Ice Plus 5	60	5



ANTI-FREEZE FOR PIPING
Self-regulating

Ice Killer

Cut and install **self-regulating** cable kit, complete with connection side and termination kit

The Ice Killer kit is composed of a 30 m self-regulating cable coil, complete with connection side and termination accessories. The cable can be cut to the desired length, installed on the pipe or tank, connected to the mains and terminated at the opposite end.

The economic and compact Ice Killer kit is sold in an attractive, easy to carry, easy to handle on-site package, is small in size, very flexible and can be easily adapted to bends in piping.

The Ice Killer cable is laid linearly or wound in piping, depending on the specific necessary power. It is then fastened to the same by means of inextensible tape (Raytech MCA-FV or MCA-ALL75 type tapes), terminated with MCA Universal accessories contained in the kit and then clad with the insulation. Operating temperature is reached very quickly and is maintained almost constant even with room temperature variations.

Product	Specific power a 10°C (W/m)	Kit composition
Ice Killer 2	10	30 m cable MCA Universal connection accessory MCA Universal termination accessory
lce Killer 6	18	30 m cable MCA Universal connection accessory MCA Universal termination accessory

ELECTRICAL SIZING	Maximum circuit length (m)					
	Ice K	iller 2	Ice Killer 6			
Starting temperature	0°C	-20°C	0°C	-20°C		
10 A electrical protection, characteristic C switch with differential 30 mA protection	95	77	58	41		







Supply voltage: 230 V

Min installation temperature: -30°C Cable dimensions: 7,7 x 5,3 mm

Max temperature with powered cable: 65°C

Max exposure temperature with non-powered cable: 65°C



Heating Cables

ANTI-FREEZE FOR PIPING
Self-regulating



MCA

Self-regulating cable for anti-freeze use or for maintaining temperatures for general use

For anti-freeze use on pipes or tanks or for maintaining process temperatures under 65°C, even in hazardous areas. Maintenance-free, reliable, easy to install. Suitable even in the presence of mild inorganic solutions.

Product	Power voltage (V)	Minimum installation temperature (°C)	Power at 10°C (W/m)	TEMPER, Continuous cable powered (°C)	ATURE MAX Intermittent cable not powered ≤1000 h cum. (°C)
Product	(•)	()	(**/111)	(C)	31000 11 carri. (c)
MCA3	220-240	-30	10	65	85
MCA5	220-240	-30	15	65	85
MCA8	220-240	-30	25	65	85
MCA5-SMALL	220-240	-30	15	65	85

How to Choose MCA Cable for Antifreeze Protection

The table gives the cable quantity for tube lenght unit (1st number) and the MCA cable code number (2nd number) versus tube diameter, thermal insulation thickness (for rockwod) and min outer temperature.

For uses other than anti-freeze, request design from Raytech technical direction.

Anti-freeze for piping

		Thermal insulation thickness									
Pip	e Ø	1	0	2	.0	3	0	4	10	5	0
					Ou	ter temp	erature	(°C)			
inch	mm	-10	-20	-10	-20	-10	-20	-10	-20	-10	-20
1/2"	15	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
3/4"	20	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
1"	25	1-3	1-8	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
11/4"	32	1-3	1-8	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
1½"	40	1-3	1-8	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
2"	50	1- 8	1-8	1-3	1-8	1-3	1-3	1-3	1-3	1-3	1-3
21/2"	65	1-8	1-8	1-3	1-8	1-3	1-3	1-3	1-3	1-3	1-3
3"	80	1-8	2 -8	1-3	1-8	1-3	1-5	1-3	1-3	1-3	1-3
4"	100	1-8	2 -8	1-5	1-8	1-3	1-5	1-3	1-5	1-3	1-3
6"	150	2 -8	2 -8	1-8	2 -8	1-8	1-8	1-3	1-8	1-3	1-8
8"	200	2 -8	-	1-8	2 -8	1-8	1-8	1-8	1-8	1-3	1-8
10"	250	2- 8	-	2- 8	-	1-8	2 -8	1-8	1-8	1-8	1-8

ELECTRICAL SIZING	Maximum length of the circuits in the heating cable (m) MCA3 MCA5						
Starting temperature		+10°C	-15°C	-25°C	+10°C	-15°C	-25°C
Switchgear protection (A),	16 A	205	140	123	145	93	82
with C curve and 30mA*	20 A	-	186	165	162	125	111
differential protection	30 A	-	195	195	-	160	160
	40 A	-	-	-	-	-	-

			MCA8		M	CA5-SMA	LL
Starting temperature		+10°C	-15°C	-25°C	+10°C	-15°C	-25°C
	10 A	-	-	-	104	69	59
Switchgear protection (A),	16 A	88	60	50	139	89	78
with C curve and 30mA*	20 A	117	75	70	-		-
differential protection	30 A	126	117	105	-	-	-
	40 A	-	125	125	-	-	-

^{*} Suggested where protection of people is requested; installations with no personnel admittance can be performed with 100 to 300 mA.

ANTI-FREEZE FOR PIPING Self-regulating

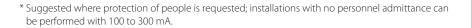
MCA Compact

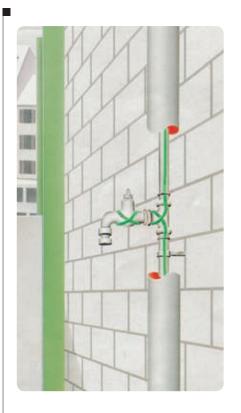
Compact size **self-regulating** cables for use as anti-freeze or to maintain temperature



Product	Power voltage (V)	Minimum installation temperature (°C)	Power at 10°C (W/m)	TEMPE Continuous cable powered (°C)	RATURE MAX Intermittent cable not powered ≤1000 h cum. (°C)	L cable (mm)	S cable (mm)
MCA2-COMPACT	230	-30	10	65	65	7,7	5,3
MCA6-COMPACT	230	-30	18	65	65	7,7	5,3

ELECTRICAL SIZING	Maximum length of the circuits in the heating cable (m) MCA2-COMPACT MCA6-COMPACT						
Starting temperature		+10°C	0°C	-20°C	+10°C	0°C	-20°C
Switchgear protection (A), with C curve and 30mA* differential protection	10 A	100	95	77	60	58	41





MCA and MCA2-COMPACT connection accessories

Connection kit integrated with the terminal box	Termination Kit	Joint Kit	Branch Kit
MCA Universal	MCA Universal	MCA Universal	MCA Universal
Thermal insulation pass-through kit MCA-AL	Cable gland MCA-PRESS		Warning label MCA-EA
Fixing tape glass MCA-FV	Fixing tape Aluminum 25mn MCA-ALL25	n	Fixing tape Aluminum 75mm MCA-ALL75





ANTI-FREEZE FOR RAMPS
Constant power

Tracking systems

ANTI-FREEZE FOR RAMPS, STEPS AND WALKWAYS

To keep garage access ramps, parking areas, outdoor stands and walkways free of snow and ice.

Available in both the **constant power** and in the **self-regulating** versions.



Mat specific power:: 300 W/m²
Power supply: 230 V ~ 50/60 Hz
Mat thickness: 7,5 mm
Min. installation temperature: +5°C
Max. working temperature: +80°C
Cold cable (supply):
length 4 meters - 3 × 1,5 mm² or 3×2,5 mm²
Heating cable type:
2 conductors, screened cable
Heating cable dimensions: ~5 × 7 mm
Heating cable power: 25 W/m

Insulation: XLPE External sheath: PVC Marking: CE



Easy Ramp

Constant wattage heating mat

Raytech Easy Ramp consists of a constant wattage heating cable assembled with tape to form a heating mat, which is easily and quickly spread on the surfaces to be protected. Easy Ramp is ideal for solving the problems caused by ice formation and the accumulation of snow on the access ramps to garages, pathways, outdoor parking areas, footpaths, etc. It can be installed in concrete, asphalt, and interlocking bricks or under porphyry paving or other paving materials blocked with cement and sand. The standard width of Easy Ramp pads is 60 cm; a sufficient width to free the track of vehicle wheels from ice and snow or to create an extremely safe pedestrian pathway.

The power density developed by Easy Ramp is 300 W/m². The mat is available in various lengths which are easily adaptable to the size of the area to track and where the size of the mat is larger than that of the ramp, the excess part of mat can be easily folded 90 degrees. The mat is supplied completely finished and ready for installation, complete with 4 meters of cold cable (3x1.5 mm² or 3x2.5 mm²) for connection to the power supply. The constant wattage heating cable, which constitutes the mat, is a 2 conductor heating cable, which is shielded; this allows one end only to be powered, making installation even faster and easier.

	Power	Specific power	Width	Length
Product	(W)	(W/m²)	(m)	(m)
Easy Ramp 4/300	670	300	0,6	4
Easy Ramp 7/300	1140	300	0,6	7
Easy Ramp 13/300	2560	300	0,6	13
Easy Ramp 21/300	3730	300	0,6	21



ANTI-FREEZE FOR RAMPS
Self-regulating

MCA Ramp

Self-regulating heating cable

The cable is used, buried in concrete, to prevent the accumulation of ice and its formation on access ramps, stairs, sidewalks, parking lots, walkways, etc. Suitable for ramps covered in concrete, interlocking brick or asphalt, both for light and heavy traffic. The cable can be installed on ramps under construction, securing the electrowelded mesh prior to pouring of the concrete, or else on already completed ramps by cutting the concrete surfaces to then fill with plastic cement after installation of the cable, or simply by laying the cable on the surface of the ramp and throwing another layer of cement. Contact Raytech for tracing designs and estimates.

