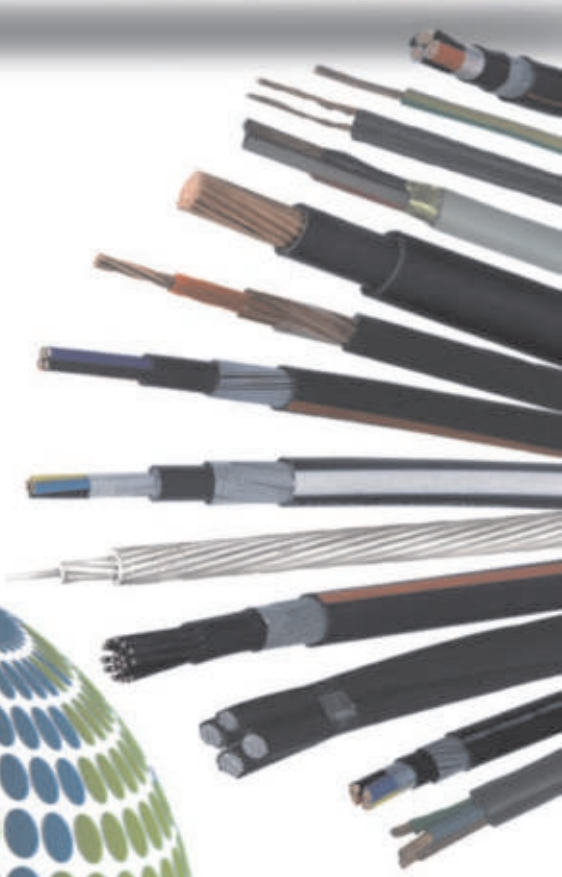
Tirupati Plastomatics Pvt. Ltd.

(Integrated Management System (IMS) Certified Company)



Quality you can trust...

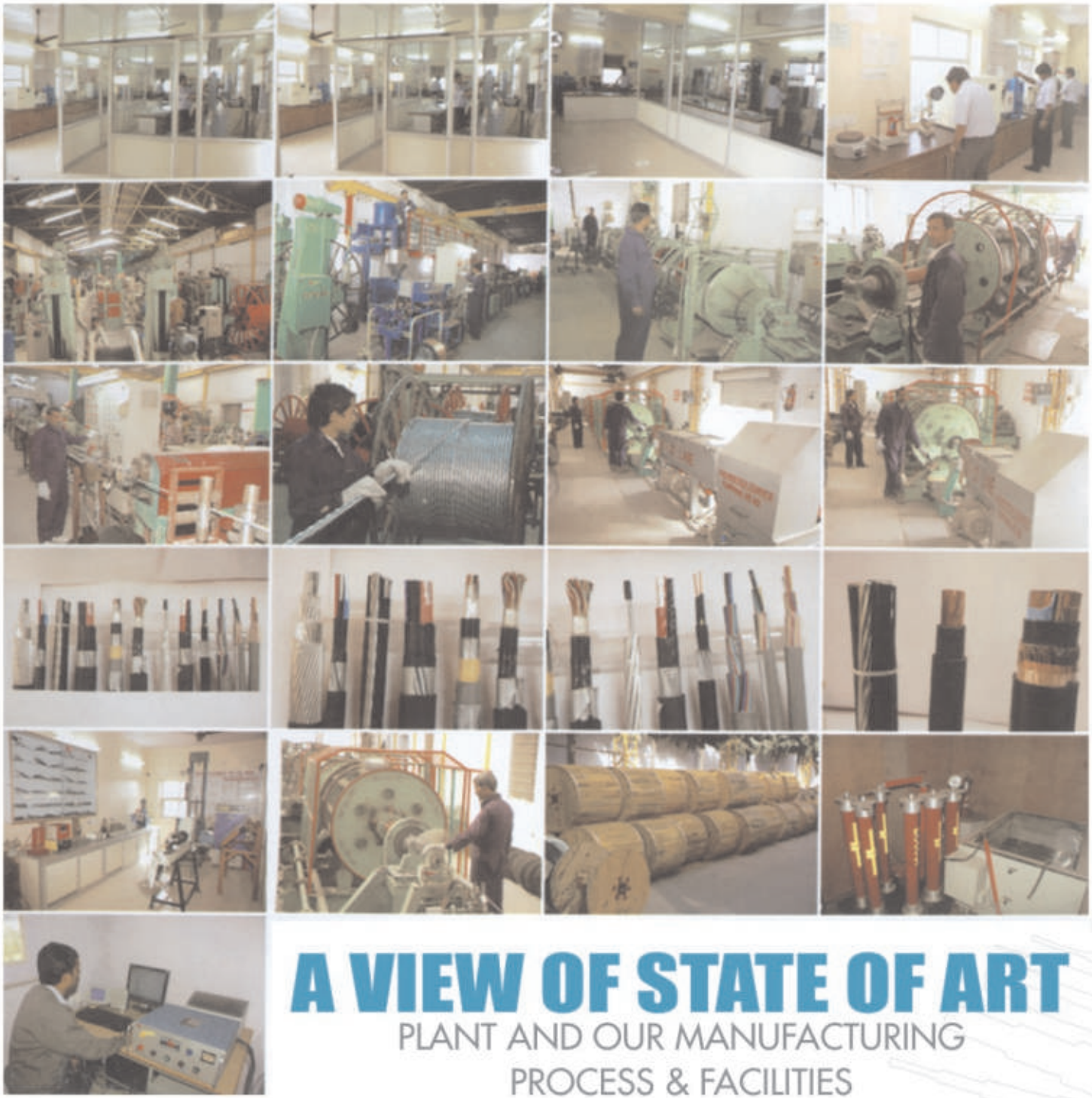
www.tirupatiplastomatics.com

Brand Name:
Gemini Cables

QUALITY ASSURED COMPANY
ISO 9001:2008

ENVIRONMENTAL MANAGEMENT SYSTEM
ISO 14001:2008

SAFETY ASSURED COMPANY
OHSAS 18001:2007



A VIEW OF STATE OF ART

PLANT AND OUR MANUFACTURING
PROCESS & FACILITIES

CONTENTS

About

Tirupati Plastomatics Pvt. Ltd. A flagship company of Gemini Group of industries Jaipur India. The founder of the company Mr. R.S. Gemini who is managing director & a well known industrialist & a renowned social worker. Tirupati Plastomatics enjoys status of an ISO-9001:2008, ISO 14001:2004, OHSAS-18001, BIS, SMEC Australia, Scott Wilson-UK & SABS certified company having a group turnover of US$ 100 Million. The company is one of the leading manufacturer of all kind of LT PVC/XLPE insulated & sheathed cables, concentric service cable & conductors with own technical know-how for last two decades being widely used by railways, utility service providers & private turnkey project executors in electricity distribution, transmission & generation. Tirupati has a dedicated & well experienced team of techno commercial experts.

In addition to serving railways & electricity boards, Tirupati has also entered into overseas markets and have executed orders of aerial bunched cables, LV underground cables & AAA conductors, ACSR conductors as per IEC/VDE/DIN/SABS/ASTM/NF/BS specification to EDM, Mozambique, Ministry of Energy and water (MEW) power project in Afghanistan and to South African & UK customers.

Mission

Guided by the philosophy 'create the best to be followed by the rest', Tirupati Platomatics aims at building a zero-defect product, which will give value satisfaction to its huge clientele. Tirupati Plastomatics strongly believes that learning and improving is a continuous process for the total growth of the company.

Vision

Tirupati Plastomatics Pvt. Ltd., the name for dedication, devotion, discipline, discipline, discrimination and determination has made a substantial growth plan with Rupees 1000 Crores turnover projection by 2015.

Awards & Recognition

- Arch of Excellence Award 2002, All India Organizational Confederation, New Delhi.
- Award from Business Initiative Development Board 2004. New Delhi.
- Indian Achiever Award of Industrial Excellence for year 2008.

Mr. R.S. Gemini, Managing Director, receiving award presented by Business Initiative Development Organization in the year 2002.

Mr. Salman Khurshid, Central Minister for External Affairs presenting the "RASHTRIYA GAURAV AWARD '2004" to Managing Director of our Company.

Mr. Ravi Gemini (Director) receiving "Indian Achiever Award of Industrial Excellence" from Dr. Murali Manohar Joshi (Former Union Minister) for year 2008.

Policy

Grow with customer by providing full customer satisfaction through quality product, support, timely deliveries & new development, operate safe, healthy & clean environment.

Comply with statutory requirements, all applicable environment, health & safety legislations, prevention of ill health and injury, interests of all stakeholders, prevention of pollution, and continual improvement in the effectiveness and perfomance of Integrated Management System by improving process work practices and risk minimization through objective driven targets.

Integrate quality safety, health & environmental matters in all existing activities and future planning.

Create & enhance awareness among employees, society and other stakeholders about environment protection, minimization of waste, wise use of energy, water & other natural resources, improve skill & competence of our employees and contractors so as to enable them to demonstrate their involvement, for sound IMS performance.

SABS

Permit to Apply Certification Mark

TIRUPATI
PLASTOMATICS PVT LTD
RAJASTHAN, INDIA

SABS APPROVED

SANS 1574-3:2007
TO: ELECTRIC FLEXIBLE CORES, CORDS AND CABLES WITH SOLID EXTRUDED DIELECTRIC INSULATION
PART 3: PVC-INSULATED CORES AND CABLES

Permit Number: 8943/14757
Effective Date: 10 November 2010
Expiry Date: 10 November 2013
Date of Original Registration: 10 November 2010

SABS

Permit to Apply Certification Mark

TIRUPATI
PLASTOMATICS PVT LTD
RAJASTHAN, INDIA

SABS APPROVED

SANS 183-2:2008 & 3:2003
TO: CONDUCTORS FOR OVERHEAD ELECTRICAL TRANSMISSION LINES
PART 2: STRANDED ALUMINIUM CONDUCTORS
PART 3: ALUMINIUM CONDUCTORS, STEEL REINFORCED

Permit Number: 8943/14158
Effective Date: 11 November 2009
Expiry Date: 11 November 2012
Date of Original Registration: 11 November 2009

SABS

Permit to Apply Certification Mark

TIRUPATI
PLASTOMATICS PVT LTD
RAJASTHAN, INDIA

SABS APPROVED

SANS 1507-2:2007, -3:2007, -4:2009 & -6:2007
TO: ELECTRIC CABLES WITH EXTRUDED SOLID DIELECTRIC INSULATION FOR FIXED INSTALLATIONS (300/500 V TO 1 900/3 300 V)
PART 2: WIRING CABLES
PART 3: PVC DISTRIBUTION CABLES
PART 4: XLPE DISTRIBUTION CABLES
PART 6: SERVICE CABLES

Permit Number: 8943/14159
Effective Date: 10 November 2010
Expiry Date: 11 November 2012
Date of Original Registration: 11 November 2009

SABS

Permit to Apply Certification Mark

TIRUPATI
PLASTOMATICS PVT LTD
RAJASTHAN, INDIA

SABS APPROVED

SANS 1418-1 & 2:2009
TO: AERIAL BUNDLED CONDUCTOR SYSTEMS
PART 1: CORES
PART 2: ASSEMBLED INSULATED CONDUCTOR BUNDLES

Permit Number: 8943/14160
Effective Date: 11 November 2009
Expiry Date: 11 November 2012
Date of Original Registration: 11 November 2009

INFORMATION

Cenelec Standards published the harmonization documents HD 361 S2 & HD 361 S3 to illustrate the code designation of Harmonized wires and cables. Listed below are some of the most company used codes and abbreviations for Flexible cables.

1- Type of determination

H: Cables and wires to the Harmonized Determination

A: Approved national type

2- Voltage designation U0/U

03: 300/300 Voltage

05: 300/500 Voltage

07: 450/750 Voltage

3- Insulation Material

V: PVC insulation suitable for continuous operating temperature up to 70°C

V: 2 PVC insulation heat resistance suitable for continuous operating temperature up to 90°C

4- Sheathed Material

V: PVC Sheathing suitable for continuous operating temperature up to 70°C

V2: PVC Sheathing suitable for continuous operating temperature up to 90°C

5- Type of Conductor

K: Flexible Conductor for fixed laying

F: Flexible Multi - Core

IDENTIFICATION

a. Single Core Cables

- Single Phase: Green/Yellow (earth), Blue (Neutral), Brown (Live)

- Three Phase: Green/Yellow (earth), Blue (Neutral), Brown, Black & Grey (Live)

b Multi-Core Cables

2 Cores: Blue & Brown

3- Cores: Green/Yellow, Blue & Brown

4- Cores: Green/Yellow, Brown, Black & Grey or;
Green/Yellow, Blue, Brown & Black

5- Cores: Green/Yellow, Blue, Brown, Black & Grey

SINGLE CORE PVC INSULATED NON-SHEATHED CABLE FOR INTERNAL WIRING 300/500 V

Technical Specification

Single Core PVC Insulated Non-Sheathed Cable for internal wiring 300/500 V.

Standard

BS 6004.

Application

Suitable for installation in surface mounted or embodied conduits, only for signaling or control conduits.

Conductor

Flexible class 5 copper conductors to BSEN 60228.

Insulation

PVC Type TI 1 to EN 50363-3.

Packing

Coils or Plastic Spools in 100 meters.

Other lengths are available upon customer request.

H05V-K

Conductor Cross-Sectional area	Nominal Radial Thickness of Insulation	Mean Overall Diameter		Conductor Resistance At 20°C Max.	Minimum Insulation Resistance at 70°C	Cable Approximate Weight
		Min	Max			
mm^2	mm	mm		Ω/km	MΩ/km	kg/km
H05V-K						
0.5	0.6	2.1	2.5	39	0.013	9.5
0.75	0.6	2.2	2.7	26	0.011	12.2
1	0.6	2.4	2.8	19.5	0.010	15.2

SINGLE CORE PVC INSULATED NON-SHEATHED HEAT RESISTANCE CABLE FOR INTERNAL WIRING 300/500 V

Technical Specification

Single Core PVC Insulated Non-Sheathed heat resistance cable for internal wiring 300/500 V.

Standard

BS 6004.

Application

Suitable for miximum conductor temperature in normal use 90°C not to be used in contact with objects at temperature higher than 85°C and not suitable for fixed installation in distribution systems.

Conductor

Flexible class 5 copper conductors to BSEN 60228.

Insulation

PVC Type TI 1 to EN 50363-3.

Packing

Coils or Plastic Spools in 100 meters.

Other lengths are available upon customer request.

H05V2-K

Conductor Cross-Sectional area	Nominal Radial Thickness of Insulation	Mean Overall Diameter		Conductor Resistance At 20°C Max.	Minimum Insulation Resistance at 90°C	Cable Approximate Weight
		Min	Max			
mm²	mm	mm		Ω/km	MΩ/km	kg/km
H05V2-K						
0.5	0.6	2.1	2.5	39	0.013	9.5
0.75	0.6	2.2	2.7	26	0.011	12.2
1	0.6	2.4	2.8	19.5	0.010	15.2

SINGLE CORE PVC INSULATED NON-SHEATHED GENERAL PURPOSE CABLE 450/750 V

Technical Specification

Single Core PVC Insulated Non-Sheathed general purpose cable 450/750 V

Standard

BS 6004.

Application

Suitable for use in channels with cover, suitable for fixed protected installation in or on light fittings and inside appliances, switchgear and control gear, for voltage up to 1000 V a.c. or up to 750 V to earth d.c.

Conductor

Flexible class 5 copper conductors to BSEN 60228.

Insulation

PVC Type TI 1 to EN 50363-3.

Voltage Rating

450/750 V..

Packing

Coils or Plastic Spools in 100 meters for sizes up to 16 mm2

Sizes more than 16 mm2 shall be 500 or 1000 meters packed in wooden drums.

Other lengths are avilable upon customer request.

H07V-K

Conductor Cross-Sectional area	Nominal Radial Thickness of Insulation	Mean Overall Diameter		Conductor Resistance At 20°C Max.	Minimum Insulation Resistance at 70°C	Cable Approximate Weight
		Min	Max			
mm²	mm	mm		Ω/km	MΩ/km	kg/km
H07V-K (70°C)						
1.5	0.7	2.8	3.4	13.3	0.0100	21.5
2.5	0.8	3.4	4.1	7.98	0.0095	35.2
4	0.8	3.9	4.8	4.95	0.0078	49.4
6	0.8	4.4	5.3	3.3	0.0068	68.5
10	1	5.7	6.8	1.91	0.0065	114.6
16	1	6.7	8.1	1.21	0.0053	170.5
25	1.2	8.4	10.2	0.78	0.0050	266
35	1.2	9.7	11.7	0.554	0.0043	378
50	1.4	11.5	13.9	0.386	0.0042	540
70	1.4	13.2	16	0.272	0.0036	745
95	1.6	15.1	18.2	0.206	0.0036	983
120	1.6	16.7	20.2	0.161	0.0032	1242
150	1.8	18.6	22.5	0.129	0.0032	1605
185	2	20.6	24.9	0.106	0.0032	2007
240	2.2	23.5	28.4	0.0801	0.0031	2510

PVC INSULATED NON-SHEATHED HEAT RESISTANCE CABLE FOR INTERNAL WIRING 450/750V

Technical Specification

PVC Insulated Non-Sheathed heat resistance cable for internal wiring 450/750V

Standard

BS 6004.