Cable roofing cement or interlocking, asphalt, gneiss, and any other material

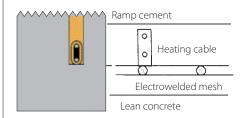
Product	Power at 0°C in concrete (W/m)	Max working temperature (°C)	Cabl Switgear*	e length Maximum length (m)
MCA 20-I-GF	90	120	40 A	64
MCA 10**	50	65	40 A	100



^{**}For ramps, stairs etc. with ambient temperature not lower than -15°C; for lower temperatures use only MCA 20-I-GF cable. For draining trenches tracing MCA8 cable shall be used. For other information contact Raytech.

Note: to trace drain outlets, use the MCA8 cable installed on the bottom of the outlets under the grate.



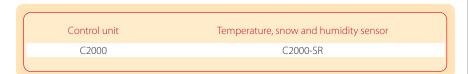


MCA Ramp connection accessories

(Connection kit integrated			
	with the terminal box	Termination Kit	Joint Kit	Cable gland
	MCA Universal	MCA Universal	MCA Universal	MCA-PRESS
- (

Control unit for Easy Ramp and MCA Ramp

The C 2000 control unit, to be completed with the C2000-SR temperature, snow and humidity sensor (sensor to be placed flush with the ramp and to be ordered separately from the control unit), activating the power contactor, gives consent to start the system only when low temperature and snow or ice are present simultaneously, optimising energy consumption.











ANTI-FREEZE FOR GUTTERS Constant power

Tracing systems

ANTI-FREEZE FOR GUTTERS

Contact and self-regulating power cables to prevent the formation of ice and snow accumulation in gutters, downspouts and roof pitches.

Easy Frost

Constant power heating cable for roofs, gutters and downpipes

Raytech Easy Frost is a 20 W/m constant power cable especially designed for roofs, gutters and downpipe protection from damage due to snow accumulation and ice formation. Easy Frost is supplied terminated and ready for installation, with 4 metres of cold cable $(3 \times 1.0 \text{ mm}^2 \text{ o } 3 \times 1.5 \text{ mm}^2)$ for supply connection.

	Specific power	Power	Resistance	Length
Product	. (W)	(W/m^2)	(Ω)	(m)
Easy Frost 50/20	20	1000	52,9	50
Easy Frost 102/20	20	2040	29,9	102





Power: 20 W/m **Power supply:** 230 V ~ 50/60 Hz Heating cable dimensions: $\sim 5 \times 7 \text{ mm}$ Min. installation temperature: $+5^{\circ}$ C Max. working temperature: +80°C Cold cable (power supply): length 4 meters - 3 x 1,0 mm² or 3 x 1,5 mm²

Heating cable type: 2 conductors, screened cable **Insulation:** XLPE External sheath: PVC

Min. bending radius: 3,5 D Marking: CE



only when connected to both the C2000-SUG and C2000-STG sensors.

Note: control unit C2000 works

Control unit for MCA 8 and Easy Frost

ON/OFF type control unit C 2000 to activate the power switch, to be completed with C 2000-STG temperature detection sensor and C 2000-SUG wet surfaces sensor: activates the system only when low temperature and water, ice or snow is present. (C 2000-STG and C 2000-SUG sensors are to be ordered and purchased separately from the control unit).

Control unit	Temperature, snow and humidity sensor	
C2000	C2000-SR	

For other accessories see page 206.

ANTI-FREEZE FOR GUTTERS Self-regulating

MCA 8

Self-regulating cable for tracing roofs, gutters and/or downpipes.

Prevents

The formation of ice inside gutters and downspouts, snow accumulation and ice on roofs, the development of infiltrations along façades, the development of ice sticks along gutters and roof ends.

Avoiding

Gutter breaking under the weight of snow, bursting and fracturing of drainpipes due to water freezing, damaged caused by a lack of draining caused by drain clogging, damage to persons or property caused by falling ice sticks, damage to persons or property caused by possible snow slides off rooves from roof edges.

Product	In air 0°C Power (W/m)	In chilly water Power (W/m)	sta	laximum cab arting tempe hrough a sw 20 A	erature of -10)°C
Product	(۷ ۷ / ۱ ۱ ۱)	(۷ ۷ / ۱ ۱ ۱)	10 A	20 A	30 A	
MCA8	24	40	40 m	50 m	75 m	

*Switchgear with "C" characteristic, having a diffferential protection of 30 mA

Note: the gutter cable is suspended along the down side of the drain pipes with accessory MCA-SUP. The cable is self-supporting up to 25 m vertical sections; in addition, an extra MCA-SUP accessory is provided for every 25 m, to which the cable is secured.



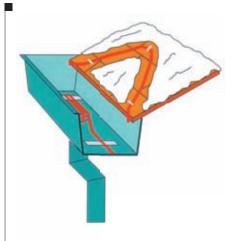


40 A 100 m

MCA 8 connection accessories

Connection kit integrated with the terminal box	Termination Kit	Joint Kit
MCA Universal	MCA Universal	MCA Universal
Branch Kit		Support device
MCA Universal		MCA-SUP
ivica Universal		IVICA-SUP

For other accessories see page 206.



The image shows gutter installation, the input of cable in a downpipe and tracking of a roof pitch.









INDUSTRIAL USE

Anti-freeze maintenance and heating

up to 65°C continuous 85°C intermittent Anti-freeze maintenance and heating

up to 120°C continuous 120°C intermittent Anti-freeze maintenance, heating and washing

up to 120°C continuous 190°C intermittent

ATEX

ATEX



MCA3
MCA5
MCA8
MCA10



MCA5-I-GF
MCA8-I-GF
MCA10-I-GF
MCA20-I-GF

MCA3-I-GF



MCA5-I-FF MCA8-I-FF MCA10-I-FF MCA20-I-FF

MCA3-I-FF



INDUSTRIAL USE

Heating Cables

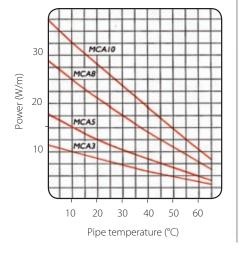
SELF-REGULATING

Up to 65°C continuous - 85°C intermittent

ATEX MCA

Self-regulating heating cables for anti-freeze or temperature maintenance use with exposure to mild inorganic solutions

Suitable for anti-freeze and process temperature maintenance use **up to 65°C** on piping and tanks. Cannot be used when washing with steam or continuous exposure to strong corrosive and organic acids.





CONSTITUTION OF THE CABLE

Copper conductors

Self regulating conductive core

Modified polyolefine insulation

Copper screen

Modified polyolefine or fluoropolymer (1-PF) outer sheath

These cables are certified KEMA 03 ATEX 2042 U for classified zones (II 2 G EE x e), according to EN 50014 and EN 50019).

Type of surface to be tracked:

Steel - Painted - Stainless Steel -Plastic.

Chemical resistance: Suitable for exposure to mild inorganic solutions.

				MAXT	EMPERATURE		
	Power voltage	Power at 10°C (W/m)	Minimum installation temperature (°C)	Continuous cable powered (°C)	Intermittent cable not powered ≤1000 h cum.	Bending radius min. (mm)	Temperature classification EN50014
Product	(V)	(۷۷/111)	(C)	(C)	(C)	(mm)	EN50014
MCA3	230	10	-33	65	85	25	T6
MCA5	230	15	-33	65	85	25	T6
MCA8	230	25	-33	65	85	25	T5
MCA10	230	33	-33	65	85	25	T5

Add the abbreviation **I-PF** for external fluoropolymer sheaths

ELECTRICAL SIZING	Maximum length of the circuits in the heating cable (m)												
			MCA3			MCA5			MCA8			MCA10	
Starting temperature		+10°C	-15°C	-25°C									
	16 A	205	140	123	145	93	82	88	60	50	70	50	45
Switchgear protection (A), with C curve and 30mA*	20 A	-	186	165	162	125	111	117	75	70	90	65	58
differential protection*	30 A	-	195	195	-	160	160	126	117	105	108	95	85
	40 A	-	-	-	-	-	-	-	125	125	-	105	105

^{*} Suggested where protection of people is requested; installations with no personnel admittance can be performed with 100 to 300 mA.

MCA 3 connection accessories

Connection kit integrated with the terminal box	Termination Kit	Joint Kit	Branch Kit	Thermal insulation pass-through kit
MCA Universal	MCA Universal	MCA Universal	MCA Universal	MCA-AL
Cable gland	Warning label	Fixing tape glass	Fixing tape Aluminum 25mm	Fixing tape Aluminum 75mm
MCA-PRESS	MCA-EA	MCA-FV	MCA-ALL25	MCA-ALL75



SELF-REGULATING

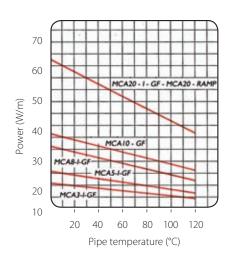
Up to 120°C continuous - 120°C intermittent

MCA-I-GF

Self-regulating heating cables for anti-freeze or temperature maintenance use with exposure to **corrosives and acids**

Suitable for maintaining process temperatures **up to 120°C** on piping and tanks, even in the presence of acids and corrosives, or for anti-freeze use where acids and corrosives are present, in safe areas. Not suitable for use in the presence of steam washing.

CONSTITUTION OF THE CABLE Copper conductors Self regulating conductive core Fluoropolymer insulation Copper screen Modified polyolefine outer sheath



Type of surface to be tracked: Steel - Painted - Stainless Steel. Chemical resistance: Suitable for exposure to corrosive and organic acids.