Application

Suitable for maximum conductor temperature in normal use 90°C not to be used in contact with object at temperature higher than 85°C and not suitable for fixed

Conductor

Flexible class 5 copper conductors to BSEN 60228.

Insulation

PVC Type TI 3 to EN 50363-3.

Packing

Coils or Plastic Spools in 100 meters for sizes up to 16 mm²

Sizes more than 16 mm² shall be 500 or 1000 meters packed in wooden drums.

Other lengths are avilable upon customer request.

H07V2-K

Conductor Cross-Sectional area	Nominal Radial Thickness of Insulation	Mean Overall Diameter		Conductor Resistance At 20°C Max.	Minimum Insulation Resistance at 90°C	Cable Approximate Weight
		Min	Max			
mm²	mm	mm		Ω/km	MΩ/km	kg/km
H07V2-K						
1.5	0.7	2.8	3.4	13.3	0.0100	21.5
2.5	0.8	3.4	4.1	7.98	0.0095	35.2
4	0.8	3.9	4.8	4.95	0.0078	49.4
6	0.8	4.4	5.3	3.3	0.0068	68.5
10	1	5.7	6.8	1.91	0.0065	114.6
16	1	6.7	8.1	1.21	0.0053	170.5
25	1.2	8.4	10.2	0.78	0.0050	266
35	1.2	9.7	11.7	0.554	0.0043	378

MULTI-CORE LIGHT DUTY PVC INSULATED AND SHEATHED FLEXIBLE CORD, CIRCULAR TWIN 3-CORE AND 4-CORE, 300/300 V

Technical Specification

Multi-Core Light Duty PVC Insulated and Sheathed flexible cord, circular twin, 3-core and 4- core, 300/300 V

Standard

BS 6500.

Application

Light duty cable for use in domestic premises, kitchens and ofices and light portable appliances such as radios and table lamps.

Conductor

Flexible class 5 copper conductors to BSEN 60228.

Insulation

PVC Type TI 2 to EN 50363-3.

Insulation colours

2-Core: Blue and Brown

3-Core: Green/Yellow, Blue and Brown

4-Core: Green/Yellow, Brown, Black & Grey or

Green/Yellow, Blue, Brown & Black

Sheathing

PVC Type TM 2 to EN 50363-4-1.

Standard Sheath Colour

White

Packing

Coils in 100 meters

Other lengths are available upon customer request

H03VV-F

Conductor Cross-Sectional area	Nominal Radial Thickness of Insulation	Radial Thickness of Sheath	Mean Overall Diameter		Conductor Resistance At 20°C Max.	Minimum Insulation Resistance at 70°C	Cable Approxi. Weight
			Min	Max			
mm^2	mm	mm	mm		Ω/km	MΩ/km	kg/km
Two Cores							
0.5	0.5	0.6	4.6	5.9	39	0.011	37.5
0.75	0.5	0.6	4.9	6.3	26	0.010	46.3
Three Cores							
0.5	0.5	0.6	4.9	6.3	39	0.0110	44.5
0.75	0.5	0.6	5.2	6.7	26	0.0100	55.8
Four Cores							
0.5	0.5	0.6	5.4	6.9	39	0.0110	54.8
0.75	0.5	0.6	5.7	7.3	26	0.0100	69.7

MULTI-CORE LIGHT DUTY 90°C PVC INSULATED AND SHEATHED FLEXIBLE CORD, CIRCULAR TWIN, 3-CORE AND 4-CORE, 300/300 V

Technical Specification

Multi-Core Light Duty 90°C PVC Insulated and Sheathed flexible cord, circular twin, 3-core and 4- core, 300/300 V

Standard

BS 6500.

Application

Light duty cable for use in domestic premises, kitchens and offices and light portable appliances such as radios and table lamps. Suitable for 90°C maximum conductor temperature in normal use.

Conductor

Flexible class 5 copper conductors to BSEN 60228.

Insulation

PVC Type TI 3 to EN 50363-3.

Insulation colours

2-Core: Blue and Brown
3-Core: Green/Yellow, Blue and Brown
4-Core: Green/Yellow, Brown, Black & Grey or Green/Yellow, Blue, Brown & Black

Sheathing

PVC Type TM 3 to EN 50363-4-1.

Standard Sheath Colour

White

Packing

Coils in 100 meters
Other lengths are available upon customer request

H03V2V2-F

Conductor Cross-Sectional area	Nominal Radial Thickness of Insulation	Radial Thickness of Sheath	Mean Overall Diameter		Conductor Resistance At 20°C Max.	Minimum Insulation Resistance at 70°C	Cable Approxi. Weight
			Min	Max			
mm²	mm	mm	mm		Ω/km	MΩ/km	kg/km
Two Cores							
0.5	0.5	0.6	4.6	5.9	39	0.011	37.5
0.75	0.5	0.6	4.9	6.3	26	0.010	46.3
Three Cores							
0.5	0.5	0.6	4.9	6.3	39	0.011	44.5
0.75	0.5	0.6	5.2	6.7	26	0.01	55.8
Four Cores							
0.5	0.5	0.6	5.4	6.9	39	0.011	54.8
0.75	0.5	0.6	5.7	7.3	26	0.01	69.7

MULTI-CORE ORDINARY DUTY PVC INSULATED AND SHEATHED FLEXIBLE CORD, CIRCULAR TWIN, 3-CORE, 4-CORE AND 5-CORE, 300/500 V

Technical Specification

Multi-Core Ordinary Duty PVC Insulated and Sheathed flexible cord, circular twin, 3-core, 4-core and 5- core, 300/500 V

Standard

BS 6500 for sizes upto 2.5mm^2. BS 7919 for 4mm^2.

Application

For use in offices and household appliances such as computers, spin extractors, washing machines, spin dryers and refrigerators and also for all kinds of outdoor industrial use.

Conductor

Flexible class 5 copper conductors to BSEN 60228.

Insulation

PVC Type TI 2 to EN 50363-3.

Insulation colours

2-Core: Blue and Brown

3-Core: Green/Yellow, Blue and Brown

4-Core: Green/Yellow, Brown, Black & Grey or

Green/Yellow, Blue, Brown & Black

5-Core: Green/Yellow, Blue, Brown, Black & Grey

Sheathing

PVC Type TM 2 to EN 50363-4-1.

Standard Sheath Colour

White

Packing

Coils in 100 meters

Other lengths and sheath colours are available upon customer request

HO5VV-F

Conductor Cross-Sectional area	Nominal Radial Thickness of Insulation	Radial Thickness of Sheath	Mean Overall Diameter		Conductor Resistance At 20°C Max.	Minimum Insulation Resistance at 70°C	Cable Approxi. Weight
			Min	Max			
mm^2	mm	mm	mm		Ω/km	MΩ/km	kg/km
Two Cores							
0.5	0.6	0.8	5.4	6.8	39	0.0130	50.3
0.75	0.6	0.8	5.7	7.2	26	0.0110	57.5
1	0.6	0.8	5.9	7.5	19.5	0.0100	65.5
1.25	0.7	0.8	6.3	8	14.73	0.0100	72.5
1.5	0.7	0.8	6.8	8.6	13.3	0.0100	88.6
2.5	0.8	1	8.4	10.6	7.98	0.0095	140
4	0.8	1.1	9.7	12.1	4.95	0.0070	186
Three Cores							
0.75	0.6	0.8	6	7.6	26	0.0110	71
1	0.6	0.8	6.3	8	19.5	0.0100	81
1.25	0.7	0.9	6.9	8.7	14.73	0.0100	103
1.5	0.7	0.9	7.4	9.4	13.3	0.0100	112
2.5	0.8	1	9.2	11.4	7.98	0.0095	172
4	0.8	1.2	10.5	13.1	4.95	0.0070	237
Four Cores							
0.75	0.6	0.8	6.6	8.3	26	0.0110	84
1	0.6	0.9	7.1	9	19.5	0.0100	99
1.5	0.7	1	8.4	10.5	13.3	0.0100	142
2.5	0.8	1.1	10.1	12.5	7.98	0.0095	220
4	0.8	1.2	11.5	14.3	4.95	0.0070	296
Five Cores							
0.75	0.6	0.9	7.4	9.3	26	0.0110	103
1	0.6	0.9	7.8	9.8	19.5	0.0100	123
1.5	0.7	1.1	9.3	11.6	13.3	0.0100	176
2.5	0.8	1.2	11.2	13.6	7.98	0.0095	272
4	0.8	1.4	13.0	16.1	4.95	0.0070	373

MULTI-CORE ORDINARY DUTY 90°C PVC INSULATED AND SHEATHED FLEXIBLE CORD, CIRCULAR TWIN, 3-CORE AND 4-CORE, AND 5-CORE, 300/500 V

Technical Specification

Multi-Core Ordinary Duty 90°C PVC Insulated and Sheathed flexible cord, circular twin, 3-core and 4- core, and 5-core, 300/500 V

Standard

BS 6500 for sizes upto 2.5mm^2. BS 7919 for 4mm^2.

Application

For use in offices and household appliances such as computers, spin extractors, washing machines, spin dryers and refrigerators and also for all kinds of outdoor industrial use. Suitable for 90°C maximum conductor temperature in normal use.

Conductor

Flexible class 5 copper conductors to BSEN 60228.

Insulation

PVC Type TI 3 to EN 50363-3.

Insulation colours

2-Core: Blue and Brown

3-Core: Green/Yellow, Blue and Brown

4-Core: Green/Yellow, Brown, Black & Grey or

Green/Yellow, Blue, Brown & Black

5-Core: Green/Yellow, Blue, Brown, Black & Grey

Sheathing

PVC Type TM 3 to EN 50363-4-1.

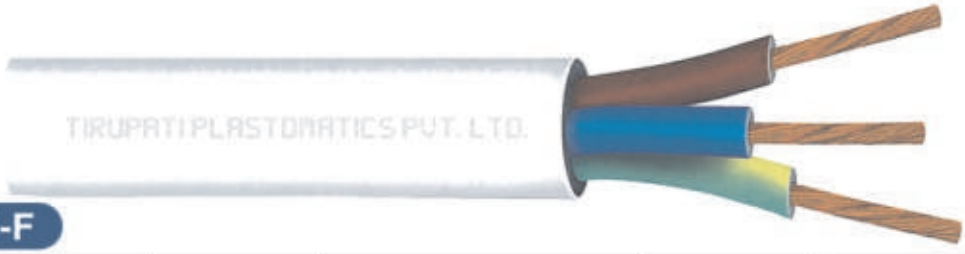
Standard Sheath Colour

White

Packing

Coils in 100 meters

Other lengths and sheath colours are available upon customer request



HO5V2V2-F

Conductor Cross-Sectional area	Nominal Radial Thickness of Insulation	Radial Thickness of Sheath	Mean Overall Diameter		Conductor Resistance At 20°C Max.	Minimum Insulation Resistance at 90°C	Cable Approxi. Weight
			Min	Max			
mm²	mm	mm	mm		Ω/km	MΩ/km	kg/km
Two Cores							
0.5	0.6	0.7	5.2	6.6	39	0.0130	43
0.75	0.6	0.8	5.7	7.2	26	0.0110	57
1	0.6	0.8	5.9	7.5	19.5	0.0100	66
1.5	0.7	0.8	6.8	8.6	13.3	0.0100	89
2.5	0.8	1	8.4	10.6	7.98	0.0095	139
4	0.8	1.1	9.7	12.1	4.95	0.0070	187
Three Cores							
0.5	0.6	0.7	5.5	7	39	0.0130	53
0.75	0.6	0.8	6	7.6	26	0.0110	71
1	0.6	0.8	6.3	8	19.5	0.0100	80
1.5	0.7	0.9	7.4	9.4	13.3	0.0100	112
2.5	0.8	1.1	9.2	11.4	7.98	0.0095	172
4	0.8	1.2	10.5	13.1	4.95	0.0070	236
Four Cores							
0.5	0.6	0.8	6.2	7.9	39	0.0130	68
0.75	0.6	0.8	6.6	8.3	26	0.0110	84
1	0.6	0.9	7.1	9	19.5	0.0100	101
1.5	0.7	1	8.4	10.5	13.3	0.0100	141
2.5	0.8	1.1	10.1	12.5	7.98	0.0095	220
4	0.8	1.2	11.5	14.3	4.95	0.0070	296
Five Cores							
0.75	0.6	0.9	7.4	9.3	26	0.0110	101
1	0.6	0.9	7.8	9.8	19.5	0.0100	120
1.5	0.7	1.1	9.3	11.6	13.3	0.0100	176
2.5	0.8	1.2	11.2	13.9	7.98	0.0095	272
4	0.8	1.4	13	16.1	4.95	0.0070	373

INDOOR CABLES

INTRODUCTION

Building Wires are used for fixed indoor installations inside conduits and within walls.

Building Wires with multi-cores can be used to connect a power supply to large loads such as air conditioning systems. Example include: copper conductors with PVC insulation (NYA) and copper with PVC insulation and nylon jacketing (THHN).

In this catalogue, we cover all technical aspects of **Tirupati Plastomatics** wires Indoor Cables. We included design considerations such as type of insulation material, insulation thicknesses, sheath material, and sheath thicknesses. Cables electrical parameters such as conductor DC resistance and current ratings are include as well.

Tirupati Plastomatics wires Indoor Cables are manufactured based on international standards such as IEC 60227, BS 6004, and UL 83, We are also capable of manufacturing according to client requirements and needs.

STANDRADS

The indoor cables described in this catalogue are all standards types, and their performances has been proved in operation. Construction and tests are in accordance with the recommendation of IEC publications where applicable, indoor cables in accordance to other standards (e.g. BS, VDE, NEMA) can be manufactured upon customer's request.

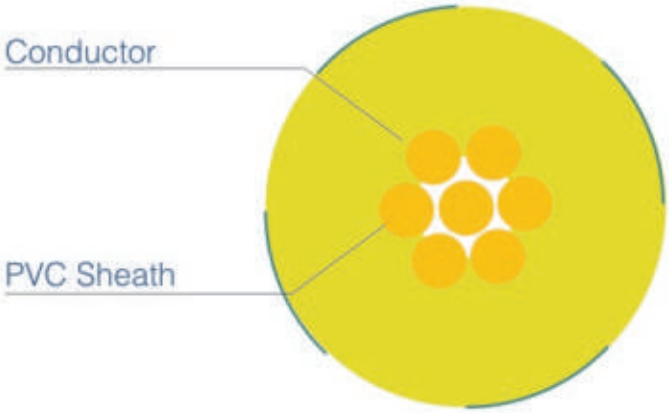
Variation in Production and Delivery Options

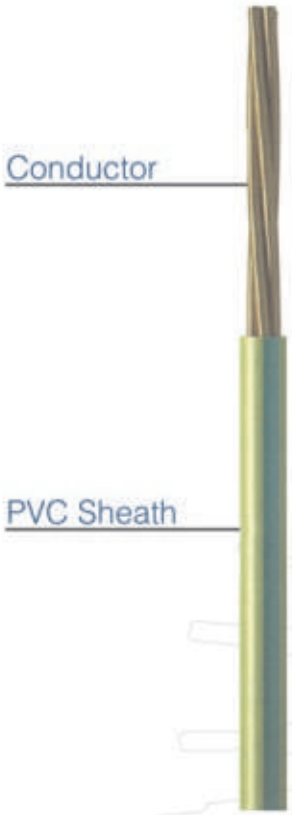
- The provided data is approximate and subject to manufacturing tolerance
- Delivery length tolerance is ± 5%
- Other product sizes are available upon customer's request

Jacket Marking

Standard embossed outer jacket marking consisting of :

1. Name of manufacturer
2. Type designation, size of conductor, rated voltage and standard
3. Continuous length marking every meter (if applicable)
3. Year of manufacture





LAYING INFORMATION

Minimum Bending Radius During Installation

During laying, the bending radius should not be smaller than values given below.
The radius depends on the outer diameter (Do) of the cable.