Product	Power voltage (V)	Power at 10°C (W/m)	Minimum installation temperature (°C)	MAX TI Continuous cable powered (°C)	EMPERATURE Intermittent cable not powered ≤1000 h cum. (°C)	Bending radius min. (mm)	Temperature classification EN50014
MCA3-I-GF	230	10	-30	120	120	25	T3
MCA5-I-GF	230	15	-30	120	120	25	T3
MCA8-I-GF	230	25	-30	120	120	25	T3
MCA10-I-GF	230	30	-30	120	120	25	T3
MCA20-I-GF	230	60	-30	120	120	25	T3

ELECTRICAL SIZING

Maximum length of the circuits in the heating cable (m)

Starting		M	ICA3-I-G	iF	М	MCA5-I-GF		MCA8-I-GF		MCA10-I-GF		MC20-I-GF / RAMP		RAMP		
temperature		+10°C	-15°C	-25°C	+10°C	-15°C	-25°C	+10°C	-15°C	-25°C	+10°C	-15°C	-25°C	+10°C	-15°C	-25°C
Switchgear protection (A),	16 A	200	180	175	165	130	117	120	97	88	85	73	69	50	41	38
with C curve and	20 A	235	235	235	189	162	152	140	125	120	114	98	92	64	55	52
30mA* differential protection	30 A	-	-	-	-	-	189	-	-	140	-	-	114	-	-	64

^{*}Suggested where protection of people is requested; installations with no personnel admittance can be performed with 100 to 300 mA.

Connection accessories for MCA-I-GF

Connection kit integrated with the terminal box	Termination Kit	Joint Kit	Branch Kit	Thermal insulation pass-through kit
MCA Universal	MCA Universal	MCA Universal	MCA Universal	MCA-AL
Cable gland	Warning label	Fixing tape glass	Fixing tape Aluminum 25mm	Fixing tape Aluminum 75mm
MCA-PRESS	MCA-EA	MCA-FV	MCA-ALL25	MCA-ALL75

SELF-REGULATING

Up to 120°C continuous - 190°C intermittent

ATEX

MCA-I-FF

Self-regulating heating cables for anti-freeze or temperature maintenance use with exposure to **corrosives and acids and high temperatures**

Suitable for maintaining process temperatures **up to 120°C** on piping and tanks, even in the presence of acids and corrosives, or for anti-freeze use even in the presence of acids and corrosives and where high temperature thermal treatment is foreseen, like steam washing, **up to 190°C.**

70 60 40 30 20 MCASHF 20 40 60 80 100 120 Pipe temperature (°C)



CONSTITUTION OF THE CABLE

Copper conductors

Self regulating conductive core

Fluoropolymer insulation

Copper screen

Fluoropolymer outer sheath

These cables are certified KEMA 03 ATEX 2042 U for classified zones (II 2 G EE x e), according to EN 50014 and EN 50019).

Type of surface to be tracked: Steel - Painted - Stainless Steel -

Plastic.

Chemical resistance: Suitable for exposure to corrosive and organic acids.

Prodotto	Power voltage (V)	Power at 10°C (W/m)	Minimum installation temperature (°C)	TEMPE Continuous cable powered (°C)	ERATURE MAX Intermittente a cavo non alimentato ≤1000 h cum. (°C)	Bending radius min. (mm)	Temperature classification EN50014
MCA3-I-FF	230	10	-30	120	190	25	T3
MCA5 -I-FF	230	15	-30	120	190	25	T3
MCA8-I-FF	230	25	-30	120	190	25	T3
MCA10-I-FF	230	30	-30	120	190	25	T3
MCA20-I-FF	230	60	-30	120	190	25	T3

ELECTRICAL SIZING

Maximum length of the circuits in the heating cable (m)

Starting		MCA3-I-GF		MCA5-I-GF		MCA8-I-GF		MCA10-I-GF		MC20-I-GF / RAMP		RAMP				
temperature		+10°C	-15°C	-25°C	+10°C	-15°C	-25°C	+10°C	-15°C	-25°C	+10°C	-15℃	-25°C	+10°C	-15°C	-25°C
Switchgear protection (A),	16 A	200	180	175	165	130	117	120	97	88	85	73	69	50	41	38
with C curve and	20 A	235	235	235	189	162	152	140	125	120	114	98	92	64	55	52
30mA* differential protection	30 A	-	-	-	-	-	189	-	-	140	-	-	114	-	-	64

^{*} Suggested where protection of people is requested; installations with no personnel admittance can be performed with 100 to 300 mA.

Connection accessories for MCA-I-FF

Connection kit integrated with the terminal box	Termination Kit	Joint Kit	Branch Kit	Thermal insulation pass-through kit
MCA Universal	MCA Universal	MCA Universal	MCA Universal	MCA-AL
Cable gland	Warning label	Fixing tape glass	Fixing tape Aluminum 25mm	Fixing tape Aluminum75mm
MCA-PRESS	MCA-EA	MCA-FV	MCA-ALL25	MCA-ALL75







Accessories

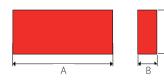


Electrical:

EN 50393 and CEI 20-33 (Note: with testing under water head and water between the cable cores), in Class 2

Flame non propagation:

IEC 60332-1 and HD 405-1 (as applicable)



MCA Universal

Universal accessory for heating cable

A revolutionary accessory is now available that is suitable for any type of self regulating heating cable either with or without screening. Its versatility provides a reliable unique solution unavailable elsewhere in the market. It has no shelf life and no tools are required during installation (including blow torches).

- Versatile and ready to use
- No need for tools
- Without heating
- Installable at any temperature
- Can be used directly underground
- Very compact
- Re-enterable
- Non toxic and flame retarded
- The connections are automatically blocked when the joint is closed

- Screw connectors available with the kit
- Also for underwater use
- Without shelf life

It allows to realize

- Connection to the power cable, integrated to the terminal box
- Pot ends
- Joints between heating cables
- Branch joint

Product	Kit Composition	Dimension A x B x C (mm)
MCA Universal	3 screw connectors to connect to the power cable or other heating cables	150 x 30 x 56



Connection termination to the power cable



Pot end



Straight joint between Heating cables



Branch joint



MCA-PC, MCA-PC-Compact

Connection kit

Supply side termination allowing connections to a terminal box. Made of cold-shrink components and also a dedicated cable gland. One for each cable.



MCA-PM, MCA-PM-Compact

Termination kit

For insulating and matching the cable ends. Made from cold-shrink components. One kit for each termination.



MCA-AL

Thermal insulation pass-through

It allows the cable to pass through the metallic covering of the thermal insulation, avoiding abrasions and the moisture or water entry under the covering. It contains cable gland and fixing plate. One kit for each cable.



MCA-GL

Joint kit

To joint cable ends or to repair damaged cables. It containes all the components required, including connectors. One kit for each cable.



MCA-PRESS

Cable gland

To allow the cable to enter in boxes, to pass through walls etc. One kit per cable.

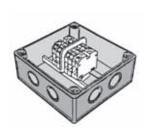




MCA-SUP

Support device for gutters and down pipes

It supports and fixes the cable in gutters and downpipes. In large gutters, requiring 2 cables laid longitudinally, it maintains the cable at the right distance.



MCA-SG

Box

Box with IP55 degree of protection, complete of terminals. It alllows the entry of 1 or more heating cables, or to branch a cable from a main tracing, or to joint cable lengths. Cables inside the box shall be MCA-PC terminated.



MCA-FV

Glass fiber tape

To fix the cable to the pipe, 3 turns every 0,3 m of pipe. Self adhesive, in 50 m rolls.



MCA-ALL25 - MCA-ALL75

Aluminium self adhesive tape 25 or 75 mm width

For cable fixing, in 50 m rolls.



GUAT 26

Connection kit for classified area

WARNING ELECTRIC TRANCING

MCA-EA

Warning label

To be applied for warning over traced items.



Control Unit C2000

C 2000 Control unit for temperature and humidity

The C2000 control unit and relative sensors are suitable for the tracing with both self-regulating cables and constant power cables. The unit allows you to power the system only when low temperatures and humid surfaces (snow - ice, etc.) are present simultaneously.



ON (green) voltage

RELAY (red) cable on power

MOIST (red) humidity presence

 $\textbf{TEMP} \quad \text{(red) the temperature is lower} \\$

than the fixed

Voltage: 230V c.a. +/- 10% 50/60Hz

Switching capacity: 16A (3600 W)
Differential ON/OFF: 0,4°C
Temperature Range: 0-10°C
After run time: 1-6 hours
Protection degree: IP20
Dimensions: 85 x 42 x 48,8 mm

Weight: 252 gr

Output: N° 1 relays

Room temperature: $0/50^{\circ}C$



C2000 - SR

Humidity and temperature sensor for ramps and stairs

Dimensions: h 32 mm - Ø 60 mm

Protection degree: IP68

Ambient temperature: -20°C / +70°C Connecting cable: 6x1,5 mm², lenght. 10 m

(possible increase up to 200 m)



C2000 - SUG

Ice and snow sensor for gutters

Dimensions: 105 x 30 x 10mm **Protection degree:** IP68

Ambient temperature: -20°C / +70°C Connecting cable: 4x1,5 mm², lenght.10 m

(possible increase up to 200 m)