CABLE FOR FIXED WIRING

Insulation	Conductor	Outer diameter (mm)	Min. Radius (mm)
PVC of (LSHF)	Copper (solid strand or flexible)	Up to 10	3 D_o
		10-25	4 D_o
		Above 25	6 D_o

Electrical Parameters of the Cables

DC Resistance of Conductor

The Maximum DC resistance values of conductors at 20°C are as per "IEC 60228" standard.
DC resistance per unit length of the conductor at other conductor temperature θ is given by:

$$R = Ro\,[1 + \alpha_{20°C}\,(t - 20°C)]$$

Where :

R = DC resistance at temperature t°C Ω/km

Ro = D.C resistance at temperature 20°C Ω/km (given in the relative tables for each type of cable

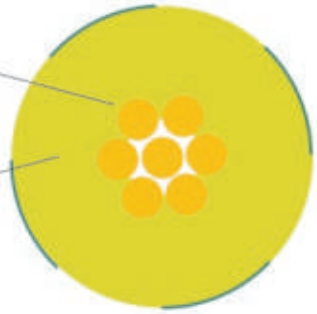
t = Conductor temperature °C

$\alpha_{20°C}$ = Temperature coefficient at 20°C 1/°C

For copper conductor $\alpha_{20°C}$ = 0.00393

SINGLE CORE

For indoor fixed installation in dry location

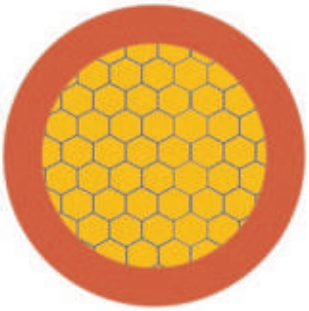


Type	: CU/PVC
Standard	: IEC 60227
Nominal Voltage	: 450/ 750 volt
Conductor	: Soft annealed solid or stranded copper wires
Insulation	: PVC compound rated 85□C (or LSHF)
Packing	: Plastic spools-coils or non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Cross Section	Normal Insulation Thickness	Approx Overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING	
					Laid in Conduits	Laid in Free Air
mm^2	mm	mm	kg/km	ohm/km	A	A
Copper Solid Conductors						
1.5	0.7	2.8	21	12.1	21	28
2.5	0.8	3.4	36	7.41	27	38
4	0.8	3.8	47	4.61	34	50
6	0.8	4.3	66	3.08	43	66
10	1.0	5.6	110	1.83	60	89
Copper Stranderd Conductors						
1.5	0.7	3.0	21	12.1	21	28
2.5	0.8	3.6	33	7.41	27	38
4	0.8	4.1	51	4.61	34	50
6	0.8	4.7	72	3.08	43	66
10	1.0	6.0	116	1.83	60	89
16	1.0	7.0	173	1.15	78	115
25	1.2	8.7	270	0.727	103	152
35	1.2	9.8	365	0.524	126	189
50	1.4	11.0	477	0.387	157	235
70	1.4	12.7	660	0.268	196	291
95	1.6	14.7	930	0.193	239	350
120	1.6	16.2	1140	0.153	280	410
150	1.8	18.1	1430	0.124	316	473
185	2.0	20.1	1770	0.0991	364	545
240	2.2	23.0	2330	0.0754	431	650
300	2.4	25.4	2910	0.0601	494	690
400	2.6	29.0	3710	0.0470	566	916

SINGLE CORE



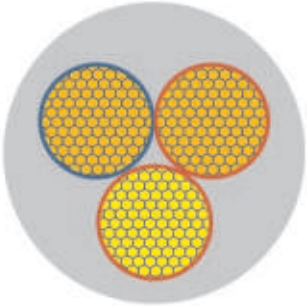
For fixed installation particular flexibility is required

Type	: CU/PVC
Standard	: IEC 60227
Nominal Voltage	: 350/500 & 450/750 volt
Conductor	: Soft annealed copper fine wires
Insulation	: PVC compound rated 85°C (or LSHF)
Packing	: Plastic spools-coils or non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Cross Section	Normal Insulation Thickness	Approx Overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING	
					Laid in Conduits	Laid in Free Air
mm^2	mm	mm	kg/km	ohm/km	A	A
0.50	0.6	2.1	9	39.0	8	11
0.75	0.6	2.2	10	26.0	11	17
1.0	0.6	2.5	15	19.5	14	22
1.5	0.7	3.0	21	13.3	21	28
2.5	0.8	3.6	36	7.98	27	38
4	0.8	4.5	52	4.95	34	50
6	0.8	5.2	71	3.30	43	66
10	1.0	6.6	116	1.91	60	89
16	1.0	7.1	172	1.21	78	115
25	1.5	9.5	248	0.780	103	152
35	1.2	10.9	366	0.554	126	189
50	1.4	13.0	510	0.386	157	235
70	1.4	15.1	705	0.272	196	291
95	1.6	17.3	930	0.206	239	350
120	1.6	17.7	1155	0.161	280	410
150	1.6	19.0	1395	0.129	316	473
185	2.0	24.0	1820	0.106	364	545
240	2.2	27.4	2340	0.0801	430	566

MULTICORE CABLES



For indoor movable installation in dry location.

Type	: CU/PVC/PVC
Standard	: IEC 60227
Nominal Voltage	: 350/500 volt
Conductor	: Soft annealed copper fine wires
Insulation	: PVC compound rated 70°C or 85°C
Jacketing	: PVC compound (or LSHF)
Packing	: Plastic spools-coils or non returnable wood drums as per customer requirements

TECHNICAL INFORMATION

Nominal Cross Section	Normal Insulation Thickness	Nominal Sheath Thickness	Approx Overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C	CURRENT RATING	
						Laid in Conduits	Laid in Free Air
nx mm^2	mm	mm	mm	kg/km	ohm/km	A	A
2*0.75	0.6	0.8	6.2	56	26.0	8	15
2*1.0	0.6	0.8	6.7	66	19.5	10	18
2*1.5	0.7	0.8	7.7	92	13.3	13	22
2*2.5	0.8	1.0	9.2	136	7.98	18	30
3*0.75	0.6	0.8	6.6	65	26.0	8	15
3*1.0	0.6	0.8	7.8	82	19.5	10	18
3*1.5	0.7	0.9	8.5	116	13.3	13	22
3*2.5	0.8	1.1	10.1	172	7.98	18	28
4*0.75	0.6	0.8	6.9	82	26.0	7	14
4*1.0	0.6	0.8	7.8	92	19.5	9	17
4*1.5	0.7	1.0	9.5	150	13.3	12	21
4*2.5	0.8	1.1	11.0	212	7.98	16	28
5*0.75	0.6	0.9	9.0	110	26.0	7	14
5*1.0	0.6	0.9	9.6	130	19.5	9	17
5*1.5	0.7	1.1	10.5	175	13.3	12	21
5*2.5	0.8	1.2	12.3	250	7.98	16	28

FLAT CABLES WITH OR WITHOUT ECC

For indoor fixed installation in dry location

Type	: CU/PVC/ PVC
Standard	: BS 6004
Nominal Voltage	: 350/500 volt
Conductor	: Soft annealed solid or stranded copper wires
Insulation	: PVC compound rated 70°C or 85°C
Jacketing	: PVC compound (or LSHF)
Packing	: Plastic spools-coils or non returnable wood drums as per customer requirements

TECHNICAL INFORMATION

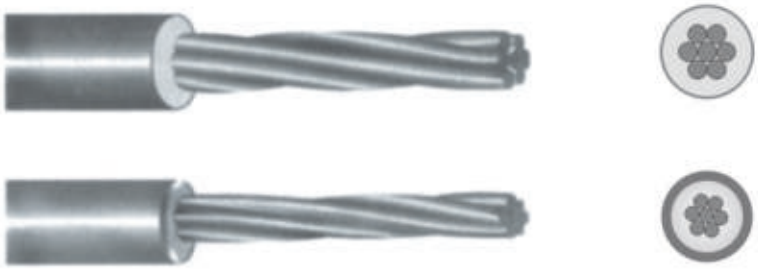
Nominal Cross Section	No. of Wires in Cord	Nominal Insu. Thick	No. of Wires in Earth Cond	Nominal Sheath Thick	Approx Overall Diameter	Approx Cable Weight	Max DC Resistance at 20°C		CURRENT RATING	
									Laid in Conduit	Laid in Free Air
n x mm^2	NR	mm	NR	mm	mm	KG/KM	Ins. cond	earth cond	A	A
I-Twin and Three Core Flat Cables without Earth Continuity Conductor										
2.*1.5	1			0.9	7.4*4.6	66	11.9		14	17
2.*2.5	1			1.0	8.7*5.4	96	7.14		20	23
2*4	7			1.0	11.4*7.2	142	4.52		26	30
2*6	7			1.1	12.7*8.0	192	3.02		33	38
2*10	7			1.2	15.6*9.4	310	1.79		44	53
2*16	7			1.3	18*10.8	455	1.13		58	70
3*1.5	1	0.7		0.9	10.2*4.6	96	11.9		14	17
3*2.5	1	0.8		1.0	12.1*5.4	142	7.14		20	23
3*4	7	0.8		1.1	15.6*7.4	217	4.52		26	30
3*6	7	0.8		1.1	17.5*8.5	282	3.02		33	38
3*10	7	1.0		1.2	22.0*9.8	465	1.79		44	53
3*16	7	1.0		1.3	25.4*11.0	675	1.13		58	70
II- Twin and Three Core Cables with Continuity Conductor										
2*1.5+1	1	0.7	1	0.9	8.9*5.2	77	11.9	17.7	13	14
2*2.5+1	1	0.8	1	1.0	10.2*6.0	112	7.14	17.7	18	20
2*4+1.5	7	0.8	1	1.0	12.6*7.2	168	4.52	11.9	24	26
2*6+2.5	7	0.8	1	1.0	14.4*8.0	233	3.02	7.41	30	33
2*10+4	7	1.0	7	1.2	18.2*9.6	375	1.79	4.52	40	44
2*16+6	7	1.0	7	1.3	21.4*11.0	540	1.13	3.02	51	59
3*1.5+1	1	0.7	1	0.9	11.8*5.4	108	11.9	17.7	13	14
3*2.5+1	1	0.8	1	1.0	13.8*6.2	152	7.14	17.7	18	20
3*4+1.5	7	0.8	1	1.1	17.2*7.4	250	4.52	11.9	24	26
3*6+2.5	7	0.8	1	1.1	19.4*8.0	325	3.02	7.14	30	33
3*10+4	7	1.0	7	1.2	24.8*9.8	525	1.79	4.52	40	44
3*16+6	7	1.0	7	1.3	28.6*10.0	760	1.13	3.02	51	59

WIRING CABLES

PRODUCT RANGE

This publication provides details of the following types of wiring cables :

6491X- Single core, PVC insulated non-sheathed calbes, available in size range 1.5mm2 to 630mm2 and rated 450/750V. These cables can be considered to have a voltage rating up to 1000V a.c. when installed in fixed protected installation eg. lighting fitting and inside appliances. switchgear and control gear.



The above wiring cables conform to BS 6004 specification for "PVC insulated cables (non-armoured) for electric power and lighting". The cables also generally satisfy the International Specification IEC 60227 (6491 X only) and German standard VDE 0281 for "PVC indulated cables and cords with rated Voltage not exceeding 750V"

CONSTRUCTION

CONDUCTORS

Wiring cable conductors are stranded, high conductivity plain annealed copper wire meeting the requirements of class 2 in BS 60228 and IEC 60228 specifications for " Conductors in insulated cables and cords". Wiring cables with solid copper conductors are offered up to 2.5mm^2.

INSULATION

The insulation of standard wiring cables is PVC grade Type TI 1 of BS 7655 (formerly BS 6746) Suitable for a maximum continuous conductor operating temperature of 70°C.

CORE IDENTIFICATION

Unless specifically agreed otherwise, insulation colours are in accordance with BS 6004 specifications as follows:
Single Core : Red, Black, Blue, Green/Yellow, Brown, Grey.

Note : Insulation colors other than the above may be manufactured on customer request.

FINISH

Wiring cables have a smooth finish and are continuously marked with Tirupati Plastomatics by printing or embossing on the external surface.

RANGE, DIMENSIONS AND WEIGHTS

SINGLE CORE PVC INSULATED CABLES

Table 1

Nominal Conductor area mm²	PVC insulated, non-sheathed 6491x, 450/750V	
	** Maximum diameter mm	Approximate Weight kg/km
1.5*	3.2	21
1.5	3.3	23
2.5*	3.9	33
2.5	4.0	35
4	4.6	50
6	5.2	70
10	6.7	120
16	7.8	180
25	9.7	280
35	10.9	370
50	12.8	500
70	14.6	700
95	17.1	970
120	18.8	1190
150	20.9	1470
185	23.3	1840
240	26.6	2400
300	29.6	3010
400	33.2	3820
500	36.9	4900
630	41.1	6100

*Note: Conductors are solid, all others are stranded. Refer to Table 5 for details.

** These dimensions are Ducab's Maximum and also apply to wiring insulated with Heat Resistant PVC, Type TI 3 (erstwhile Type 5). The weight (kg/km) of Heat Resistant PVC wiring cables will be slightly less than the standard 6491X Cables shown above.

PERFORMANCE CHARACTERISTICS

VOLTAGE RATINGS

The non-sheathed general pupose type 6491X cables are rated 450/750V (450V to earth, 750V between conductors). These cables are considered suitable for fixed protected installations in lighting fittings and inside appliances, switchgear and control gear for voltages up to 1000V a.c. up to 750V to earth d.c..

CURRENT CARRYING CAPACITIES AT AMBIENT TEMPERATURE 30°C

The tabulated current capacities relate to continuous loading and are also known as the " full thermal rating" implying that the cables will operate at their maximum conductor continuous temperature of 70°C. The data is extracted from IEE Wiring Regulations (BS 7671).

The tabulated current rating capacities also relate to installation where the overload protection is afforded by fuse to BS 88 or BS 1361 or a miniature circuit breaker. Where the conductor is protected by semi-enclosed fuse to BS 3036, the Size of the conductor is to be such that its tabulated current carrying capacity is not less than the value of the fuse rating adjusted by multiplier 1.38 in addition to the correction factors for ambient temperature, thermal insulation and grouping. For details refer to IEE Wiring Regulations.

VOLTAGE DROP DATA

For a given cable run, to calculate the voltage drop (in mV), the tabulated value (mV/A/m) has to be multiplied by the cable route length in metres and the design current. For three-phase circuits the tabulated mV/A/m values relate to the line voltage.

For cables of 16mm2 or less cross sectional area, the inductance can be ignored and mV/A/m values are based on resistance (r) only. For cables of cross sectional area greater than 16mm2, mV/Am values based on resistance (r) and inductance (x) are significant. However for brevity, Table 2, for single core cables of sizes 25mm2 & 35mm2, list (mV/A/m) z values based on total impedance (z) only.

Where the power factor of the A.C. load is widely different form the cable power factor, use of (mV/A/m) z values for calculating the volt drop may give a pessimistically high value. For detailed information, reference should be made to Appendix 4 of the IEE Wiring Regulations.

SINGLE CORE PVC INSULATED NON-SHEATHED CABLES- CABLES IN CONDUIT ON A WALL OR CEILING OR IN TRUNKING (REFERENCE METHOD 3)

Table 2

Conductor Cross Sectional Area mm²	Current carrying capacities (amperes)		Voltage Drop (mV/A/m)		Conductor Cross Sectional Area mm²	Current carrying capacities (amperes)		Voltage Drop (mV/A/m)					
	2 cables single phase ac or dc	3 or 4 cables three phase ac	2 cables single phase ac	3 or 4 cables three phase ac		2 cables single phase ac or dc	3 or 4 cables three phase ac	2 cables single phase ac			3 or 4 cables three phase ac		
								r	x	z	r	x	z
1	13.5	12	44	38	50	151	134	0.95	0.30	1.00	0.81	0.26	0.85
1.5	17.5	15.5	29	25	70	192	171	0.65	0.29	0.72	0.56	0.25	0.61
2.5	24	21	18	15	95	232	207	0.49	0.28	0.56	0.42	0.24	0.48
4	32	28	11	9.5	120	269	239	0.39	0.27	0.47	0.33	0.23	0.41
6	41	36	7.3	6.4	150	300	262	0.31	0.27	0.41	0.27	0.23	0.36
-	-	-	-	-	185	341	296	0.25	0.27	0.37	0.22	0.23	0.32
10	57	50	4.4	3.8	240	400	346	0.195	0.26	0.33	0.17	0.23	0.29
16	76	68	2.8	2.4	300	458	394	0.160	0.26	0.31	0.14	0.23	0.27
*25	101	89	1.8	1.55	400	546	467	0.130	0.26	0.29	0.12	0.22	0.25
*35	125	110	1.3	1.10	500	626	533	0.110	0.26	0.28	0.10	0.22	0.25
					630	720	611	0.094	0.25	0.27	0.08	0.22	0.24

* Voltage drop for sizes 25mm2 and 35mm2 are based on total impedance 'z' only.
For 'r' and 'x' data, IEE Wiring Regulation should be referred to .

Note: data in the above table is based on IEE Wiring Regulations. The Current carrying capacities of Heat Resistant PVC insulated cables are higher, please refer to Technical Department if data is required.

THERMAL INSULATION

Current rating pertaining to cables or cable conduits totally surrounded by thermally insulating material are not included in the above tables. For such situations. in the absence of precise information, a rating factor of 0.5 may be applied to the appropriate current ratings.
For multicore cables, current ratings of cables installed in thermally insulated ceiling s but in contact with a thermally conductive surface on one side are stated. For similar information applicable to single core cables, reference should be made to the IEE Wiring Regulations.