C2000 - STG

Temperature sensor for gutters

Dimensions: 86 x 45 x 35 mm **Protection degree:** IP55

Ambient temperature: -20°C / 70°C Connecting cable: not included





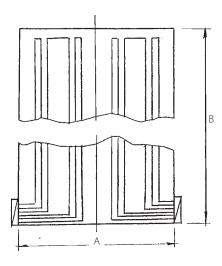
Piping tracing piping valve support flange **PIPING DATA** • External diameter **D** (m, mm or inch) Thickness **S** (mm) Section length (attach isometric tracing) (m) Piping material **TEMPERATURE DATA** • Maintenance (indicate if for anti-freeze) (°C) ______ • Minimum room temp. (°C) _____ • Maximum exposure temperature: - continuous (°C) ______ - intermittent (°C) ______ - for (hours/year) _____ Outdoor or indoor installation ______ Temperature classification (T...) **INSULATION** Material used ACIDS OR CORROSIVES Presence or absence and any type **AREA CLASSIFICATION** Indicate if safe or classified, zone 1 or 2, anti-explosion, etc. PRESENCE OF VALVES - FLANGES - SUPPORTS - PUMPS VALVES FLANGES Type (gate, ball, etc.) Quantity _____ • PUMPS Type -----• SUPPORTS Type Quantity Dimensions -----POWER VOLTAGE · Voltage (V) ANY USE OF CABLE AS HEATER Also indicate • Fluid to be heated Type/density (kg/dm³) Thermal conductivity (W/m °C) Specific heat (J/kg °C) Speed in pipe (m/sec)

• Time required for heating (h)

Tank and silo tracing SILO OR TANK DATA - Cylinder D x H (m) ______ - Flat-face A x B x C x... (m) _____ If necessary, attach a sketch with dimensions Material **TEMPERATURE DATA** Maintenance (indicate if for anti-freeze) (°C) Minimum room temp. (°C) • Maximum exposure temperature: - continuous (°C) _____ - intermittent (°C) _____ - for (hours/year) _____ Outdoor or indoor installation Temperature classification (T...) INSULATION Material used _______ ACIDS OR CORROSIVES Presence or absence and any type _____ AREA CLASSIFICATION Indicate if safe or classified, zone 1 or 2, anti-explosion, etc. PRESENCE OF VALVES - FLANGES - SUPPORTS - PUMPS VALVES FLANGES Type (gate, ball, etc.) Quantity _____ Quantity _____ • PUMPS Type -----• SUPPORTS Type _____ Quantity Dimensions -----POWER VOLTAGE • Voltage (V) ANY USE OF CABLE AS HEATER Also indicate • Fluid to be heated Type/density (kg/dm³) Thermal conductivity (W/m °C) Specific heat (J/kg °C) Speed in pipe (m/sec) • Time required for heating (h)

Ramp tracing

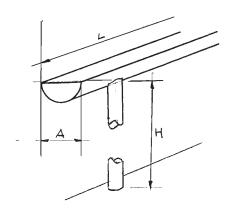




RAMP DATA		
Dimensions A x B (m)		
If necessary, attach drawing of p		
<i>y,</i> 3 1		
TYPE OF TRAFFIC:	☐ Light (vehicles, vans, et	c.)
	☐ Heavy (trucks, TIR truck	
	Other	•
Ramp covering		
(Concrete, self-locking, porphyry		
(Concrete, sen locking, porphyry	, tiles, aspiralit, etc.)	
Direction of travel		
(one way, 2 ways simultaneously		
(Offic way, 2 ways sifficitaticously	, etc.)	
☐ Complete tracking	☐ Tracking only on wheel	naccador
Li Complete tracking	in tracking only on wheel	passages
Minimum environmental tempe	raturo (°C)	
wiiminum environmentar tempe	rature (C)	
CLIMATIC CONDITIONS:	□ Moderate	□Severe
CLIMATIC CONDITIONS.	□ Moderate	□ 2evele
DOWED VOLTAGE		
POWER VOLTAGE		
\/ I;		
Voltage (V)		
Available power (kW)		
Any possibility of three-phase po	ower	

Gutter and downspout tracing





GUTTER A	ND DOWNSPOUT D	ATA	
DIMENSION	NS:		
Width A (m	ı)		
Length L (n	n)		
Height H (n	n)		
If necessary	/, attach drawing of μ	blan	
TYPE:	□ copper	□ steel sheet	
	□ concrete	□ concrete drain outlet	
	□ bitumen	□ other	
Minimum e	environmental tempe	erature (°C)	
CLIMATIC C	CONDITIONS:	□ Moderate	□ Severe
POWER VO	DLTAGE		
2			
Available p	ower (kW)		
Any possib	ility of three-phase p	ower	





COMFORT HOUSE

Flooring

PRIMARY, SECONDARY OR FLOORING COMFORT HEATING SYSTEMS

page 216



Easy Floor
For the intelligent
tracing of tile,
marble, etc. floors



Easy Wood
For the intelligent
tracing of wood or
laminate flooring

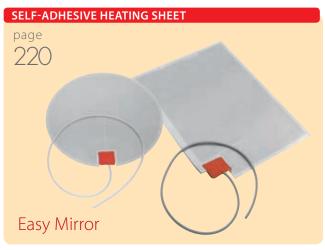


Raytech
Intelligent
Display
Intelligent room timed
thermostat



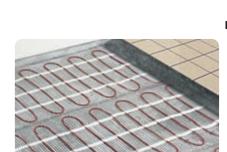
Happy Life Comfort tracing of mats, bedside carpets, platforms

Mirror



Ceiling





Comfort House

Primary, secondary or flooring comfort heating systems

Heating mats and intelligent timed thermostat: Raytech intelligent systems for primary, secondary and flooring heating comfort for homes, offices, kindergartens, schools and hospitals.

Constant power heating mats for flooring

Combining the total reliability of the Raytech mat system with the RID microprocessor intelligent thermostat, it is possible to autonomously control all space heating parameters, as a primary means in less cold months and as a secondary means together with a more traditional system, and for comfort heating in bathrooms, kitchens, living rooms and children's bedrooms. After the first programming of the RID timed thermostat, you are free to forget about the system, which will run itself, ensuring optimal conditions.



FLOORING

Easy Floor

Heating mat for the intelligent tracing of tile, marble, floors, etc.

The Easy Floor mat is laid directly on a layer of thermal insulation that coats the floor finished with concrete, and then buried in self-levelling concrete and covered with tiles. The flooring tracing mats are supplied in standard widths of 50 cm, power 150 W/m².

Product	Width (m)	Length (m)	Power (W)
Easy Floor 2	0,5	2	150
Easy Floor 3	0,5	3	225
Easy Floor 4	0,5	4	300
Easy Floor 2-ST	0,5	2	150
Easy Floor 3-ST	0,5	3	225
Easy Floor 4-ST	0,5	4	300

Other sizes available upon request















The kit is composed of:

- Heating mat complete with cold tail
- RID microprocessor intelligent room timed thermostat complete with sensor
- Corrugated pipe for positioning

Note: –ST type kits are supplied without a RID room timed thermostat

FLOORING



The kit is composed of:

Heating mat complete with connection wires and connectors, tapes and grippers for connection.

RID microprocessor intelligent room timed thermostat complete with sensor. Corrugated pipe for sensor positioning

Note: provide for thermal insulation of at least 6 mm in thickness (e.g. sheet of polystyrene) under the heating sheet and a barrier against humidity (polythene sheet at least 0.1 mm) above.

Contact Raytech for any clarifications.

Easy Wood

Heating mat for the intelligent tracing of wood or laminate floors.

Easy Wood is a very thin film (only 0.3 mm) controlled by a digital intelligent timed thermostat with RID microprocessor supplied with the kit. It is advisable not to exceed a temperature of 28°C. Suitable for secondary or comfort heating.

Product	Width (m)	Length (m)	Power (W)
Easy Wood 8	0,6	8,4	80
Easy Wood 16	0,6	16,8	80

Other sizes available upon request.















Raytech Intelligent Display

Intelligent room timed thermostat

The RID (Raytech Intelligent Display) microprocessor room timed thermostat is simple to use, thanks to its step-by-step programming guide. The easy to read display supplies a complete explanation of set parameters after 10 seconds.

It includes a wood floor function, which limits the temperature to 28°C for wood flooring.

The RID autonomously controls all room functions, with no need for extra operations. Weekly programming makes it possible to to take into account the set temperature to be maintained, the type and thickness of the flooring, temperature limits not to be exceeded, modes for increasing temperature, etc.

This device is equipped with an anti-freeze function when the house is not inhabited, a block for untimely interventions (for example children) and communicates any operating failures to the appropriate alarms.

Product	Dimensions (mm)
RID room thermostat	85 x 85 x 45



Sensor	Included with the kit
Temperature range	+5 / +50°C
Temperature limit	+5 / +55°C
Start Up Programme	Automatic, self learning
Manual	0,1-10°C
Room temperature	0 / +40°C
Differential On/Off	Standard 0,4°C Adjustable 0,1-1°C
Power supply	230 V / 50-60 Hz
Self-consumption	5 W
Max output current	16 A (3400 W/220 V)

Happy Life

Comfort tracing of mats, bedside carpets, platforms

Powered at 28V, laid under the platform or mat to keep feet warm. Ideal for the elderly and children.

- Comfort heating on bedside carpets
- For comfort tracing in children's rooms
- For the comfort of the elderly, and as a relief from rheumatism
- $\bullet \ \, \text{To speed up the drying of shoes, especially during the winter months}$
- To heat doghouses

Product	Dimension (m)	Power (W)
Happy Life 610	60 x 100	62





Complete with power transformer.









Easy Mirror

Self-adhesive heating sheet

No more fogged mirrors after a shower or bath! Easy Mirror, the self-adhering heating sheet to be applied on the back of the mirror and connected to the mains, eliminates this problem! Powered 230V, double insulated in accordance with safety regulations. Brings the surface of the mirror to 30°C in about 3-5 minutes, removing the film of moisture. Easy Mirror sheets are packaged with a sheet of laminated aluminium on polyester, with double insulation made with 4 more sheets of vulcanised polyester, completely sealed against water.

• Ideal for bathrooms, saunas, kitchens, private homes, Hotels, gyms and sports facilities

	Sheet dimensions	Power
Product	(cm)	(W)
Easy Mirror 35	Ø 35	50
Easy Mirror 36/50	36 x 50	50





Installation Sequence











Heat where you want it, when you want it



The ideal solution for all low thermal comfort environments











Warm Up

Ceiling heating panels

WARM-UP ceiling heating panels by Raytech can be installed invisibly and built into the ceiling of any home, office, showroom, workshop, greenhouse, camper vans etc., maximising space and freeing up wall space. Their positioning does not require any invasive procedures on the walls of the room, and their electrical connection is extremely simple. They can be installed, possibly placing them at the points where maximum thermal efficiency is required, with any mounting system: hung with chains, flush mounted, or recessed in false ceilings, always easily and quickly. The type of heating, based on infrared radiation, which makes it similar to solar radiation, is safe and unharmful, quick, efficient and extremely comfortable.

Why choose the Warm-Up System?

- It is installed without requiring any invasive procedures to be carried out on the structures of the house.
- It is easily unistalled for re-use in another context.
- Its radiated heat is safe, with no air movement, and does not dirty the walls and room.
- It is used for primary heating and for secondary heating as an integrative system, and optimises and reduces heating costs thanks to the RID-WL thermostat.

An ideally integrated invisible system that can also be decorative!



VERANDAS



PREFABRICATED BUILDINGS



EXHIBITION SPACES

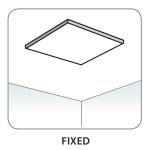


GAZEBOS



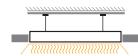








ENCASED





Controlled by a timed thermostat or a power regulator, they reduce consumption to a minimum

What Are the Benefits to the System compared to others?

- Heating is immediate, in just a few minutes.
- It leaves room walls free because it is installed on the ceiling, flush mounted or recessed in false ceilings.
- It does not pollute, as it does not use gas or hydrocarbons.
- It optimises heating and reduces costs.
- Unlike other types of heating systems, it does not require maintenance!
- It uses the energy produced by photovoltaic systems, reducing heating costs.
- It can be coloured, and is therefore easily camouflaged or used as a decorative element.

Class 2 degree of protection IP44 Power required for comfort heating: about 60W/m²

(one Warm Up 1 panel every 4m²) For primary heating with well-insulated walls: about 120W/m²

Product	Color	Power (W)	Dimensions (mm)
Warm Up 1	White. Paintable	240 W	590 x 590 x 40
Warm Up 2	white, Paintable	500 W	1190 x 590 x 40





OFFICES





WAREHOUSES - GARAGES HOMES



CEILING

Warm Up accessories



Temperature accuracy: 0,1°C
Field of operation: from 0°C to +40°C
Field of temperature: from 5°C to +35°C
Power supply: 2 AAA 1.5 V batteries
Degree of protection: IP30
Frequency: 868 MHz
Powered receiver: 230 V, 50 Hz
Relay range: 16 A
Range in distance:
100 m outdoors, 30 m indoors

Programmable in 30 minute blocks 9 pre-installed programmes and 4 user-set programmes "Self-learning" temperature control Child lock
Low battery alarm
Unlimited programme memory in the case of discharged batteries



Digital wireless timed thermostat

Raytech has established the innovative WIRELESS RID-WLTIMED ROOM THERMOSTAT for maximum efficiency and speed and ease of installation. This system combines well-known reliability and control of environmental parameters of the system RID with a wireless connection.

The RID-WL, which operates in radio frequency, allows non-invasive installation in any environment, both for new installations and those related to renovations, or to reinforce an existing primary system.

The RID-WL is coupled with its own receiver, tuned to the frequency of its own thermostat (exclusive signal), which is able to control an ampacity of 16 A.

RID-WL, since it is not wired, it can be moved within the range of use and positioned where controlling the parameters is important.

It is equipped with an easy to read backlit LCD screen and is programmable and provided with a built-in internal sensor, but can be connected to a separate sensor, for example on the floor.

Product	Description
RID-WL	Timed thermostat including receiver



Degree of protection: IP30 Frequency: 868 MHz Powered receiver: 230 V, 50 Hz Relay range: 8 A Range in distance: 100 m outdoors, 30 m indoors

Additional relay device

Additional relay device, with a maximum of 6 devices which can be controlled by the same RID-WL timed thermostat