RATING FACTORS
FOR AMBIENT TEMPERATURE OTHER THAN 30°C, THE TABULATED CURRENT RATINGS SHOULD BE ADJUSTED BY FACTORS AS FOLLOWS:

Table 3

Ambient temperature °C		25	30	35	40	45	50	55	60	65	70	75	80	85
Overload protection afforded by device other than semi-enclosed fuse to BS 3036	Heat resisting PVC (90°C)*	1.03	1.0	0.97	0.94	0.91	0.87	0.84	0.80	0.76	0.71	0.61	0.5	0.35
	Ordinary PVC (70°C)	1.03	1.0	0.94	0.87	0.79	0.71	0.61	0.50	0.35	-	-	-	-
Semi-enclosed fuse to BS 3036 (formerly coarse excess current protection)	Heat resisting PVC (90°C)*	1.03	1.0	0.97	0.94	0.91	0.87	0.84	0.80	0.76	0.72	0.68	0.63	0.49
	Ordinary PVC (70°C)	1.03	1.0	0.97	0.94	0.91	0.87	0.84	0.69	0.48	-	-	-	-

* These factors are applicable only to ratings in Table 2.

CORRECTION FACTORS FOR GROUPS OF CABLES (REF. IEE WIRING REGULATION)

Table 4

Method of Installation		Correction factor													
		Number of circuits or multicore cables													
		2	3	4	5	6	7	8	9	10	12	14	16	18	20
Enclosed in conductor trunking (Method 3 or 4) or bunched and clipped directly to non-metalic surface (Method 1)		0.80	0.70	0.65	0.60	0.57	0.54	0.52	0.50	0.48	0.45	0.43	0.41	0.39	0.38
Single layer clipped to a non-metalic surface (Method 1)	Touching	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.70	-	-	-	-	-	-
	Spaced*	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Single layer multicore on a perforated metal cable tray, vertical or horizontal (Method 1)	Touching	0.86	0.81	0.77	0.75	0.74	0.73	0.73	0.72	0.71	0.70	-	-	-	-
	Spaced*	0.91	0.89	0.88	0.87	0.87	-	-	-	-	-	-	-	-	-
Single Layer Single Core on a perforated metal cable tray, touching (method 11)	Horizontal	0.90	0.85	-	-	-	-	-	-	-	-	-	-	-	-
	Vertical	0.85	-	-	-	-	-	-	-	-	-	-	-	-	-
Single layer multicore touching on ladder supports (Method 13)		0.86	0.82	0.80	0.79	0.78	0.78	0.78	0.77	-	-	-	-	-	-

* 'Spaced' means a clearance between adjacent surfaces of at least one cable diameter (D). Where the horizontal clearances between adjacent cables exceeds 2D no correction factor need be applied.

Notes to Table 4:

1. The factors in the table are applicable to groups of cables all of one size. The value of current derived from application of the appropriate factors is the maximum continuous current to be carried by any of the cables in the group.

2. If, due to know operating conditions, a cable is expected to carry not more than 30% of its grouped rating, it may be ignored for the purpose of obtaining the rating factor for the rest of the group.

CONDUCTOR RESISTANCE

Nominal conductor area mm²	Maximum diameter of conductor mm	Maximum conductor resistance per km at 20°C ohm	Nominal conductor area mm²	Maximum diameter of conductor mm	Maximum conductor resistance per km at 20°C ohm
1.5*	1.38	12.1	50	8.30	0.387
1.5	1.59	12.1	70	10.00	0.268
2.5*	1.78	7.41	95	11.70	0.193
2.5	2.01	7.41	120	13.15	0.153
-	-	-	150	14.55	0.124
4	2.55	4.61	185	16.30	0.0991
6	3.12	3.08	240	18.75	0.0754
10	4.05	1.83	300	21.00	0.0601
16	4.85	1.15	400	23.90	0.0470
25	6.15	0.727	500	28.40	0.0366
35	7.25	0.524	630	31.70	0.0283

CONDUCTOR SHORT CIRCUIT RATINGS

Short circuit rating of copper conductor shall be calculated suing following formula:
Short circuit current $I = kA/\sqrt{t}$

k = 0.115
A = Cross sectional Area of conductor
t = Duration in seconds

e.g. Short circuit rating of 300mm² Cu conductor for 1 second.

$I = 0.115 \times 300/\sqrt{1}$
$= 34.5kA/sec.$

The values of short circuit ratings derived from above formula based on the PVC insulated cable being fully loaded at the start of the short circuit conductor temperature of 70°C and final conductor temperature of 160°C.

WIRING CABLE INSTALLATION

Wiring cables should be installed in accordance with IEE Wiring Regulations, or local installation regulations.
Minimum internal radius at bends:

CABLE DIAMETER	Minimum internal radius
Up to 10mm	3 x cable diameter
Exceeding 10mm but less than 25mm	4 x cable diameter
Exceeding 25mm	6 x cable diameter

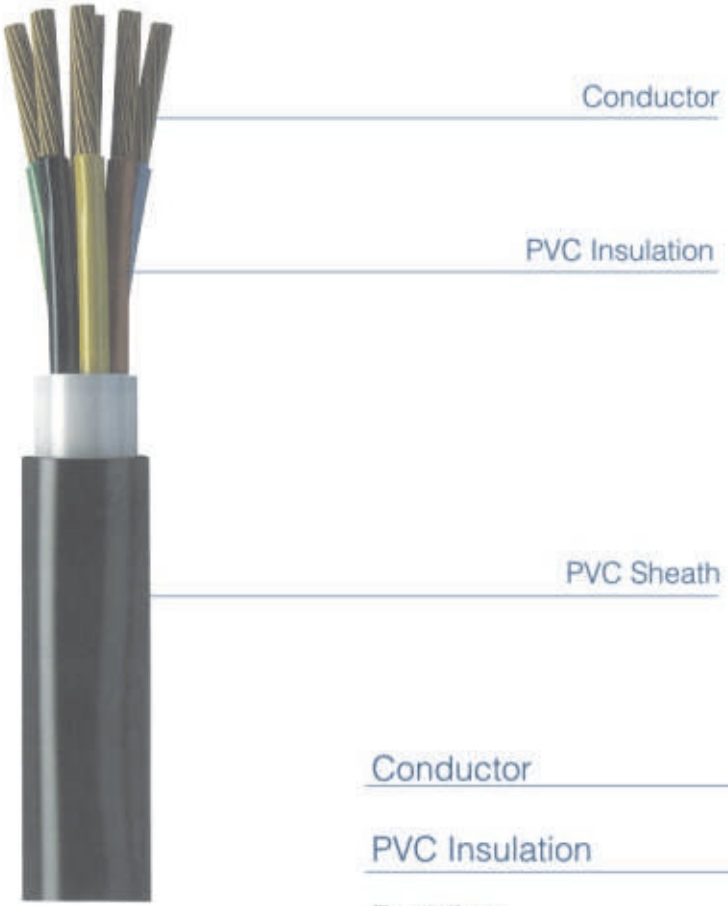
CONTROL CABLES

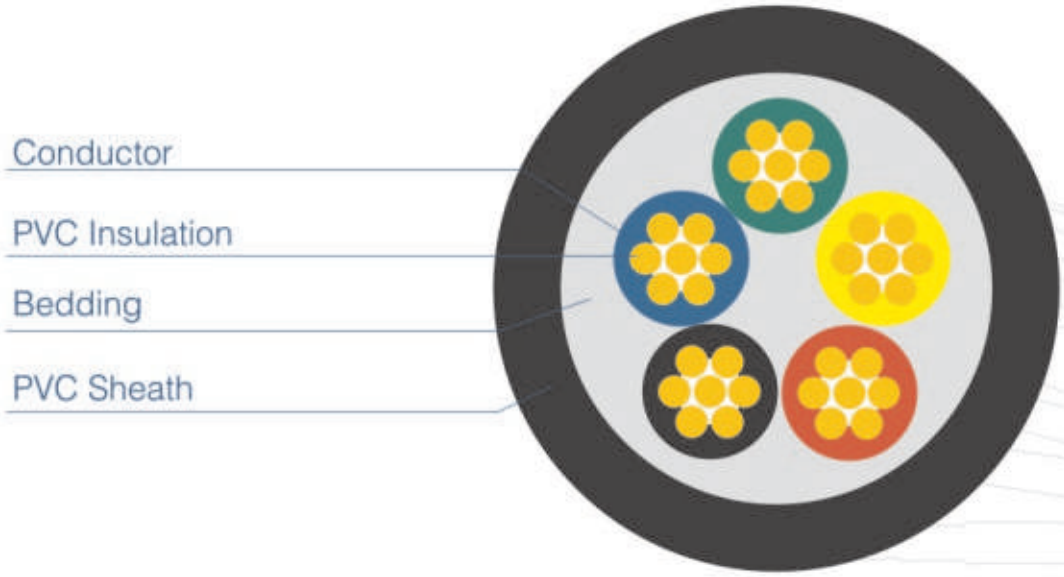
Introduction

Control Cables are used for outdoor/indoor installations for transmitting signals and connecting control units in the industry, railways, and traffic signals. Control cables are usually made of multiple cores such as 7, 10, 12, 14, and 16 cores; and control cables may be armored or unarmored.

In this catalogue, we cover all technical aspects of Tirupati Plastomatics Pvt. Ltd. Control Cables. We included design considerations such as number of cores, type of insulation material, insulation thickness, sheath material, and sheath thicknesses. Cables Electrical Parameters such as conductor DC resistance and current ratings are included as well.

Tirupati Plastomatics Pvt. Ltd. Control Cables are manufactured based on international standards such as IEC 60502-1. We are also capable of manufacturing according to client requirements and needs.





General Information

Standards

The cables described in this catalogue are all standard types, and their performances has been proved in operation. Construction and tests are in accordance with the recommendation of IEC publications where applicable.

Control cables in accordance to other standards (e.g. BS, VDE, NEMA) can be manufactured upon customer's request.

Variation in Production and Delivery Options

The provided data is approximate and subject to manufacturing tolerance

Delivery length tolerance is ±5%

Jacket Marking

Standard embossed outer jacket marking consisting of:

1- Name of manufacturer
2- Type designation, size of conductor, rated voltage and standard.
3- Continuous length marking every meter.
4- Year of manufacture.

Laying Information

Minimum Bending Radius During Installation

During laying, the bending radius should not be smaller than values given below.

The radius depends on the outer diameter (D_o) of the cable.

PVC and XLPE insulated Cables

Conductor	Construction	Outer diameter (mm)	Min. Radius
Stranded Copper	Armoured or Unarmoured	Any	8 D_o

Electrical Parameters Of The Cables
DC Resistance of Conductor

The maximum DC resistance values of conductors at 20°C are as per "IEC 60228" standard.
DC resistances per unit length of the conductor at other conductor temperature is given by:

$$R = R_o [1+\alpha_{20°C} (t-20°C)]$$

Where:

R = DC resistance at temperature t°C Ω/KM

R_o = DC resistance at temperature 20°C Ω/KM (given in the relative tables for each type of cable)

t = Conductor temperature °C

$\alpha_{20°C}$ = Temperature coefficient at 20°C 1/C

For copper conductor $\alpha_{20°C}$ = 0.00393

Multicore cable

For outdoor and indoor installations in damp and wet locations

Type : CU / PVC / PVC

Standard : IEC 60502-1

Rated Voltage : 0.6 / 1 KV

Conductor : Soft annealed stranded copper wires (or soild copper)

Insulation : PVC compound rated 70°C or 85°C (or XLPE or LSHF)

Jacketing : PVC compound (or LSHF)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	kg/km	ohm/km	A	A	A
5*1.5	0.8	1.8	13.0	237	12.10	25	22	19
7*1.5	0.8	1.8	13.1	282	12.10	22	20	17
10*1.5	0.8	1.8	16.4	368	12.10	19	18	16
12*1.5	0.8	1.8	16.7	438	12.10	18	16	15
14*1.5	0.8	1.8	18.3	452	12.10	16	15	13
16*1.5	0.8	1.8	19.5	532	12.10	15	14	13
19*1.5	0.8	1.8	19.6	610	12.10	14	13	11
24*1.5	0.8	1.8	22.8	726	12.10	12	11	11
30*1.5	0.8	1.8	24.0	865	12.10	11	11	9
37*1.5	0.8	1.8	25.7	1050	12.10	10	9	8
5*2.5	0.8	1.8	14.0	305	7.41	33	29	25
7*2.5	0.8	1.8	15.2	365	7.41	30	26	22
10*2.5	0.8	1.8	18.3	485	7.41	27	23	20
12*2.5	0.8	1.8	19.5	530	7.41	25	22	19
14*2.5	0.8	1.8	19.7	640	7.41	22	20	17
16*2.5	0.8	1.8	20.4	700	7.41	20	18	15
19*2.5	0.8	1.8	22.5	840	7.41	19	17	15
24*2.5	0.8	1.8	25.3	990	7.41	18	16	13
30*2.5	0.8	1.8	26.7	1230	7.41	16	14	12
37*2.5	0.8	1.9	30.0	1530	7.41	14	13	11
5*4	1.0	1.8	17.9	528	4.61	42	36	34
7*4	1.0	1.8	19.3	650	4.61	38	33	30
10*4	1.0	1.8	22.6	725	4.61	34	30	27
12*4	1.0	1.8	24.7	470	4.61	31	27	25
14*4	1.0	1.8	25.3	945	4.61	28	24	22
16*4	1.0	1.8	25.8	1140	4.61	27	23	21
19*4	1.0	1.8	28.4	1520	4.61	25	21	20
24*4	1.0	1.9	31.5	1590	4.61	22	19	17
30*4	1.0	2.0	34.4	1960	4.61	20	17	15
37*4	1.0	2.1	37.0	2500	4.61	18	16	14

Multicore cable

For outdoor installations in damp and wet locations

Type	:	CU / PVC /STA/ PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires (or soild copper)
Insulation	:	PVC compound rated 70°C or 85°C (XLPE or LSHF)
Bedding	:	PVC compound (or LSHF)
Armouring	:	Steel Tape
Jacketing	:	PVC compound (or LSHF)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal S. Tape Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
7*15	0.8	0.2	1.8	16.1	440	12.10	22	20	17
10*1.5	0.8	0.2	1.8	19.0	555	12.10	19	18	16
12*1.5	0.8	0.2	1.8	20.0	630	12.10	18	16	15
14*1.5	0.8	0.2	1.8	20.3	670	12.10	16	15	14
16*1.5	0.8	0.2	1.8	21.2	760	12.10	15	14	13
19*1.5	0.8	0.2	1.8	22.2	825	12.10	14	13	12
24*1.5	0.8	0.2	1.8	25.8	1025	12.10	12	12	11
30*1.5	0.8	0.2	1.8	27.0	1190	12.10	11	11	9
37*1.5	0.8	0.2	1.8	28.7	1340	12.10	10	9	8
5*2.5	0.8	0.2	1.8	16.3	465	7.41	33	29	25
7*2.5	0.8	0.2	1.8	17.0	530	7.41	30	26	22
10*2.5	0.8	0.2	1.8	20.0	820	7.41	27	23	20
12*2.5	0.8	0.2	1.8	21.0	860	7.41	25	22	19
14*2.5	0.8	0.2	1.8	22.5	885	7.41	22	20	17
16*2.5	0.8	0.2	1.8	24.5	1110	7.41	20	18	16
19*2.5	0.8	0.2	1.8	26.3	1170	7.41	19	17	15
24*2.5	0.8	0.2	1.8	28.5	1355	7.41	18	16	13
30*2.5	0.8	0.2	1.9	31.5	1910	7.41	16	14	12
37*2.5	0.8	0.2	1.9	32.5	1960	7.41	14	13	11
5*4	1.0	0.2	1.8	18.7	635	4.61	42	36	34
7*4	1.0	0.2	1.8	20.0	740	4.61	38	33	30
10*4	1.0	0.2	1.8	24.5	965	4.61	34	30	27
12*4	1.0	0.2	1.8	25.5	1125	4.61	31	27	25
14*4	1.0	0.2	1.8	26.4	1275	4.61	28	24	22
16*4	1.0	0.2	1.8	27.8	1400	4.61	27	23	21
19*4	1.0	0.2	1.8	29.5	1620	4.61	25	21	20
24*4	1.0	0.2	2.0	34.6	2040	4.61	22	19	17
30*4	1.0	0.2	2.0	36.5	2670	4.61	20	17	15
37*4	1.0	0.5	2.2	41.0	3260	4.61	18	16	14