Product	Description
RID-WL-R	Additional receiver for loads greater than 8 A

Product Code Index

PRODUCT | CODE 0-9 / A - B

19-9 200 PTD-2004		Product	Code	Category	Page	Product	Code	Category	Page
258 RTD-20LC	0-9	250 RTD-20/A	250RTD20/A			AUTO 20/50-I	2050-I-AUTO	i	
256 RTD-2005		250 RTD-20/B	250RTD20/B	Separable connectors	176	AUTO 20/50-I	2050-I-AUTO	Cold-shrink	150
250 RTD-200T		250 RTD-20/C	250RTD20/C	Separable connectors	176	AUTO 20/630-E	20630-E-AUTO	Cold-shrink	151
250 RTD-20/F 250 RTD-20/F 350 parable cornectors 76		250 RTD-20/D	250RTD20/D	Separable connectors	176	AUTO 20/630-E	20630-E-AUTO	Cold-shrink	151
259 RTS-200A 250 RTS-200B Separable connectors 756 AUTO 301/20-E 301/20-EAUTO Cold-shrink 133 250 RTS-200C 250 RTS-200C Separable connectors 756 AUTO 301/20-E 301/20-EAUTO Cold-shrink 133 250 RTS-200C 250 RTS-200C Separable connectors 756 AUTO 301/20-E 301/20-EAUTO Cold-shrink 133 250 RTS-200C 250 RTS-200C Separable connectors 756 AUTO 301/20-E 301/20-EAUTO Cold-shrink 153 250 RTS-200C 250 RTS-200C Separable connectors 757 AUTO 301/20-E 30400-E 30400-E 40400-E		250 RTD-20/E	250RTD20/E	Separable connectors	176	AUTO 20/630-I	20630-I-AUTO	Cold-shrink	150
250 RTS-20/18 250 RTS-20/18 250 RTS-20/12 250 RTS-20/1		250 RTD-20/F	250RTD20/F	Separable connectors	176	AUTO 20/630-I	20630-I-AUTO	Cold-shrink	150
250 RTS-20/C 250		250 RTS-20/A	250RTS20/A	Separable connectors	176	AUTO 30/120-E	30120-E-AUTO	Cold-shrink	153
250 RTS-20/D 250		250 RTS-20/B	250RTS20/B	Separable connectors	176	AUTO 30/120-E	30120-E-AUTO	Cold-shrink	153
250 RTS-20/E 250RTS-20/E 250RTS-20/E 250RTS-20/F		250 RTS-20/C	250RTS20/C	Separable connectors	176	AUTO 30/120-I	30120-I-AUTO	Cold-shrink	153
250 RTS-20/F 250 RTS-20/F Separable connectors 77		250 RTS-20/D	250RTS20/D	Separable connectors	176	AUTO 30/120-I	30120-I-AUTO	Cold-shrink	153
630 RTO-20/A-C400		250 RTS-20/E	250RTS20/E	Separable connectors	176	AUTO 30/400-E	30400-E-AUTO	Cold-shrink	153
630 RTO-20/B-C400 630 RTO-20/B-C400 569 RTO-20/C-C630 630 RTO-20/C-C630 630 RTO-20/C-C630 630 RTO-20/C-C630 630 RTO-20/C-C630 630 RTO-20/C-C630 630 RTO-30/B-C400 630 RTO-30/B-C50 630 RTO		250 RTS-20/F	250RTS20/F	Separable connectors	176	AUTO 30/400-E	30400-E-AUTO	Cold-shrink	153
630 RTO-20/C-C630 630RT020/C-C630 Separable connectors 177 AUTO 30/95-E 30/95-E-AUTO Cold-shrink 153 630 RTO-30/A-C400 630RT030/A-C400 Separable connectors 177 AUTO 30/95-E 30/95-E-AUTO Cold-shrink 153 630 RTO-30/A-C400 630RT030/A-C400 Separable connectors 177 AUTO 30/95-E 30/95-AUTO Cold-shrink 153 630 RTO-30/A-C400 630RT030/A-C400 Separable connectors 177 AUTO 30/95-E 30/95-AUTO Cold-shrink 153 630 RTO-30/D-C630 630RT030/A-C50 Separable connectors 177 B B BAG GEL 200-R BAGGGL200-F modeling fillers 71 630 RTT-20/A-C95 630RT120/A-C95 Separable connectors 177 B BAG GEL 200-V BAGGGL200-F modeling fillers 71 630 RTT-20/C-C40 630RT120/C-C40 Separable connectors 177 BAG GEL 400-R BAGGGL200-F modeling fillers 71 630 RTT-20/D-C240 630RT120/C-C40 Separable connectors 177 BAG GEL 400-R BAGGGL400-F modeling fillers 71 630 RTT-20/D-C240 630RT120/C-C40 Separable connectors 177 BAG GEL 400-F BAGGGL400-F modeling fillers 71 630 RTT-30/A-C95 630RT120/A-C95 Separable connectors 177 BAG GEL 400-F BAGGGL400-F modeling fillers 71 630 RTT-30/A-C95 630RT120/A-C95 Separable connectors 177 BAG GEL 400-F BAGGGL400-F modeling fillers 71 630 RTT-30/A-C95 630RT120/A-C96 Separable connectors 177 BAG RTV 200-F BAGGGL400-F modeling fillers 71 840 RTV 200-F BAGGGL400-F BAGGGL400-F modeling fillers 71 840 RTV 200-F BAGGGL400-F BAGGGL400-F modeling fillers 71 840 RTV 200-F BAGGGL400-F		630 RTO-20/A-C400	630RTO20/A-C400	Separable connectors	177	AUTO 30/400-I	30400-I-AUTO	Cold-shrink	153
630 RTO-20/D-C630 630RT030/A-C600 630RT030/A-C600 630RT030/A-C600 630RT030/A-C600 630RT030/A-C600 630RT030/A-C600 630RT030/C-C630 630RT030		630 RTO-20/B-C400	630RTO20/B-C400	Separable connectors	177	AUTO 30/400-I	30400-I-AUTO	Cold-shrink	153
630 RTO-30/A-C400 630RT030/A-C400 Separable connectors 177 AUTO 30/95-1 30/95-HAUTO Cold-shrink 153 630 RTO-30/B-C400 630RT030/B-C400 Separable connectors 177 BAG GEL 200-R BAGGEL 200-R		630 RTO-20/C-C630	630RTO20/C-C630	Separable connectors	177	AUTO 30/95-E	3095-E-AUTO	Cold-shrink	153
630 RTO-30/B-C400 630 RTO30/B-C400 Separable connectors 177 B B G GEL 200 R BAGGEL200 R Insulating fillers 71		630 RTO-20/D-C630	630RTO20/D-C630	Separable connectors	177	AUTO 30/95-E	3095-E-AUTO	Cold-shrink	153
630 RTO-30/C-C630		630 RTO-30/A-C400	630RTO30/A-C400	Separable connectors	177	AUTO 30/95-I	3095-I-AUTO	Cold-shrink	153
630 RTO-30/C-C630		630 RTO-30/B-C400	630RTO30/B-C400	Separable connectors	177	AUTO 30/95-I	3095-I-AUTO	Cold-shrink	153
630 RTG-30/D-C630 630RT20/A-C95 Separable connectors 177 BAG GEL 200-T Insulating fillers 71 630 RTT-20/A-C95 630RT20/B-C95 Separable connectors 177 BAG GEL 200-V BAGGEL 200-V Insulating fillers 71 630 RTT-20/C-C240 630RT20/B-C150 Separable connectors 177 BAG GEL 400-R BAGGEL 400-R Insulating fillers 71 630 RTT-20/C-C240 630RT20/B-C240 Separable connectors 177 BAG GEL 400-T BAGGEL 400-V Insulating fillers 71 630 RTT-20/C-C240 630RT20/C-C240 Separable connectors 177 BAG GEL 400-V BAGGEL 400-V Insulating fillers 71 630 RTT-20/C-C240 630RT30/C-C240 Separable connectors 177 BAG GEL 400-V BAGGEL 400-V Insulating fillers 71 630 RTT-30/C-C240 630RT30/C-C250 Separable connectors 177 BAG GEL 400-V BAGGEL 400-V Insulating fillers 71 630 RTT-30/C-C240 630RT30/C-C250 Separable connectors 177 BAG-RTV 200-R BAGRIV200-R Problem solving kits 139 630 RTT-30/B-C150 630RT30/C-C240 Separable connectors 177 BAG-RTV 200-R BAGRIV350-N Problem solving kits 139 630 RTT-30/C-C240 630RT30/C-C240 Separable connectors 177 BAG-RTV 350-R BAGRIV350-R Problem solving kits 139 630 RTT-30/C-C240 630RT30/C-C240 Separable connectors 177 BAG-RTV 350-R BAGRIV350-R Problem solving kits 139 630 RTT-30/C-C240 630RT30/C-C240 Separable connectors 177 BAG-RTV 350-R BAGRIV350-R Problem solving kits 139 630 RTT-30/C-C300 630RT30/C-C300 Separable connectors 177 BBIT-40/16-A/U 560931-000 Heat-shrink 180 AUTO 10/240-E 10120-E-AUTO Cold-shrink 151 BBIT-55/D-A/U 5609224001 Heat-shrink 180 AUTO 10/240-E 10240-E-AUTO Cold-shrink 151 BBIT-55/D-A/U 560931-000 Heat-shrink 180 AUTO 10/240-E 10240-E-AUTO Cold-shrink 151 BBIT-10/40-A/U BBIT-00/40-A/U Heat-shrink 178 AUTO 10/630-E 10530-E-AUTO Cold-shrink 151 BBIT-10/G-O-A/U BBIT-00/40-A/U Heat-shrink 178 AUTO 10/630-E 10530-E-AUTO Cold-shrink 151 BBIT-10/G-O-A/U BBIT-00/40-A/U Heat-shrink 179 AUTO 15/300-E 15300-E-AUTO Cold-shrink 151 BBIT-10/G-O-A/U BBIT-00/40-A/U Heat-shrink 179 AUTO 15/300-E 15300-E-AUTO Cold-shrink 151 BBIT-10/G-O-A/U BBIT-00/40-A/U Heat-shrink 179 AUTO 15/300-E 15300-E-AUTO Cold-shrink 151 BBIT-10/		630 RTO-30/C-C630	630RTO30/C-C630			BAG GEL 200-R	BAGGEL200-R	Insulating fillers	71
630 RTT-20/A-C95		630 RTO-30/D-C630	630RTO30/D-C630			BAG GEL 200-T	BAGGEL200-T		
630 RTT-20/B-C150 630RTT20/C-C240 630RTT20/C-C240 Separable connectors 177 BAG GEL 400-T BAGGEL400-T Insulating fillers 71 630 RTT-20/C-C240 630RTT20/C-C240 Separable connectors 177 BAG GEL 400-T BAGGEL400-T Insulating fillers 71 630 RTT-20/C-C240 630RTT20/C-C240 Separable connectors 177 BAG GEL 400-V BAGGEL400-V Insulating fillers 71 630 RTT-20/C-C300 630RTT20/C-C300 Separable connectors 177 BAG-RTV 200-N BAGRIV200-N Problem solving kits 139 630 RTT-30/A-C95 630RTT30/A-C95 Separable connectors 177 BAG-RTV 200-R BAGRIV200-R Problem solving kits 139 630 RTT-30/B-C150 630RTT30/C-C150 Separable connectors 177 BAG-RTV 350-R BAGRIV350-N Problem solving kits 139 630 RTT-30/C-C240 630RTT30/C-C240 Separable connectors 177 BAG-RTV 350-R BAGRIV350-R Problem solving kits 139 630 RTT-30/C-C240 630RTT30/C-C240 Separable connectors 177 BBIT-25/10-A/U 560931-000 Heat-shrinck 180 630 RTT-30/C-C300 630RTT30/C-C300 Separable connectors 177 BBIT-25/10-A/U 560931-000 Heat-shrinck 180 AUTO 10/120-E 10120-E-AUTO Cold-shrink 150 BBIT-100/40-A/U 560931-000 Heat-shrinck 180 AUTO 10/120-E 10120-E-AUTO Cold-shrink 151 BBIT-100/40-A/U 560982-000 Heat-shrinck 180 AUTO 10/240-E 10240-E-AUTO Cold-shrink 151 BBIT-100/40-A/U 426377-000 Heat-shrinck 180 AUTO 10/330-E 10303-E-AUTO Cold-shrink 151 BBIT-100/40-A/U BBIT-00/40-A/U Heat-shrinck 180 AUTO 10/330-E 10303-E-AUTO Cold-shrink 151 BBIT 150/G0-A/U BBIT-00/40-A/U Heat-shrinck 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 151 BBIT 150/G0-A/U BBIT-00/40-A/U Heat-shrinck 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 151 BBIT 150/G0-A/U BBIT-00/40-A/U Heat-shrinck 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 151 BBIT 150/G0-A/U BBIT-00/40-A/U BBIT-00/40-A/U Heat-shrinck 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 151 BDIT-00/40-A/U BBIT-00/40-A/U BBIT-00/60-A/U Heat-shrinck 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 150 BBIT 150/G0-A/U BBIT-00/40-A/U BBIT-00/60-A/U Heat-shrinck 179 AUTO 20/340-E 15300-E-AUTO Cold-shrink 151 BDIPA 3/2 BOPA 3/2-		630 RTT-20/A-C95	630RTT20/A-C95			BAG GEL 200-V	BAGGEL200-V		71
630 RTT-20/D-C240		630 RTT-20/B-C150	630RTT20/B-C150			BAG GEL 400-R	BAGGEL400-R	_	
630 RTT-20/D-C240		630 RTT-20/C-C240	630RTT20/C-C240	Separable connectors		BAG GEL 400-T	BAGGEL400-T	Insulating fillers	71
630 RTT-20/E-C300 630RTT30/E-C300 Separable connectors 177 BAG-RTV 200-N BAGRTV200-N Problem solving kits 139 630 RTT-30/A-C95 630RTT30/A-C95 Separable connectors 177 BAG-RTV 200-R BAGRTV200-R Problem solving kits 139 630 RTT-30/B-C150 630RTT30/B-C150 Separable connectors 177 BAG-RTV 350-N BAGRTV350-N Problem solving kits 139 630 RTT-30/B-C-C240 630RTT30/B-C240 Separable connectors 177 BAG-RTV 350-N BAGRTV350-R Problem solving kits 139 630 RTT-30/B-C-C300 630RTT30/B-C240 Separable connectors 177 BBG-RTV 350-N BAGRTV350-R Problem solving kits 139 630 RTT-30/B-C300 630RTT-30/B-C300 Separable connectors 177 BBG-RTV-30-N 5609274001 Heat-shrink 180 AUTO 10/120-E 10120-F-AUTO Cold-shrink 151 BBT-65/25-A/U 56093-000 Heat-shrink 180 AUTO 10/240-E 10120-F-AUTO Cold-shrink 150 BBT-100/40-A/U 56093-000 Heat-shrink 180 AUTO 10/240-E 10240-F-AUTO Cold-shrink 151 BBT-150/60-A/U 56098-000 Heat-shrink 180 AUTO 10/240-E 10240-F-AUTO Cold-shrink 151 BBT-150/G0-A/U 426377-000 Heat-shrink 180 AUTO 10/300-E 10300-E-AUTO Cold-shrink 151 BBT 100/40-A/U BBT100/40-A/U Heat-shrink 178 AUTO 10/630-E 10530-F-AUTO Cold-shrink 151 BBT 100/40-A/U BBT100/40-A/U Heat-shrink 178 AUTO 10/630-E 10530-F-AUTO Cold-shrink 151 BBT 100/40-A/U BBT150/60-A/U Heat-shrink 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 150 BBT 40/16-A/U BBT150/60-A/U Heat-shrink 178 AUTO 15/300-E 15300-E-AUTO Cold-shrink 151 BBT 66/25-A/U BBT150/60-A/U Heat-shrink 178 AUTO 15/300-E 15300-E-AUTO Cold-shrink 151 BDPA 3/2 BDPA-3-EC Junctions 56 AUTO 15/630-I High 1500-E-AUTO Cold-shrink 151 BDPA 3/2 BDPA-3-EC Junctions 56 AUTO 15/630-I High 1500-E-AUTO Cold-shrink 151 BDPA 4 BDPA-4-EC Junctions 56 AUTO 15/630-I High 1500-E-AUTO Cold-shrink 151 BDPA 4 BDPA-3-EC Junctions 56 AUTO 15/630-I High 1500-E-AUTO Cold-shrink 151 BDPA 5 BDPA-3-EC Junctions 56 AUTO 15/630-I High 1500-E-AUTO Cold-shrink 151 BDPA 5 BDPA-3-EC Junctions 56 AUTO 15/630-I High 1500-E-AUTO Cold-shrink 151 BDPA 5 BDPA-3-EC Junctions 56 AUTO 15/70-I High 1500-E-AUTO Cold-shrink 151 BPM 30/12-A/U BPM 30/12-A/U Heat-sh							BAGGEL400-V	_	