Multicore cable

For outdoor installations in damp and wet locations

Type	:	CU / PVC / SWA / PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires (or soild copper)
Insulation	:	PVC compound rated 70°C or 85°C (XLPE or LSHF)
Bedding	:	PVC compound (or LSHF)
Armouring	:	Steel Wires
Jacketing	:	PVC compound (or LSHF)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal S. Wire diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
7*15	0.8	0.9	1.8	17.0	595	12.10	22	20	17
10*1.5	0.8	0.9	1.8	20.0	760	12.10	19	18	16
12*1.5	0.8	0.9	1.8	20.5	850	12.10	18	16	15
14*1.5	0.8	1.6	1.8	24.5	1150	12.10	16	15	14
16*1.5	0.8	1.6	1.8	26.0	1200	12.10	15	14	13
19*1.5	0.8	1.6	1.8	28.0	1360	12.10	14	13	12
24*1.5	0.8	1.6	1.8	29.0	1550	12.10	12	12	11
30*1.5	0.8	1.6	1.8	31.0	1730	12.10	11	11	9
37*1.5	0.8	1.6	1.9	17.0	2150	12.10	10	9	8
5*2.5	0.8	0.9	1.8	18.5	610	7.41	33	29	25
7*2.5	0.8	0.9	1.8	21.5	700	7.41	30	26	22
10*2.5	0.8	0.9	1.8	22.5	870	7.41	27	23	20
12*2.5	0.8	0.9	1.8	24.7	970	7.41	25	22	19
14*2.5	0.8	1.6	1.8	26.0	1430	7.41	22	20	17
16*2.5	0.8	1.6	1.8	27.0	1515	7.41	20	18	16
19*2.5	0.8	1.6	1.8	31.5	1610	7.41	19	17	15
24*2.5	0.8	1.6	1.9	32.0	2200	7.41	18	16	13
30*2.5	0.8	1.6	1.9	34.5	2460	7.41	16	14	12
37*2.5	0.8	1.6	2.0	39.7	2550	7.41	14	13	11
5*4	1.0	0.9	1.8	21.0	820	4.61	42	36	34
7*4	1.0	0.9	1.8	27.0	960	4.61	38	33	30
10*4	1.0	1.6	1.9	27.8	1495	4.61	34	30	27
12*4	1.0	1.6	1.8	29.0	1800	4.61	31	27	25
14*4	1.0	1.6	1.8	30.5	1820	4.61	28	24	22
16*4	1.0	1.6	1.8	32.0	2050	4.61	27	23	21
19*4	1.0	1.6	1.9	38.0	2270	4.61	25	21	20
24*4	1.0	2.0	2.1	38.0	2995	4.61	22	19	17
30*4	1.0	2.0	2.1	40.0	3570	4.61	20	17	15
37*4	1.0	2.0	2.2	42.5	3930	4.61	18	16	14

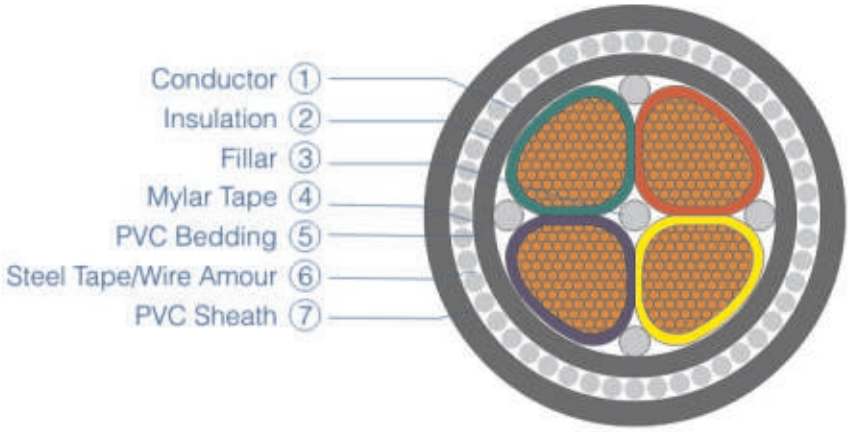
LOW VOLTAGE CABLES

INTRODUCTION

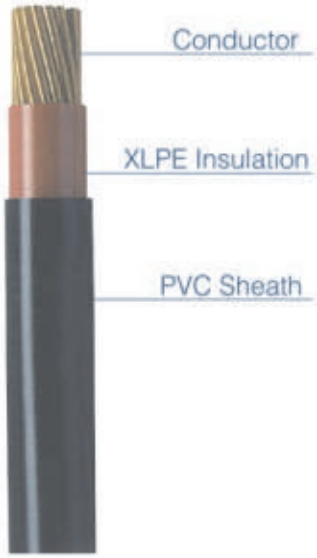
Low Voltage Power Cables are used to transmit electrical energy from one locatin to another. Low Voltage Power Cables are usually employed in the distribution process of electricity to varios loads such as hose holds.

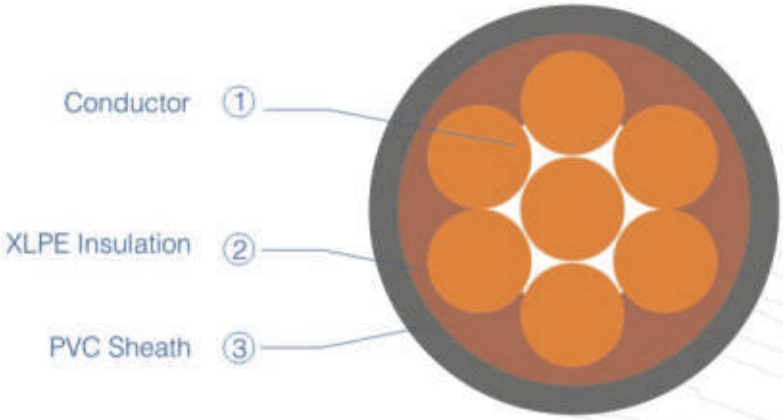
In this catalogue, we cover all technical asects of Tirupati Plastomatics Pvt. Ltd. Low Voltage Power Cables. We included design consideratins such as tye of insulation material (i.e. PVC and XLPE), insulatin thickness, type of armour, armour diaensions, sheath material and sheath thickness. Cables Electrical Parameters such as Conductor DC Resistance and current ratings are included as well.

Tirupati Plastomatics Pvt. Ltd. Low Voltage Power Cable are manufactured based on international standards such as IEC 60502-1, BS 5467 and BS 6346. We are also capable of manufacturing according to client requirements and needs.



Sector Shape 4 Cores





Round Shape 1 Cores

Low Voltage Power Cables - Design and Testing

Low voltage power cables are normally either single core or multi-core (i.e three-core or four-core).

- Conductor Design

  Conductor are made of copper or aluminum. They are circular stranded, compacted or non-compacted, or shapped (i.e. sectors). Our conductor design is in compliance with the requirements of IEC 60228 and BS 6360 specifications.

- Insulation

  -XLPE material, and complies with te requirements of IEC 60502-1 and BS 5467

  Speciications.

  -PVC material, and complies with the requirements of IEC 60502-1, BS 6346, and SASO

  1694 specifications

Assembly

All cable cores are laid-up together with usage of non-hygroscopic filler material and are temperature compatible with all different cable layers such as insulation, bedding, and sheath.

Armoring

Armoring material can be either Aluminum for single core cables or steel for multi-core cables. Armor can be either wires or tape. Our cable armoring is in compliance with the requirements of IEC 60502-1, BS 5467, and BS 6346 Specifications.

Ourter Sheath / Jacket

Our cables sheathes are made of extruded layers of PVC or PE material and is in compliance with the requirements of IEC 60502-1 and BS 7655 Specifications. We are also capable of providing cable sheaths with special requirements to be:

-Termite retardant

- Oil & Gasoline retardant

- Ozone / acid / alkali retardant

- Flame retardant and in compliance with requirements of IEC 60332-1 and IEC 61034-2

- Low Smoke Halogen Free and in compliance with requirements of BS 7211 and BS 6724.

Testing of Low Voltage Power Cables

We Tirupati Plastomatics Pvt. Ltd. are capable of performing all standard routine tests and sample tests that are normally carried out in accordance to IEC 60502 standards. We have all necessary equipment for such tests such as high voltage labs and special oven. We are also capable of performing tests in accordance with international or national requirements as agreed upon with our customers.

- Routine Tests

  -Voltage Test

  - Measurement of the electrical resistance of conductors

- Sample Tests

  -Conductor examination

  -Check of dimensions

  -Hot set test for XLPE insulations

General information

Selecting A Power Cables

The following factors are important when selecting a suitable cable construction which is required to transport electrical energy from the power station to the consumer:

-Maximum operating voltage
- Insulation level
- Frequency
- Load to be carried
- Magnitude and duration of possible overload
- Magnitude and duration of short-circuit curent
- Voltage drop
- Length of line
- Mode of installation

*undergound (direct or in ducts)
* in air

- Chemical and physical properties of soil
- Max. and min. ambient air temperature and soil temperatures
- Specification and requirements to be met

Voltage

Teh standard rated voltage of a cable is denoted by U_o/U (Um), i.e. "0.6/1 (1.2)" where:

Uo: is the rated power-frequency voltage between conductor and earth

U: is the rated power-frequency voltage between conductors.

Um: is the maximum continuously permissible operating voltage of a cable at any time or in any part of the network.

Standards

The cables described in this catalogue are all standard types, and their performance has been proved in operation. Construction and tests are in accordance with the recommendation of IEC publications where applicable.

Power cables in accrdance to other standards (e.g. BS, VDE, NEMA) can be manufactured upon customer's request.

Variation in Production and Delivery Options

- The provided data are approximate
- Delivery length tolerance is ± 5% and subject o manufacturing tolerance
- Other sizes are available upon request.

Jacket Marking

Standard embossed outer jacket marking consisting of :

1- Name of manufacturer

2- Type designation, size of conductor, rated voltage and standard.

3-Continuous length marking every meter.

4- Year of manufacture.

Laying Information

Minimum Bending Radius During Installation

During laying, the bending radius should not be smaller than values given below.
The radius depends on the outer diameter (Do) of the cable.

PVC and XLPE insulated Cables up to 3.6 kV

Conductor	Construction	Outer diameter (mm)	Min. Radius
Stranded aluminum or copper	Armoured or Unarmoured	Any	8 Do

Maximum Tensile Forces During laying

Means of Pulling	Type of Cable	Formula	Factor
With pulling head attached to the conductors	All types of cables	$P=\sigma.A$	σ=50 N/mm^2 (Copper conductor) σ= 30 N/mm^2 (Al conductor)
with pulling stocking	Un-armoured cables	$P = \sigma . A$	σ=50 N/mm^2 (Copper conductor) σ= 30 N/mm^2 (Al conductor)
	Armoured cables	$P= k. d^2$	k= 9N/mm^2

P= Pull in N
A= Total cross sectional area in mm^2 of all conductors
d= Outside diameter of the cable in mm
σ = Permissible tensile stress of conductor in N/mm^2
k= Emperically derived factor in N/mm^2

Electrical Parameters of the Cables

DC Resistance of Conductor

The Maximum DC resistance values of conductors at 20°C are as per "IEC 60228" standard.

DC resistance per unit length of the conductor at other conductor temperature is given by:

$$R=R_o\,[1+\alpha_{20°C}\,(t-20°C)]$$

Where :

R= DC resistance at temperature t °C Ω/km

Ro = D.C. resistance at temperature 20°C

Ω/km (given in the relative table for each type of cable)

t = Conductor temperature °C

$\alpha_{20°C}$ = Temperature coefficient at 20°C 1/°C

For copper conductor $\alpha_{20°C}$ = 0.00393

For aluminum conductor $\alpha_{20°C}$ = 0.00403

A.C. Resistance of Conductor

The AC Resistance per unit length of the conductor (effective resistance) at its maximum operating temperature is made up of the DC resistance at this temperature and the extra resistance which takes into account additional losses caused by the current displacement in the conductor (skin effect, proximity effect). The AC resistance is given in the relative tables for each type of cable.

Inductance

The values of the inductance for both multi cores and three single core cables have been calculated based on the following equation

L=K+0.2 ln (2S / d) (mH/km)

Where:

K= a constant relating to the conductor formation (mH/km).

d=the conductor diameter (mm)

S= axial spacing between conductors for cables in trefoil formation (mm)

= 1.26 x axial spacing between conductors for cables in flat formation (mm)

The values for inductance of single core cables has been calculated based on one cable diameter between cables in flat formation.

Operation capacitance

The values of operating capacitance for cables has been calculated based on the following presump-

$$C=\frac{\varepsilon_r}{18\ \ln\,(D/d)}\ (\mu f/km)$$

Where :

ε_r = Relative permativity of insulation

D = External diameter of insulation (mm)

d = Conductor diameter (mm)

Operation Temperature for XLPE Insulated Cables

90°C for continuous normal operation

105°C for emergency overload conditions.

250°C for short circuit conditions.

Voltage Drop

When current flows in a cable conductor, there is a voltage drop between the ends of the conductor which is the product of the current and the impedance. The following equations should be used to calculate the voltage drop:

1-Single phase system

$Vd = 2(R \cos\phi + X \sin\phi)$ (Volt/amp/meter)

2-Three phase system

$Vd = \sqrt{3}(R \cos\phi + X \sin\phi)$ (Volt/amp/meter)

Where :

Vd = Voltage drop (V/A.m)

R= AC resistance of conductor at a maximum conductor temperature (Ω/km)

X = Inductive reactance of cable (Ω/km)

Cosϕ = power factor of load

* Voltage drop data for L.V Cables are tabulated in tables 16 to 23

Cable Short Circuit Capacity

The permissible short-circuit as presented in tables 12 to 15 are calculated in accordance with IEC 724, which are based on the following conditions:

1-Short circuit starts from the maximum operating temperature.

2-Maximum temperature during short circuit XLPE = 250°C, PVC = 160°C

3-Maximum short circuit current duration is 5 seconds.

The short - circuit current (I) shall be calculated from the formula.

$$I_2 = \frac{K^2 \times S^2}{T} \times \ln\left[\frac{\theta_1+\beta}{\theta_2+\beta}\right]$$

Where :

I = Short circuit current (A)

T = Duration of short circuit (Second)

K = Constant for the material of the conductor

S = Area of conductor (mm^2)

θ_1 = Final temperature (°C)

θ_2 = Initial temperature (°C)

β = Reciprocal of the temperature coefficient of resistance () of the conductor.

Current Ratings

Recommendations for Current Ratings

The current rating of power cables is defined by the maximum intensity of current (in amperes), which can flow continuously through the cable, under permanent loading conditions without any risk of damaging the insulation or deterioration of its electrical properties.

-Current carrying capacities have been calculated in accordance with IEC 60287 (calculation of the continous current rating of cables)

-The values given in the tables are valid for one circuit in three phase system under conditions specified. For grouping cables rating factors must be used.

-It is to be observed that the current carrying capacities presented in TPPL technical data sheets are intended as a guide to assist operating engineers in selecting cables for safety and reliability.

- Basic assumptions and conditions of installation :

* Ambient ground temperature : 20°C
* Ambient air temperature : 30°C
* Depth of cable burial : 1.0m
* Thermal resistivity of soil : 120°C cm.W

-Cables in air are assumed to be proteced from direct solar radiation.

-Single core cables are installed as indicated in the technical information table. Spacing between cables in flat formation is assumed to be one cable diameter.

- For three and four core cbles, it is usual to assume the same current carrying capacity for four cores cables as for three core cables. Out calculated values are based actually on three core cables. These values are suitable with enough accuracy also for four cores cables in most cases.

- The inner diameter of ducts has been assumed to be at least 1.5 times the diameter of the cables.

To obtain the maximum current arrying capacity of cable operating at different conditions from the standards, you have to multiply the values of the current given in the technical information for the corresponding cable by the ratig factors mentioned in the tables from 1 to 11, as follows:

Ia = Kt. is in amperes

Where :

Ia : Current rating at actual operating conditions (amperes)

Is : Current rating at standard operating conditions (amperes)

Kt : Rating factor given in the tables 1 to 11. it has to be noted that Kt is the total rating factor : Kt = K1 K2...Kn

You may have a multiplication of so many partial rating factors, as may as the difference of laying and operating conditions from standard conditions.