630 RTT-30/B-C150 630 RTT-30/B-C150 Separable connectors 177 BAG-RTV 350-N BAGRTV350-N Problem solving kits 139 630 RTT-30/C-C240 660931-000 Heat-shrink 180 AUTO 10/120-E 10120-E-AUTO Cold-shrink 151 BBIT-10/G-A-VU 560981-000 Heat-shrink 180 AUTO 10/240-E 10240-E-AUTO Cold-shrink 151 BBIT-10/G-A-VU 426377-000 Heat-shrink 180 AUTO 10/300-E 10300-E-AUTO Cold-shrink 151 BBT 50/C-A-VU BBT100/G-A-VU Heat-shrink <		630 RTT-20/E-C300	630RTT20/E-C300	Separable connectors	177	BAG-RTV 200-N	BAGRTV200-N	_	139
630 RTT-30/C-C240 630RTT30/C-C240 Separable connectors 177 BAG-RTV 350-R BAGRTV350-R Problem solving kits 139 630 RTT-30/D-C240 630RTT30/D-C240 Separable connectors 177 BBIT-25/10-A/U 5609274001 Heat-shrink 180 630 RTT-30/D-C300 630RTT30/C-C300 Separable connectors 177 BBIT-40/16-A/U 560931-000 Heat-shrink 180 AUTO 10/120-E 10120-E-AUTO Cold-shrink 151 BBIT-65/25-A/U 5609364001 Heat-shrink 180 AUTO 10/120-I 10120-HAUTO Cold-shrink 150 BBIT-100/40-A/U 560981-000 Heat-shrink 180 AUTO 10/240-E 10240-E-AUTO Cold-shrink 151 BBIT-100/40-A/U 560981-000 Heat-shrink 180 AUTO 10/240-E 10240-E-AUTO Cold-shrink 150 BBIT-15/80-A/U 426377-000 Heat-shrink 180 AUTO 10/240-E 10300-E-AUTO Cold-shrink 151 BBIT-150/60-A/U BBIT100/40-A/U Heat-shrink 180 AUTO 10/300-E 10300-E-AUTO Cold-shrink 151 BBIT 150/60-A/U BBIT100/40-A/U Heat-shrink 178 AUTO 10/630-E 10630-E-AUTO Cold-shrink 151 BBIT 150/60-A/U BBIT100/40-A/U Heat-shrink 178 AUTO 10/630-E 10530-E-AUTO Cold-shrink 151 BBIT 50/60-A/U BBIT40/16-A/U Heat-shrink 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 151 BB BT 65/25-A/U BBIT60/60-A/U Heat-shrink 178 AUTO 15/340-E 15300-E-AUTO Cold-shrink 151 BB BT 65/25-A/U BBIT60/60-A/U Heat-shrink 178 AUTO 15/340-E 15300-E-AUTO Cold-shrink 151 BOPA 3/2 BOPA3-TEC Junctions 56 AUTO 15/340-E 15630-E-AUTO Cold-shrink 151 BOPA 3/2 BOPA3-TEC Junctions 56 AUTO 15/630-E 15630-E-AUTO Cold-shrink 151 BOPA 3/2 BOPA3-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA3-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA3-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA3-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA3-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA3-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA3-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA3-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA3-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA3-TEC Juncti		630 RTT-30/A-C95	630RTT30/A-C95	Separable connectors		BAG-RTV 200-R	BAGRTV200-R	Problem solving kits	139
630 RTT-30/C-C240 630 RTT-30/C-C240 Separable connectors of 30 RTT-30/C-C240 Problem solving kits of 139 BAG-RTV 350-R B AGRTV 350-R Problem solving kits of 139 BBT-30/C-C240 139 BBT-30/C-C240 Separable connectors of 177 BBT-30/C-A/U BBT-40/16-A/U 560927-4001 Heat-shrink 180 BBT-30/C-C240 BBT-30/C-C240 Separable connectors of 177 BBT-30/C-A/U BBT-40/16-A/U 560931-000 Heat-shrink 180 BBT-30/C-C240 BBT-30/C-C240 BBT-30/C-A/U 560931-000 Heat-shrink 180 BBT-30/C-C240 BBT-30/C-C240 BBT-30/C-A/U 560936-000 Heat-shrink 180 BBT-30/C-C240 BBT-30/C-C240 BBT-30/C-C240 Separable connectors of 170 BBT-30/C-A/U BBT-30/C-C240		630 RTT-30/B-C150	630RTT30/B-C150	Separable connectors	177	BAG-RTV 350-N	BAGRTV350-N	Problem solving kits	139
630 RTT-30/E-C300 630 RTT-30/E-C300 Separable connectors 177 BBIT-40/16-A/U 560931-000 Heat-shrink 180 A AUTO 10/120-E 10120-E-AUTO Cold-shrink 151 BBIT-65/25-A/U 5609364001 Heat-shrink 180 AUTO 10/120-I 10120-I-AUTO Cold-shrink 150 BBIT-10/40-A/U 560981-000 Heat-shrink 180 AUTO 10/240-E 10240-E-AUTO Cold-shrink 151 BBIT-15/60-A/U 560982-000 Heat-shrink 180 AUTO 10/300-E 10300-E-AUTO Cold-shrink 151 BBIT 100/40-A/U BBIT100/40-A/U BBIT100/40-A/U Heat-shrink 178 AUTO 10/300-E 10630-E-AUTO Cold-shrink 151 BBT 150/60-A/U BBT150/60-A/U Heat-shrink 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 151 BBT 65/25-A/U BBT40/16-A/U BBT40/16-A/U BBT40/16-A/U Heat-shrink 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 151 BBT 65/25-A/U BBT40/16-A/U BBT40/16-A/U BBT40/16-A/U		630 RTT-30/C-C240	630RTT30/C-C240	Separable connectors	177	BAG-RTV 350-R	BAGRTV350-R	Problem solving kits	139
A AUTO 10/120-E AUTO 10/120-I 10120-F-AUTO Cold-shrink 150 BBIT-100/40-A/U 560981-000 Heat-shrink 180 AUTO 10/120-I 10120-F-AUTO Cold-shrink 151 BBIT-150/60-A/U 560982-000 Heat-shrink 180 AUTO 10/240-E 10240-F-AUTO Cold-shrink 150 BBIT-175/80-A/U 426377-000 Heat-shrink 180 AUTO 10/300-E 10300-F-AUTO Cold-shrink 151 BBIT 100/40-A/U B		630 RTT-30/D-C240	630RTT30/D-C240	Separable connectors	177	BBIT-25/10-A/U	5609274001	Heat-shrink	180
AUTO 10/120-I 10120-I-AUTO Cold-shrink 150 BBIT-100/40-A/U 560981-000 Heat-shrink 180 AUTO 10/240-E 10240-E-AUTO Cold-shrink 151 BBIT-150/60-A/U 560982-000 Heat-shrink 180 AUTO 10/240-I 10240-I-AUTO Cold-shrink 150 BBIT-150/60-A/U 426377-000 Heat-shrink 180 AUTO 10/300-E 10300-E-AUTO Cold-shrink 151 BBIT 100/40-A/U BBIT100/40-AU Heat-shrink 178 AUTO 10/630-E 10630-E-AUTO Cold-shrink 151 BBIT 150/60-A/U BBIT100/40-AU Heat-shrink 178 AUTO 10/630-I 10630-I-AUTO Cold-shrink 151 BBIT 40/16-A/U BBIT40/16-AU Heat-shrink 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 150 BBIT 40/16-A/U BBIT60/60-AU Heat-shrink 178 AUTO 15/240-I 15240-I-AUTO Cold-shrink 150 BDPA 3 BDPA3-TEC Junctions 56 AUTO 15/300-E 15300-E-AUTO Cold-shrink 151 BDPA 3/2 BDPA3/2-IEC Junctions 56 AUTO 15/630-I 15630-I-AUTO Cold-shrink 151 BDPA 4 BDPA4-TEC Junctions 56 AUTO 15/630-I 15630-I-AUTO Cold-shrink 151 BDPA 4 BDPA4-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BDPA 5 BDPA 5 BDPA5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BDPA 5 BDPA 5 BDPA5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BDPA 5 BDPA5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BDPA 5 BDPA5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BDPA 5 BDPA5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BDPA 5 BDPA5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BDPA 5 BDPA5-TEC Junctions 56 AUTO 15/70-E 20185-E-AUTO Cold-shrink 151 BDPA 5 BDPA5-TEC Junctions 56 AUTO 20/185-E 20185-E-AUTO Cold-shrink 151 BDPA 5/0-A/U BPM15/6-A/U Heat-shrink 179 AUTO 20/185-E 20185-E-AUTO Cold-shrink 151 BDPA 5/0-A/U BPM15/6-A/U Heat-shrink 179 AUTO 20/185-I 20185-I-AUTO Cold-shrink 151 BDPA 5/0-A/U BPM5/30-AU Heat-shrink 179 AUTO 20/185-I 20185-I-AUTO Cold-shrink 151 BDPA 5/0-A/U BPM5/30-AU Heat-shrink 179 AUTO 20/185-I 20185-I-AUTO Cold-shrink 150 BPM 75/30-A/U BPM5/30-AU Heat-shrink 179 AUTO 20/240-E 20240-E-AUTO Cold-shrink 151 BDPA 5/0-A/U 2246244002 Heat-shrink 180 AUTO 20/50-E 2050-E-AUTO Cold-shrink 151 BDPA 5/0-A/U 22		630 RTT-30/E-C300	630RTT30/E-C300	Separable connectors	177	BBIT-40/16-A/U	560931-000	Heat-shrink	180
AUTO 10/240-E 10240-E-AUTO Cold-shrink 151 BBIT-150/60-A/U 560982-000 Heat-shrink 180 AUTO 10/240-I 10240-I-AUTO Cold-shrink 150 BBIT-175/80-A/U 426377-000 Heat-shrink 180 AUTO 10/300-E 10300-E-AUTO Cold-shrink 151 BBT 100/40-A/U BBT100/40-AU Heat-shrink 178 AUTO 10/630-E 10630-E-AUTO Cold-shrink 151 BBT 150/60-A/U BBT150/60-AU BBT150/60-AU Heat-shrink 178 AUTO 10/630-I 10630-I-AUTO Cold-shrink 150 BBT 40/16-A/U BBT40/16-AU Heat-shrink 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 151 BBT 65/25-A/U BBT65/25-AU Heat-shrink 178 AUTO 15/230-E 15300-E-AUTO Cold-shrink 151 BOPA 3/2 BOPA 3-TEC Junctions 56 AUTO 15/630-I 15630-E-AUTO Cold-shrink 151 BOPA 4 BOPA 4-T transtion 784472-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA 5 BOPA 5-TEC Junctions 56 AUTO 15/70-I 1570-I-AUTO Cold-shrink 151 BOPA 1 BOPA 1-T transtion 784472-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA 5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA 5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA 5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 1 BOPA 1-T transtion 784472-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA 5-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 1 BOPA 1-T transtion 784472-TEC Junctions 56 AUTO 20/185-E 20185-E-AUTO Cold-shrink 151 BOPA 1 BOPA 1-T transtion 784472-TEC Junctions 150 BOPA 5-TEC Junctions 150 BOPA 5-TEC Junctions 150 BOPA 1-T transtion 78472-TEC Junctions 150 BOPA 1-T transtion 150 BOPA 1-T transtion 150 BO	Α	AUTO 10/120-E	10120-E-AUTO	Cold-shrink	151	BBIT-65/25-A/U	5609364001	Heat-shrink	180
AUTO 10/240-I 10240-I-AUTO Cold-shrink 150 BBIT-175/80-A/U 426377-000 Heat-shrink 180 AUTO 10/300-E 10300-E-AUTO Cold-shrink 151 BBT 100/40-A/U BBT100/40-AU Heat-shrink 178 AUTO 10/630-E 10630-E-AUTO Cold-shrink 151 BBT 150/60-A/U BBT150/60-AU Heat-shrink 178 AUTO 10/630-I 10630-I-AUTO Cold-shrink 150 BBT 40/16-A/U BBT40/16-AU Heat-shrink 178 AUTO 15/240-E 15240-E-AUTO Cold-shrink 151 BBT 65/25-A/U BBT65/25-AU Heat-shrink 178 AUTO 15/240-I 15240-I-AUTO Cold-shrink 150 BOPA 3 BOPA-TEC Junctions 56 AUTO 15/300-E 15300-E-AUTO Cold-shrink 151 BOPA 3/2 BOPA3/2-TEC Junctions 56 AUTO 15/630-E 15630-E-AUTO Cold-shrink 151 BOPA 4 BOPA-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 4 BOPA-TEC Junctions 56 AUTO 15/70-E 1570-E-AUTO Cold-shrink 151 BOPA 5 BOPA5-TEC Junctions 56 AUTO 15/70-I 1570-I-AUTO Cold-shrink 150 BOPA 5 BOPA5-TEC Junctions 56 AUTO 15/70-I 1570-I-AUTO Cold-shrink 151 BOPA 5 BOPA5-TEC Junctions 56 AUTO 15/70-I 1570-I-AUTO Cold-shrink 151 BOPA 5 BOPA5-TEC Junctions 56 AUTO 15/70-I 1570-I-AUTO Cold-shrink 151 BOPA 5 BOPA5-TEC Junctions 56 AUTO 15/70-I 1570-I-AUTO Cold-shrink 151 BOPA 5 BOPA5-TEC Junctions 56 AUTO 15/70-I 1570-I-AUTO Cold-shrink 151 BOPA 5 BOPA5-TEC Junctions 56 AUTO 15/70-I 1570-I-AUTO Cold-shrink 151 BOPA 5 BOPA5-TEC Junctions 179 AUTO 20/185-E 20185-E-AUTO Cold-shrink 151 BOPA 5 BOPA5-TEC Junctions 179 AUTO 20/185-I 20185-I-AUTO Cold-shrink 151 BOPA 5 BOPA5-TEC Junctions 179 AUTO 20/185-I 20185-I-AUTO Cold-shrink 151 BOPA 5/20-A/U BPM15/6-AU Heat-shrink 179 AUTO 20/185-I 20185-I-AUTO Cold-shrink 150 BPM 50/20-A/U BPM50/20-AU Heat-shrink 179 AUTO 20/185-I 20185-I-AUTO Cold-shrink 151 BPM 50/20-A/U BPM50/20-AU Heat-shrink 179 AUTO 20/240-E 20240-E-AUTO Cold-shrink 151 BPM-30/12-A/U 5904284002 Heat-shrink 180 AUTO 20/50-E 20240-E-AUTO Cold-shrink 151 BPTM-30/12-A/U 2246244002 Heat-shrink 180 AUTO 20/50-E 2050-E-AUTO Cold-shrink 151 BPTM-50/20-A/U 2246244002 Heat-shrink 180		AUTO 10/120-I	10120-I-AUTO	Cold-shrink	150	BBIT-100/40-A/U	560981-000	Heat-shrink	180
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AUTO 20/50-E 2050-E-AUTO Cold-shrink 151 BPTM-50/20-A/U 2246244002 Heat-shrink 180		AUTO 20/240-E	20240-E-AUTO	Cold-shrink		BPTM-30/12-A/U	723955-000	Heat-shrink	
AUTO 20/50-E 2050-E-AUTO Cold-shrink 151 BPTM-75/30-A/U 6129164002 Heat-shrink 180		AUTO 20/50-E	2050-E-AUTO	Cold-shrink	151	BPTM-50/20-A/U	2246244002	Heat-shrink	180
		AUTO 20/50-E	2050-E-AUTO	Cold-shrink	151	BPTM-75/30-A/U	6129164002	Heat-shrink	180



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Product	Code	Category	Page	Product	Code	Category	Page
BPTM-100/40-A/U	178238-000	Heat-shrink	180	CGP-TEC-12.7/6.4-4 Yellow	5068214005	Heat-shrink	99
BPTM-120/50-A/U	412147-000	Heat-shrink	180	CGP-TEC-12.7/6.4-6 Blue	5068334005	Heat-shrink	99
BPTM-175/70-A/U	920423-000	Heat-shrink	180	CGP-TEC-12.7/6.4-9 White	5069984005	Heat-shrink	99
BPTM-205/110-A/U	499685-000	Heat-shrink	180	CGP-TEC-12.7/6.4-X Transparent	5069744004	Heat-shrink	99
C 2000	200001-000	Heating cables	209	CGP-TEC-19/9.5-0 Black	5069874011	Heat-shrink	99
C 2000-SR	200009-000	Heating cables	209	CGP-TEC-19/9.5-2 Red	5068104006	Heat-shrink	99
C 2000-STG	200005-000	Heating cables	209	CGP-TEC-19/9.5-4 Yellow	5068224005	Heat-shrink	99
C 2000-SUG	200004-000	Heating cables	209	CGP-TEC-19/9.5-6 Blue	5068344005	Heat-shrink	99
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CGP-TEC-2.4/1.2-2 Red	5068044005	Heat-shrink	99	CGP-TEC-38/19-X Transparent	5068364005	Heat-shrink	99
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