Table 1

Rating Factors K for Variation in Ground Temperature

Ground Temperature °C	20	25	30	35	40	45	50	55
PVC cables rated 70°C	1.00	0.95	0.90	0.84	0.78	0.71	0.63	0.54
PVC cables rated 85°C	1.00	0.96	0.92	0.87	0.83	0.78	0.73	0.67
XLPE cables rated 90°C	1.00	0.92	0.92	0.88	0.84	0.79	0.75	0.70

Table 2

Rating Factors K for Variation in Air Temperature

Air Temperature°C	25	30	35	40	45	50	55
PVC cables rated 70°C	1.07	1.00	0.93	0.87	0.79	0.70	0.61
PVC cables rated 85°C	1.04	1.00	0.95	0.90	0.85	0.80	0.74
XLPE cables rated 90°C	1.04	1.00	0.96	0.91	0.87	0.82	0.76

Table 3

Rating Factors K for Variation in Ground Depth

Depth of Laying (m)	0.6	0.7	0.8	0.9	1.0	1.1	1.2
k	1.05	1.03	1.02	1.01	1.0	0.99	0.98

Table 4

Rating Factors K for Variation in Soil Resistivity

Soil Resistivity (°C. cm/W)	80	90	100	120	150	200	250
k	1.17	1.12	1.07	1.0	0.91	0.80	0.73

Table 5

Rating Factors K for Variation of Max. Operating Temperatures for PVC Insulating Cables

PVC Rated Temperature	70	85	105
Rating Factor	0.84	1.00	1.18

Table 6

Trefoil or Flat Formation Derating Factors for Three Single Core Cable Laid Direct in Ground

Number of Circuits	Spacing Spacing Trefoil Formation				Spacing Spacing Trefoil Formation	
	Touching		Spacing = 0.15 M		Spacing = 0.30 M	
NR	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat
2	0.77	0.80	0.82	0.85	0.88	0.91
3	0.66	0.69	0.73	0.76	0.80	0.83
4	0.60	0.63	0.68	0.71	0.74	0.77
5	0.56	0.59	0.64	0.67	0.72	0.75
6	0.53	0.57	0.61	0.64	0.70	0.73

Table 7

Trefoil or Flat Formation Derating Factors for Multi-Core Cables Laid Direct in Ground

Number of Cables	Spacing Spacing Trefoil Formation				Flat Formation	
	Touching		Spacing = 0.15 M		Spacing = 0.30 M	
NR	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat
2	0.81	0.81	0.87	0.87	0.91	0.91
3	0.69	0.70	0.76	0.78	0.82	0.84
4	0.62	0.63	0.72	0.74	0.77	0.81
5	0.58	0.60	0.66	0.70	0.73	0.78
6	0.54	0.56	0.63	0.67	0.70	0.76

Table 8

Flat Formation Derating Factors for Three Single Core Cables Laid in Free Air

Clearance = Cable diameter (d)		Number of circuits		
Clearance from the wall 2 cm		1	2	3
Laid on the Floor		0.92	0.89	0.88
	Number of troughs			
Laid cables	1	0.92	0.89	0.88
troughs	2	0.87	0.84	0.83
(circulation of air	3	0.84	0.82	0.81
is restricted)	6	0.82	0.80	0.79
	Number of racks			
Laid	1	1.00	0.97	0.96
on cable racks	2	0.97	0.94	0.93
	3	0.96	0.96	0.92
	6	0.94	0.91	0.90
Arranged near the wall		0.94	0.91	0.89
Arranged on the wall		0.89	0.86	0.84

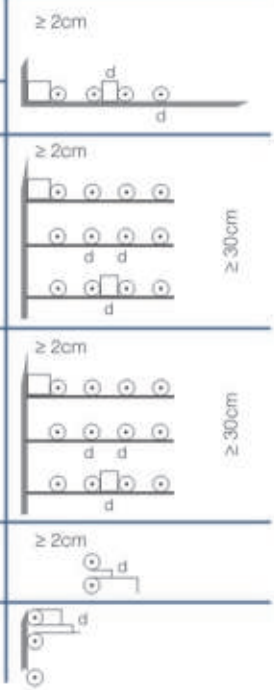


Table 9

Trefoil Touching Formation Derating Factors for Three Single Core Cables Laid in Free Air

Clearance = 2 (d)		Number of circuits		
Clearance from the wall 2 cm		1	2	3
Laid on the Floor		0.95	0.90	0.88
	Number of troughs			
Laid cables	1	0.95	0.90	0.88
troughs	2	0.90	0.85	0.83
(circulation of air	3	0.88	0.83	0.81
is restricted)	6	0.86	0.81	0.79
	Number of racks			
Laid	1	1.00	0.97	0.96
on cable racks	2	0.97	0.94	0.93
	3	0.96	0.93	0.92
	6	0.94	0.91	0.90
Arrangements for which reduction of the current is not necessary				

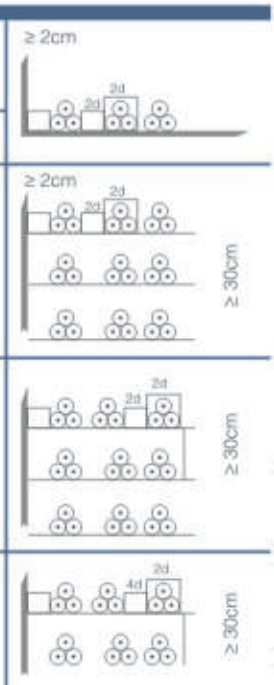


Table 10

Horizontal or Vertical Formation Derating Factor For Multi-Core Cables Laid Free Air

Clearance = Cable diameter (d)		Number of circuits				
Clearance from the wall ≥ 2 cm		1	2	3	6	9
Laid on the Floor		0.95	0.90	0.88	0.85	0.84
	Number of troughs					
Laid cables	1	0.95	0.90	0.88	0.85	0.84
troughs	2	0.90	0.85	0.83	0.81	0.80
(circulation of air	3	0.88	0.83	0.81	0.79	0.78
is restricted)	6	0.86	0.81	0.79	0.77	0.76
	Number of racks					
Laid	1	1.00	0.98	0.96	0.93	0.92
on cable racks	2	1.00	0.95	0.93	0.90	0.89
	3	1.00	0.94	0.92	0.89	0.88
	6	1.00	0.93	0.90	0.87	0.86
Arranged near the wall		1.00	0.93	0.90	0.87	0.86
Arrangements for which reduction of the current is not necessary		Clearnace from the wall ≥ 2 cm			Clearnace between cables ≥ 2 d	

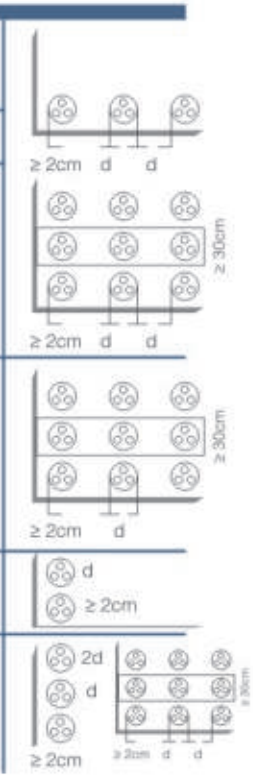


Table 11

Derating Factors for Multi-Core Cables Touching and in Contact with the Wall in Free Air

Clearance touching troughs		Number of circuits				
and contact with wall		1	2	3	6	9
Laid on the ground		0.90	0.84	0.80	0.75	0.73
	Number of troughs					
Laid cables	1	0.95	0.84	0.80	0.75	0.73
troughs	2	0.95	0.80	0.76	0.71	0.69
(circulation of air	3	0.95	0.78	0.74	0.70	0.68
is restricted)	6	0.95	0.76	0.72	0.68	0.66
	Number of racks					
	1	0.95	0.84	0.80	0.75	0.73
	2	0.95	0.80	0.76	0.71	0.69
Laid	3	0.95	0.78	0.74	0.70	0.68
on cable racks	6	0.95	0.76	0.72	0.68	0.66
Arranged near the wall		0.95	0.78	0.73	0.68	0.66

Table 12

Short Circuit Current for Copper Conductors - XLPE Insulated (KA) at (90/250)°C

Area (mm^2)	Time (s)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	7.24	5.12	4.18	3.62	3.24	2.29	1.62	1.32	1.14	1.02
25	11.31	8.00	6.53	5.66	5.06	3.58	2.53	2.07	1.79	1.60
35	15.84	11.20	9.14	7.92	7.08	5.01	3.54	2.89	2.50	2.24
50	22.62	16.00	13.06	11.31	10.11	7.15	5.06	4.13	3.58	3.20
70	31.67	22.40	18.29	15.84	14.16	10.02	7.08	5.78	5.01	4.48
95	42.98	30.39	24.82	21.49	19.22	13.59	9.61	7.85	6.80	6.08
120	54.30	38.39	31.34	27.15	24.28	17.17	12.14	9.91	8.59	7.68
150	67.87	47.99	39.19	33.94	30.35	21.46	15.18	12.39	10.73	9.60
185	83.71	59.19	48.33	41.85	37.42	26.47	18.72	15.28	13.24	11.94
240	108.59	76.79	62.70	54.30	48.56	34.34	24.28	19.83	17.17	15.36
300	135.74	95.98	78.37	67.87	60.71	42.93	30.35	24.78	21.46	19.20

Table 13

Short Circuit Current for Aluminum Conductors - XLPE Insulated (KA) at (90/250)°C

Area (mm^2)	Time (s)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	4.78	3.38	2.76	2.39	2.14	1.51	1.07	0.87	0.76	0.68
25	7.47	5.28	4.31	3.73	3.34	2.36	1.67	1.36	1.18	1.06
35	10.46	7.40	6.04	5.23	4.68	3.31	2.34	1.91	1.65	1.48
50	14.94	10.56	8.63	7.47	6.68	4.72	3.34	2.73	2.36	2.11
70	20.91	14.79	12.08	10.46	9.35	6.61	4.68	3.82	3.31	2.96
95	28.38	20.07	16.39	14.19	12.69	8.98	6.35	5.18	4.49	4.01
120	35.85	25.35	20.70	17.93	16.03	11.34	8.02	6.55	5.67	5.07
150	44.82	31.69	25.88	22.41	20.04	14.17	10.02	8.18	7.09	6.34
185	55.28	39.09	31.91	27.64	24.72	17.48	12.36	10.09	8.74	7.82
240	71.71	50.71	41.40	35.85	32.07	22.68	16.03	13.09	11.34	10.14
300	89.64	63.38	51.75	44.82	40.09	28.35	20.04	16.37	14.17	12.68

Table 14

Short Circuit Current for Copper Conductors - PVC Insulated (Type 5), as per Table 1 of BS 6746 (KA) at (85/160)°C

Area (mm^2)	Time (s)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	5.25	3.71	3.03	2.63	2.35	1.66	1.17	0.96	0.83	0.74
25	8.20	5.80	4.74	4.10	3.67	2.59	1.83	1.50	1.30	1.16
35	11.49	8.12	6.63	5.74	5.14	3.63	2.57	2.10	1.82	1.62
50	16.41	11.60	9.47	8.20	7.34	5.19	3.67	3.00	2.59	2.32
70	22.97	16.24	13.26	11.49	10.27	7.26	5.14	4.19	3.63	3.25
95	31.18	22.05	18.00	15.59	13.94	9.86	6.97	5.69	4.93	4.41
120	39.38	27.85	22.74	19.69	17.61	12.45	8.81	7.19	6.23	5.57
150	49.23	34.81	28.42	24.61	22.01	15.57	11.01	8.99	7.78	6.96
185	60.71	42.93	35.05	30.36	27.15	19.20	13.58	11.08	9.60	8.59
240	78.76	55.69	45.47	39.38	35.22	24.91	17.61	14.38	12.45	11.14
300	98.45	69.62	56.84	49.23	44.03	31.13	22.01	17.97	15.57	13.92

Table 15

Short Circuit Current for Aluminum Conductors - PVC Insulated (Type 5) as per table 1 of BS 6746 (KA) at (85/160)°C

Area (mm^2)	Time (s)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	3.47	2.45	2.00	1.74	1.55	1.10	0.78	0.63	0.55	0.49
25	5.42	3.83	3.13	2.71	2.43	1.71	1.21	0.99	0.86	0.77
35	7.59	5.37	4.38	3.80	3.40	2.40	1.70	1.39	1.20	1.07
50	10.85	7.67	6.26	5.42	4.85	3.43	2.43	1.98	1.71	1.53
70	15.18	10.74	8.77	7.59	6.79	4.80	3.40	2.77	2.40	2.15
95	20.61	14.57	11.90	10.30	9.22	6.52	4.61	3.76	3.26	2.91
120	26.03	18.41	15.03	13.01	11.64	8.23	5.82	4.75	4.12	3.68
150	32.54	23.01	18.79	16.27	14.55	10.29	7.28	5.94	5.14	4.60
185	40.13	28.38	23.17	20.06	17.95	12.69	8.97	7.33	6.34	5.68
240	52.06	36.81	30.06	26.03	23.28	16.46	11.64	9.50	8.23	7.36
300	65.07	46.01	37.57	32.54	29.10	20.58	14.55	11.88	10.29	9.20

Table 16

0.6/1 KV Cables Single Core Unarmoured Cables, With Stranded Circular Copper Conductor, XLPE Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)		Voltage Drop (mV/Amp/meter)	
4	4.61	5.878	5.878	10.22	10.146
6	3.08	3.927	3.927	6.894	6.826
10	1.83	2.333	2.333	4.170	4.097
16	1.15	1.466	1.466	2.687	2.614
25	0.727	0.927	0.927	1.766	1.693
35	0.524	0.668	0.668	1.321	1.248
50	0.387	0.493	0.494	1.025	0.953
70	0.268	0.342	0.343	0.765	0.693
95	0.193	0.247	0.248	0.272	0.529
120	0.153	0.196	0.197	0.510	0.438
150	0.124	0.159	0.160	0.447	0.376
185	0.0991	0.127	0.129	0.393	0.322
240	0.0754	0.098	0.100	0.342	0.272
300	0.0601	0.078	0.081	0.310	0.241
400	0.0470	0.062	0.066	0.278	0.211
500	0.0366	0.050	0.054	0.256	0.191
630	0.0283	0.040	0.045	0.237	0.173

Table 17

0.6/1 KV Cable Single Core Unarmoured Cables, With Stranded Circular Aluminum Conductor, XLPE Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)		Voltage Drop (mV/Amp/meter)	
16	1.91	2.449	2.449	4.361	4.287
25	1.20	1.538	1.538	0.808	2.735
35	0.868	1.113	1.113	2.079	2.006
50	0.641	0.822	0.822	1.590	1.517
70	0.443	0.568	0.568	1.154	1.081
95	0.320	0.410	0.411	0.884	0.881
120	0.253	0.324	0.325	0.734	0.662
150	0.206	0.264	0.265	0.632	0.560
185	0.164	0.211	0.212	0.540	0.469
240	0.125	0.161	0.162	0.452	0.381
300	0.100	0.129	0.131	0.398	0.327
400	0.0778	0.101	0.103	0.349	0.279
500	0.0605	0.079	0.082	0.311	0.242
630	0.0469	0.062	0.066	0.280	0.213

The Above data are based on :
- Max. operating temperature : 90 °C
- Power factor : 0.85
- Rated frequency : 60 Hz
- Distance between cable in flat formation : One cable diameter

Table 18

(0.6/1 KV Cable) Single Core Unarmoured Cables, With Stranded Circular Copper Conductor, PVC Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)		Voltage Drop (mV/Amp/meter)	
4	4.61	5.787	5.787	10.07	9.996
6	3.08	3.866	3.866	6.794	6.721
10	1.83	2.297	2.297	4.115	4.041
16	1.15	1.433	1.433	2.654	2.581
25	0.727	0.913	0.913	1.746	1.673
35	0.524	0.658	0.658	1.307	1.234
50	0.387	0.486	0.486	1.018	0.945
70	0.268	0.337	0.337	0.758	0.686
95	0.193	0.243	0.244	0.597	0.526
120	0.153	0.193	0.194	0.509	0.437
150	0.124	0.156	0.158	0.446	0.375
185	0.0991	0.125	0.127	0.393	0.322
240	0.0754	0.096	0.098	0.341	0.271
300	0.0601	0.077	0.080	0.308	0.239
400	0.0470	0.062	0.065	0.280	0.212
500	0.0366	0.049	0.053	0.257	0.191
630	0.0283	0.039	0.045	0.237	0.173

Table 19

(0.6/1 KV Cable) Single Core Unarmoured Cables, With Stranded Circular Aluminum Conductor, PVC Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)		Voltage Drop (mV/Amp/meter)	
16	1.91	2.410	2.410	4.297	4.224
25	1.20	1.514	1.514	0.769	2.695
35	0.868	1.095	1.095	2.051	2.978
50	0.641	0.809	0.809	1.567	1.494
70	0.443	0.559	0.559	1.137	1.064
95	0.320	0.404	0.405	0.872	0.799
120	0.253	0.319	0.320	0.459	0.653
150	0.206	0.260	0.261	0.623	0.551
185	0.164	0.207	0.208	0.532	0.461
240	0.125	0.158	0.160	0.447	0.376
300	0.100	0.127	0.129	0.393	0.322
400	0.0778	0.099	0.102	0.344	0.275
500	0.0605	0.078	0.081	0.307	0.239
630	0.0469	0.062	0.066	0.275	0.208

The Above data are based on :
- Max. operating temperature : 90 °C
- Power factor : 0.85
- Rated frequency : 60 Hz
- Distance between cable in flat formation : One cable diameter

Table 20

(0.6/1 KV Cable) Multicore Cables, With Stranded Copper Conductor, XLPE Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)	Voltage Drop (mV/Amp/meter)
1.5	12.1	15.428	22.82
2.5	7.41	9.448	14.01
4.0	4.61	5.878	8.747
6.0	3.08	3.927	5.871
10	1.83	2.333	3.519
16	1.15	1.446	2.239
25	0.727	0.927	1.446
35	0.524	0.669	1.063
50	0.387	0.494	0.809
70	0.268	0.343	0.585
95	0.193	0.248	0.444
120	0.153	0.197	0.368
150	0.124	0.161	0.315
185	0.0991	0.130	0.270
240	0.0754	0.101	0.226
300	0.0601	0.083	0.198
400	0.0470	0.067	0.176
500	0.0366	0.056	0.158

Table 21

(0.6/1 KV Cables) Multicore Cables With Stranded Aluminum Conductor, XLPE Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)	Voltage Drop (mV/Amp/meter)
16	1.91	2.449	3.686
25	1.20	1.538	2.347
35	0.868	1.113	1.717
50	0.641	0.822	1.292
70	0.443	0.568	0.918
95	0.320	0.411	0.684
120	0.253	0.326	0.557
150	0.206	0.266	0.469
185	0.164	0.212	0.391
240	0.125	0.163	0.317
300	0.100	0.132	0.271
400	0.0778	0.104	0.230
500	0.0605	0.083	0.199

The Above data are based on :
- Max. operating temperature : 90 °C
- Power factor : 0.85
- Rated frequency : 60 Hz

Table 22

(0.6/1 KV Cable) Multicore Cables, With Stranded Copper Conductor, PVC Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)	Voltage Drop (mV/Amp/meter)
1.5	12.1	15.191	22.476
2.5	7.41	9.303	13.800
4.0	4.61	5.787	8.624
6.0	3.08	3.867	5.791
10	1.83	2.297	3.474
16	1.15	1.444	2.212
25	0.727	0.913	1.430
35	0.524	0.658	1.053
50	0.387	0.486	0.803
70	0.268	0.337	0.581
95	0.193	0.244	0.443
120	0.153	0.194	0.367
150	0.124	0.158	0.315
185	0.0991	0.128	0.269
240	0.0754	0.099	0.226
300	0.0601	0.081	0.199
400	0.0470	0.066	0.176
500	0.0366	0.055	0.159

Table 23

(0.6/1 KV Cables) Multicore Cables With Stranded Aluminum Conductor, PVC Insulated and PVC Sheathed

Cross Section Area (mm^2)	D.C. Resistance (Ω/km)	A.C. Resistance (Ω/km)	Voltage Drop (mV/Amp/meter)
16	1.91	2.410	3.635
25	1.20	1.514	2.315
35	0.868	1.096	1.696
50	0.641	0.809	1.278
70	0.443	0.560	0.908
95	0.320	0.405	0.680
120	0.253	0.321	0.554
150	0.206	0.262	0.466
185	0.164	0.209	0.389
240	0.125	0.161	0.316
300	0.100	0.130	0.271
400	0.0778	0.103	0.230
500	0.0605	0.082	0.199

The Above data are based on :
- Max. operating temperature : 90 °C
- Power factor : 0.85
- Rated frequency : 60 Hz

Single Core Cable

For outdoor installations in damp and wet locations

Type	:	CU / XLPE /PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires
Insulation	:	XLPE compound (PVC or LSHF)
Jacketing	:	PVC compound (or LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING					
						Laid in ground			Laid in Free Air		
						•••	∴	⊕	•	•••	∴
n x mm²	mm	mm	mm	kg/km	ohm/km	A	A	A	A	A	A
STRANDED COPPER CONDUCTORS											
4	0.7	1.4	6.8	82	4.6100	59	56	43	59	53	44
6	0.7	1.4	7.1	105	3.0810	74	71	57	73	66	59
10	0.7	1.4	8.2	150	1.8300	97	93	74	94	88	76
16	0.7	1.4.	9.3	200	1.1500	125	121	95	129	123	105
25	0.9	1.4	11.1	315	0.7270	163	154	120	159	152	135
35	0.9	1.4	12.2	400	0.5240	194	187	148	199	193	170
50	1.0	1.4	13.1	510	0.3870	228	217	177	246	234	205
70	1.1	1.4	15.2	725	0.2680	285	268	217	310	298	263
95	1.1	1.5	16.7	980	0.1930	336	319	262	386	374	322
120	1.2	1.5	18.5	1215	0.1530	388	371	296	450	439	380
150	1.4	1.6	20.5	1510	0.1240	428	405	336	509	497	433
185	1.6	1.6	22.7	1850	0.0991	490	462	382	591	579	491
240	1.7	1.7	25.5	2410	0.0754	564	530	439	725	714	597
300	1.8	1.8	28.0	3005	0.0601	638	593	496	918	842	690
400	2.0	1.9	31.5	3810	0.0470	735	673	559	995	971	796
500	2.2	2.0	35.0	4765	0.0366	827	752	621	1203	1100	907
630	2.4	2.2	42.0	6290	0.0283	946	844	707	1287	1264	1065
800	2.6	2.3	47.5	8280	0.0221	1060	935	798	1463	1439	1217
1000	2.8	2.4	52.5	9760	0.0176	1174	1015	866	1615	1591	1346

Single Core Cable

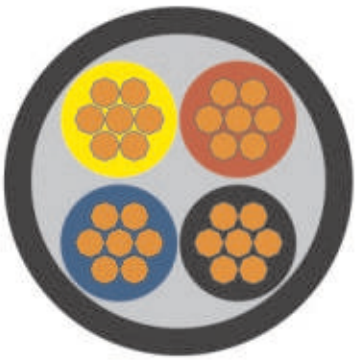
For outdoor installations in damp and wet locations

Type	:	AL / XLPE /PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Stranded Aluminum wires
Insulation	:	XLPE compound (or PVC or LSHF)
Jacketing	:	PVC compound (or LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING					
						Laid in ground			Laid in Free Air		
n x mm²	mm	mm	mm	kg/km	ohm/km	A	A	A	A	A	A
STRANDED COPPER CONDUCTORS											
16	0.7	1.4	9.2	115	1.9100	97	95	72	99	94	70
25	0.9	1.4	11.3	168	1.2000	123	120	91	129	123	105
35	0.9	1.4	12.1	205	0.8680	148	143	114	158	152	135
50	1.0	1.4	13.0	265	0.6410	177	169	131	193	187	164
70	1.1	1.4	16.2	345	0.4430	217	205	165	246	240	199
95	1.1	1.5	17.8	445	0.3200	257	245	194	316	304	240
120	1.2	1.5	18.5	555	0.2530	302	285	234	363	351	269
150	1.4	1.6	20.7	570	0.2060	336	319	257	415	404	333
185	1.6	1.6	24.2	840	0.1640	382	365	291	486	468	374
240	1.7	1.7	27.5	1070	0.1250	445	422	342	573	556	445
300	1.8	1.8	28.0	1310	0.1000	507	473	388	644	632	515
400	2.0	1.9	33.5	1620	0.0778	587	547	445	772	755	606
500	2.2	2.0	36.5	2010	0.0605	661	616	507	901	878	702
630	2.4	2.2	42.5	2520	0.0469	758	701	581	1053	1030	831
800	2.6	2.3	47.0	3160	0.0367	855	764	650	1193	1170	948
1000	2.8	2.4	52.0	3875	0.0291	946	832	707	1310	1287	1076

Multicore Cable



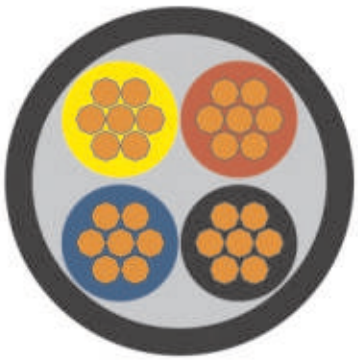
For outdoor and indoor installations in damp and wet locations

Type	:	CU / PVC /PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires (or Aluminum)
Insulation	:	PVC compound
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	kg/km	ohm/km	A	A	A
2*1.5	0.8	1.8	12.1	195	12.100	33	27	27
2*2.5	0.8	1.8	12.8	233	7.410	41	35	35
2*4	1.0	1.8	14.7	310	4.610	55	45	49
2*6	1.0	1.8	16.1	390	3.080	68	56	63
2*10	1.0	1.8	17.8	510	1.830	89	77	84
2*16	1.0	1.8	19.8	690	1.150	116	91	112
2*25	1.2	1.8	23.2	990	0.727	150	119	147
2*35	1.2	1.7	25.3	1020	0.524	177	147	182
3*1.5	0.8	1.8	12.5	210	12.100	29	25	22
3*2.5	0.8	1.8	13.5	275	7.410	37	32	28
3*4	1.0	1.8	15.4	370	4.610	49	42	39
3*6	1.0	1.8	16.8	460	3.080	61	50	49
3*10	1.0	1.8	18.6	635	1.830	82	67	64
3*16	1.0	1.8	20.8	860	1.150	102	84	91
3*25	1.2	1.8	24.5	1210	0.727	136	112	119
3*35	1.2	1.8	27.2	1620	0.524	163	133	140
	ph/N				ph/N			
3*10+6	1.0	1.8	19.7	710	1.83/3.08	82	67	67
3*16+10	1.0	1.8	22.5	980	1.15/1.83	102	84	91
3*25+16	1.2/1.0	1.8	26.0	1460	0.727/1.15	136	112	119
3*35+16	1.2/1.0	1.8	28.0	1740	0.524/1.15	163	133	140
4*1.5	0.8	1.8	13.5	255	12.100	29	25	22
4*2.5	0.8	1.8	14.5	310	7.410	37	32	28
4*4	1.0	1.8	17.0	445	4.610	49	42	39
4*6	1.0	1.8	18.0	550	3.080	61	50	49
4*10	1.0	1.8	20.5	770	1.830	82	67	64
4*16	1.0	1.8	22.8	1060	1.150	102	84	91
4*25	1.2	1.8	27.0	1580	0.727	136	112	119
4*35	1.2	1.8	29.5	2020	0.524	163	133	140
5*1.5	0.8	1.8	13.0	235	12.100	29	25	22
5*2.5	0.8	1.8	14.5	365	7.410	37	32	28
5*4	1.0	1.8	18.0	530	4.610	49	42	39
5*6	1.0	1.8	19.5	625	3.080	61	50	49

Multicore Cable



For outdoor and indoor installations in damp and wet locations

Type	:	CU / XLPE /PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires (or Aluminum)
Insulation	:	XLPE compound
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	kg/km	ohm/km	A	A	A
2*1.5	0.7	1.8	11.6	170	12.100	34	29	28
2*2.5	0.7	1.8	12.5	205	7.410	42	37	37
2*4	0.7	1.8	13.5	260	4.610	57	47	51
2*6	0.7	1.8	14.6	325	3.080	72	61	67
2*10	0.7	1.8	16.5	455	1.830	93	81	88
2*16	0.7	1.8	18.6	620	1.150	121	97	117
2*25	0.9	1.8	22.2	920	0.727	158	125	154
2*35	0.9	1.8	24.5	1140	0.524	189	157	185
3*1.5	0.7	1.8	12.2	190	12.100	30	27	25
3*2.5	0.7	1.8	13.2	235	7.410	40	34	36
3*4	0.7	1.8	14.0	315	4.610	51	42	46
3*6	0.7	1.8	15.5	400	3.080	65	53	56
3*10	0.7	1.8	17.5	555	1.830	86	70	76
3*16	0.7	1.8	19.5	770	1.150	111	88	99
3*25	0.9	1.8	23.5	1150	0.727	146	119	135
3*35	0.9	1.8	25.8	1480	0.524	177	140	161
3*10+6	0.7	1.8	18.3	625	1.83/3.08	86	70	76
3*16+10	0.7	1.8	20.5	880	1.15/1.83	111	88	99
3*25+16	0.9/0.7	1.8	24.2	1305	0.727/1.15	146	119	135
3*35+16	0.9/0.7	1.8	26.5	1620	0.524/1.15	177	140	161
4*1.5	0.7	1.8	13.0	225	12.100	30	27	25
4*2.5	0.7	1.8	14.0	290	7.410	40	34	36
4*4	0.7	1.8	15.2	375	4.610	51	42	46
4*6	0.7	1.8	16.8	480	3.080	65	53	56
4*10	0.7	1.8	18.8	675	1.830	86	70	76
4*16	0.7	1.8	21.5	955	1.150	111	88	99
4*25	0.9	1.8	25.5	1435	0.727	146	119	135
4*35	0.9	1.8	28.5	1865	0.524	177	140	161
5*1.5	0.7	1.8	13.8	255	12.100	30	27	25
5*2.5	0.7	1.8	15.0	330	7.410	40	34	36
5*4	0.7	1.8	16.5	430	4.610	51	42	46
5*6	0.7	1.8	18.0	600	3.080	65	53	56

Multicore Cable

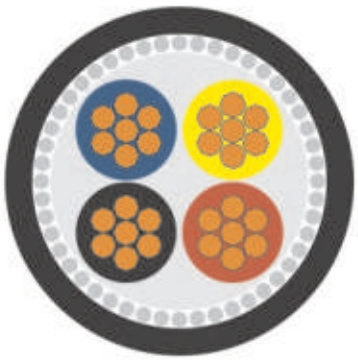
For outdoor and indoor installations in damp and wet locations

Type	:	CU /XLPE/STA/ PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires (or Aluminum)
Insulation	:	XLPE compound
Bedding	:	PVC compound (or LSHF or PE)
Armouring	:	Steel Tape
Jacketing	:	PVC compound (or LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S. Tape	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
2*6	0.7	0.20	1.8	15.5	410	3.080	71	60	66
2*10	0.7	0.20	1.8	17.2	550	1.830	92	80	87
2*16	0.7	0.20	1.8	19.3	720	1.150	120	96	115
2*25	0.9	0.20	1.8	22.9	1050	0.727	157	124	152
2*35	0.9	0.20	1.8	25.0	1300	0.524	187	154	183
3*6	0.7	0.20	1.8	16.1	490	3.080	64	51	55
3*10	0.7	0.20	1.8	18.3	660	1.830	84	69	75
3*16	0.7	0.20	1.8	20.1	890	1.150	109	87	98
3*25	0.9	0.20	1.8	24.5	1280	0.727	145	117	133
3*35	0.9	0.20	1.8	26.5	1635	0.524	174	139	159
3*10+6	0.7	0.20	1.8	19.0	730	1.83/3.08	84	69	75
3*16+10	0.7	0.20	1.8	21.5	1000	1.15/1.83	109	87	98
3*25+16	0.9/0.7	0.20	1.8	25.1	1500	0.727/1.15	145	117	133
3*35+16	0.9/0.7	0.20	1.8	27.3	1810	0.524/1.15	174	139	159
4*6	0.7	0.20	1.8	17.2	570	3.080	64	51	55
4*10	0.7	0.20	1.8	18.6	680	1.830	84	69	75
4*16	0.7	0.20	1.8	21.5	960	1.150	109	87	98
4*25	0.9	0.20	1.8	25.5	1430	0.727	145	117	133
4*35	0.9	0.20	1.8	28.0	1860	0.524	174	139	159
5*4	0.7	0.20	1.8	16.5	435	4.610	50	41	44
5*6	0.7	0.20	1.8	18.0	610	3.0800	64	51	55

Multicore Cable



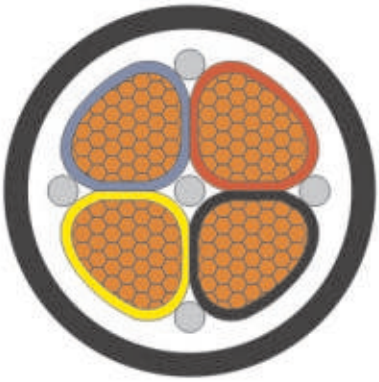
For outdoor and indoor installations in damp and wet locations

Type	:	CU / XLPE / SWA /PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires
Insulation	:	XLPE compound (or PVC or LSHF)
Bedding	:	PVC compound (or LSHF or PE)
Armouring	:	Steel Wire
Jacketing	:	PVC compound (or LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S. Wire	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
2*1.5	0.7	0.9	1.8	13.5	348	12.100	35	30	29
2*2.5	0.7	0.9	1.8	14.2	395	7.410	53	39	39
2*4	0.7	0.9	1.8	15.5	470	4.610	58	48	53
2*6	0.7	0.9	1.8	16.5	550	3.080	73	62	68
2*10	0.7	0.9	1.8	18.2	700	1.830	95	82	89
2*16	0.7	0.9	1.8	20.2	900	1.150	122	98	118
2*25	0.9	1.60	1.8	25.5	1540	0.727	160	126	156
2*35	0.9	1.60	1.8	27.0	1850	0.524	192	158	187
3*1.5	0.7	0.9	1.8	14.0	390	12.100	31	28	26
3*2.5	0.7	0.9	1.8	15.0	440	7.410	41	35	37
3*4	0.7	0.9	1.8	16.0	530	4.610	52	43	47
3*6	0.7	0.9	1.8	17.0	630	3.080	66	54	57
3*10	0.7	0.9	1.8	19.5	820	1.830	87	71	77
3*16	0.7	0.9	1.8	21.5	1080	1.150	112	89	101
3*25	0.9	1.60	1.8	26.5	1820	0.727	148	121	136
3*35	0.9	1.60	1.8	29.0	2220	0.524	180	143	164
3*10+6	0.7	0.9	1.8	20.5	1005	1.83/3.08	87	71	77
3*16+10	0.7	1.60	1.8	22.5	1205	1.15/1.83	112	89	101
3*25+16	0.9/0.7	1.60	1.8	27.5	1920	0.727/1.15	148	121	136
3*35+16	0.9/0.7	1.60	1.8	29.2	2490	0.524/1.15	180	143	164
4*1.5	0.7	0.9	1.8	14.6	420	12.100	31	28	26
4*2.5	0.7	0.9	1.8	15.6	490	7.410	41	35	37
4*4	0.7	0.9	1.8	16.3	610	4.610	52	43	47
4*6	0.7	0.9	1.8	18.2	730	3.080	66	54	57
4*10	0.7	0.9	1.8	20.5	940	1.830	87	71	77
4*16	0.7	1.60	1.8	24.2	1510	1.150	112	89	101
4*25	0.9	1.60	1.8	28.5	2080	0.727	148	121	136
4*35	0.9	1.60	1.8	31.5	2580	0.524	180	143	164
5*1.5	0.7	0.9	1.8	15.6	450	12.100	31	28	26
5*2.5	0.7	0.9	1.8	16.8	530	7.410	41	35	37
5*4	0.7	0.9	1.8	18.5	700	4.610	52	43	47
5*6	0.7	0.9	1.8	19.8	860	3.080	66	54	57

Multicore Cable



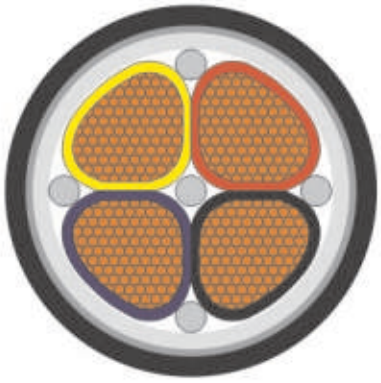
For outdoor and indoor installations in damp and wet locations

Type	:	CU / XLPE /PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires
Insulation	:	XLPE compound (or PVC)
Bedding	:	PVC compound (LSHF or PE)
Jacketing	:	PVC compound (LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	kg/km	ohm/km	A	A	A
3*50+25	1.0/0.9	1.8	26.5	1850	0.3870/0.727	211	170	199
3*70+35	1.1/0.9	1.9	30.5	2560	0.268/0.524	251	211	240
3*95+50	1.1/1.0	2.1	34.0	3460	0.1930/0.387	302	246	298
3*120+70	1.2/1.1	2.2	38.0	4390	0.153/0.268	348	287	345
3*150+70	1.4/1.1	2.3	41.5	5290	0.124/0.268	382	322	392
3*185+95	1.6/1.1	2.5	46.5	6650	0.0991/0.193	428	363	450
3*240+120	1.7/1.2	2.7	52.0	8610	0.0754/0.153	496	427	538
3*300+150	1.8/1.4	2.9	57.0	10730	0.0601/0.124	559	474	626
3*400+185	2.0/1.6	3.1	65.5	13650	0.0470/0.0991	638	544	720
3*500+240	2.2/1.7	3.3	72.5	17130	0.0336/0.0754	718	620	819
4*50	1.0	1.8	27.5	2010	0.387	211	170	199
4*70	1.1	2.0	31.3	2860	0.268	251	211	240
4*95	1.1	2.1	34.8	3890	0.193	302	246	298
4*120	1.2	2.3	40.0	4910	0.153	348	287	345
4*150	1.4	2.4	43.6	5060	0.124	382	322	392
4*185	1.6	2.6	48.6	7500	0.0991	428	363	440
4*240	1.7	2.8	54.5	9790	0.0754	496	427	538
4*300	1.8	3.0	61.0	12200	0.0601	559	474	626
4*400	2.0	3.3	70.0	15560	0.0470	638	544	720
4*500	2.2	3.5	77.5	19430	0.0366	718	620	819

Multicore Cable



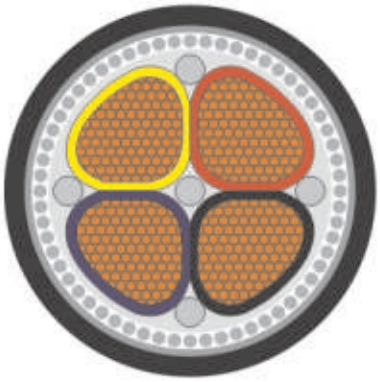
For outdoor and indoor installations in damp and wet locations

Type	:	CU /XLPE /STA/PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires
Insulation	:	XLPE compound (or PVC)
Bedding	:	PVC compound (or LSHF or PE)
Armouring	:	Steel Tape (or LSHF or PE)
Jacketing	:	PVC compound

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S. Tape	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
3*50+25	1.0/0.9	0.20	1.9	29.0	2140	0.387/0.727	211	170	199
3*70+35	1.1/0.9	0.20	2.0	33.5	2950	0.268/0.524	251	211	240
3*95+50	1.1/1.0	0.20	2.2	38.0	4260	0.193/0.387	302	246	298
3*120+70	1.2/1.1	0.50	2.3	42.0	5240	0.153/0.268	348	287	345
3*150+70	1.4/1.1	0.50	2.4	46.2	6290	0.124/0.268	382	322	392
3*185+95	1.6/1.1	0.50	2.6	51.1	7760	0.0991/0.193	428	363	450
3*240+120	1.7/1.2	0.50	2.8	57.2	9910	0.0754/0.153	496	427	538
3*300+150	1.8/1.4	0.50	3.0	62.5	12150	0.0607/0.124	559	474	626
3*400+185	2.0/1.6	0.50	3.2	70.0	15100	0.0475/0.0991	638	544	720
3*500+240	2.2/1.7	0.50	3.2	77.5	18860	0.0366	718	620	819
4*50	1.0	0.20	1.9	30.0	2370	0.3870	211	170	199
4*70	1.1	0.20	2.1	35.0	3270	0.2680	251	211	240
4*95	1.1	0.50	2.2	39.5	4700	0.1930	302	246	298
4*120	1.2	0.50	2.4	43.8	5805	0.1530	348	287	345
4*150	1.4	0.50	2.6	49.0	7120	0.1240	382	322	392
4*185	1.6	0.50	2.7	53.5	8660	0.0991	428	363	450
4*240	1.7	0.50	2.9	60.5	11190	0.0754	496	427	538
4*300	1.8	0.50	3.1	65.0	13730	0.0601	559	474	626
4*400	2.0	0.50	3.4	75.0	17290	0.0470	638	544	720
4*500	2.2	0.50	3.7	82.5	21340	0.0366	718	620	816

Multicore Cable



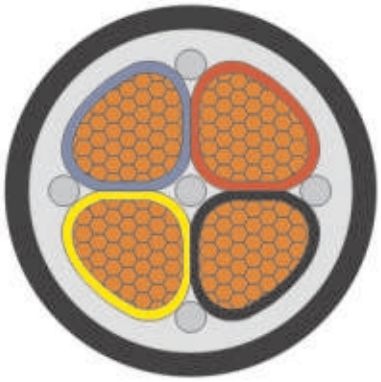
For outdoor and indoor installations in damp and wet locations

Type	:	CU /XLPE /SWA/PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Soft annealed stranded copper wires
Insulation	:	XLPE compound (or PVC or LSHF)
Bedding	:	PVC compound (or LSHF or PE)
Armouring	:	Steel Wires
Jacketing	:	PVC compound

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S. Wire	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
3*50+25	1.0/0.9	1.60	1.9	31.5	2800	0.387/0.727	211	170	205
3*70+35	1.1/0.9	2.00	2.1	36.5	3950	0.268/0.524	251	211	246
3*95+50	1.1/1.0	2.00	2.2	40.0	5010	0.193.0.387	302	246	304
3*120+70	1.2/1.1	2.00	2.3	44.0	6110	0.153/0.268	348	287	351
3*150+70	1.4/1.1	2.50	2.5	49.5	7690	0.124/0.268	382	322	398
3*185+95	1.6/1.1	2.50	2.7	54.6	9260	0.0991/0.193	428	363	456
3*240+120	1.7/1.2	2.50	2.9	60.5	11600	0.0754/0.153	496	427	544
3*300+150	1.8/1.4	2.50	3.0	65.3	13950	0.0601/0.124	559	474	632
3*400+185	2.0/1.6	3.15	3.4	76.1	18360	0.0470/0.0991	638	544	725
3*500+240	2.2/1.7	3.15	3.6	82.5	22160	0.0366/0.0754	718	620	825
4*50	1.0	1.60	2.0	32.5	3030	0.3870	211	170	205
4*70	1.1	2.00	2.2	38.0	4310	0.2680	251	211	246
4*95	1.1	2.00	2.3	41.8	5530	0.1930	302	246	304
4*120	1.2	2.50	2.5	47.0	7100	0.1530	348	287	351
4*150	1.4	2.50	2.6	52.0	8560	0.1240	382	322	398
4*185	1.6	2.50	2.8	57.0	10260	0.0991	428	363	456
4*240	1.7	2.50	3.0	64.0	12950	0.0754	496	427	544
4*300	1.8	2.50	3.2	69.0	15680	0.0601	559	474	632
4*400	2.0	3.15	3.5	80.5	20640	0.0470	638	544	725
4*500	2.2	3.15	3.8	88.5	25125	0.0366	718	620	825

Multicore Cable



For outdoor and indoor installations in damp and wet locations

Type	:	AL / XLPE /PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Drawn Aluminum wires
Insulation	:	XLPE compound (or PVC or LSHF)
Bedding	:	PVC compound (LSHF or PE)
Armouring	:	Steel Wires
Jacketing	:	PVC compound (LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Thickness of Sheath	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
						Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	kg/km	ohm/km	A	A	A
3*50+25	1.0/0.9	1.8	26.0	800	0.641/1.20	165	129	152
3*70+35	1.1/0.9	1.9	29.5	1110	0.443/0.868	200	164	187
3*95+50	1.1/1.0	2.1	33.4	1420	0.320/0.641	239	193	228
3*120+70	1.2/1.1	2.2	37.8	1800	0.253/0.443	268	222	263
3*150+70	1.4/1.1	2.3	42.0	2310	0.206/0.443	302	252	310
3*185+95	1.6/1.1	2.5	46.5	2670	0.164/0.320	331	281	351
3*240+120	1.7/1.2	2.7	51.5	3410	0.125/0.253	388	328	421
3*300+150	1.8/1.4	2.9	57.0	4180	0.100/0.206	445	369	497
3*400+185	2.0/1.6	3.1	64.6	5300	0.0778/0.164	513	433	573
3*500+240	2.2/1.7	3.34	71.8	7220	0.0605/0.125	581	497	655
4*50	1.0	1.8	27.5	860	0.6410	165	129	152
4*70	1.1	2.0	31.5	1110	0.4430	200	164	187
4*95	1.1	2.1	34.6	1560	0.3200	239	193	228
4*120	1.2	2.3	39.5	2030	0.2530	268	222	263
4*150	1.4	2.4	43.5	2480	0.2060	302	252	310
4*185	1.6	2.5	49.0	2960	0.1640	331	281	351
4*240	1.7	2.8	55.0	3830	0.1250	388	328	421
4*300	1.8	3.0	61.0	4690	0.1000	445	369	497
4*400	2.0	3.3	73.0	6280	0.0778	513	433	573
4*500	2.2	3.5	77.5	7620	0.0605	581	497	655

TWO CORE

For outdoor and indoor installations in damp and wet locations

Type	: CU/PVC/PVC/SWA/PVC
Standard	: BS 6346
Nominal Voltage	: 600/1000 volt
Conductor	: Plain annealed copper wires
Insulation	: PVC compound Type 5 HR 85°C
Armouring	: Steel round wire
Sheathing	: PVC compound Type 9
Packing	: non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Area of Conductor	Maximum Conductor Resistance at 20°C	Thickness of Insulation	Thickness of Extruded Bedding	Diameter of Armour Wire	Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length
sqmm	ohm/km	mm	mm	mm	mm	mm	kg/km	Meter ±5%
1.5*	12.1	0.7	0.8	0.9	1.3	12.7	300	1000
1.5	12.1	0.7	0.8	0.9	1.4	13.0	315	1000
2.5*	7.41	0.8	0.8	0.9	1.4	14.7	370	1000
2.5	7.41	0.8	0.8	0.9	1.4	14.8	395	1000
4	4.61	0.8	0.8	0.9	1.4	15.5	455	1000
6	3.08	0.8	0.8	0.9	1.5	17.0	550	1000
10	1.83	1.0	0.8	1.25	1.6	20.0	840	1000
16	1.15	1.0	0.8	1.25	1.6	22.5	1040	1000
25**	0.727	1.2	1.0	1.6	1.7	27.0	1620	500
35**	0.524	1.2	1.0	1.6	1.8	29.4	1960	500
50**	0.387	1.4	1.0	1.6	1.9	32.8	2240	500
70**	0.268	1.4	1.0	1.6	1.9	36.0	2800	500
95**	0.193	1.6	1.2	2.0	2.1	42.5	3720	500
120**	0.153	1.6	1.2	2.0	2.2	45.5	4590	500
150**	0.124	1.8	1.2	2.0	2.3	50.0	5420	500
185**	0.0991	2.0	1.4	2.5	2.4	55.0	6910	250
240**	0.0754	2.2	1.4	2.5	2.5	61.5	8440	250
300**	0.0601	2.4	1.6	2.5	2.7	66.5	10150	250
400**	0.0470	2.6	1.6	3.15	2.9	73.5	12520	250

*Circular solid conductor (Class 1)
All Conductors Circular stranded or circular stranded compacted (Class 2).
**Cables with sector shaped conductor having lesser overall dimension, weight & cost are available on request

TWO CORE

For outdoor and indoor installations in damp and wet locations

Type	: AL/PVC/PVC/SWA/PVC
Standard	: BS 6346 and IEC 60502-1
Nominal Voltage	: 600/1000 volt
Conductor	: Aluminum wires
Insulation	: PVC compound Type 5 HR 85°C
Armouring	: Steel round wire
Sheathing	: PVC compound Type 9
Packing	: non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Area of Conductor	Maximum Conductor Resistance at 20°C	Thickness of Insulation	Thickness of Extruded Bedding	Diameter of Armour Wire	Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length
sqmm	ohm/km	mm	mm	mm	mm	mm	kg/km	Meter ±5%
16	1.91	1.0	1.0	1.25	1.8	23.0	910	1000
25	1.20	1.2	1.0	1.6	1.8	27.3	1320	500
35	0.868	1.2	1.0	1.6	1.8	29.5	1550	500
50	0.641	1.4	1.0	1.6	1.9	33.0	1670	500
70	0.443	1.4	1.2	2.0	2.0	37.8	2310	500
95	0.320	1.6	1.2	2.0	2.2	42.5	2800	500
120	0.253	1.6	1.2	2.0	2.3	45.8	3155	500
150	0.206	1.8	1.4	2.5	2.4	51.0	4070	500
185	0.164	2.0	1.4	2.5	2.6	55.5	4700	250
240	0.125	2.2	1.6	2.5	2.8	62.2	5720	250
300	0.100	2.4	1.6	2.5	2.9	67.3	6710	250
400	0.0778	2.6	1.6	2.5	3.2	74.5	7810	250
500	0.0366	2.8	1.8	3.15	3.4	84.0	10160	200

All Conductors Circular stranded or circular stranded compacted (Class 2).

THREE CORE

For outdoor and indoor installations in damp and wet locations

Type	: CU/PVC/PVC
Standard	: BS 6346 and IEC 60502-1
Nominal Voltage	: 600/1000 volt
Conductor	: Plain annealed copper wires
Insulation	: PVC compound Type 5 HR 85°C
Sheathing	: PVC compound Type 9
Packing	: non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Area of Conductor	Maximum Conductor Resistance at 20°C	Thickness of Insulation	Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length
sqmm	ohm/km	mm	mm	mm	kg/km	Meter ±5%
1.5*	12.1	0.7	1.8	11.2	170	1000
1.5	12.1	0.7	1.8	11.6	180	1000
2.5*	7.41	0.8	1.8	12.0	220	1000
2.5	7.41	0.8	1.8	12.5	230	1000
4	4.61	0.8	1.8	14.0	305	1000
6	3.08	0.8	1.8	16.5	385	1000
10	1.83	1.0	1.8	17.8	565	1000
16	1.15	1.0	1.8	20.0	780	1000
25	0.727	1.2	1.8	21.5	1055	500
35	0.524	1.2	1.8	23.5	1365	500
50	0.387	1.4	1.8	27.4	1760	500
70	0.268	1.4	2.0	29.8	2390	500
95	0.193	1.6	2.1	34.8	3245	500
120	0.153	1.6	2.2	37.9	3980	500
150	0.124	1.8	2.3	40.6	4910	500
185	0.0991	2.0	2.5	45.5	6050	250
240	0.07254	2.2	2.6	51.5	7750	250
300	0.0601	2.4	2.8	56.7	9670	250
400	0.0470	2.6	3.1	64.0	12420	250
500	0.0366	2.8	3.4	69.5	15490	250

*Circular solid conductor (Class 1)
Conductor including 16sqmm. and above shaped stranded conductor (Class 2)
Cables upto and including 6sqmm. generally to BS 6346 and IEC 60502-1
Cables 10sqmm to 400sqmm conform generally to BS 6346
500sqmm cable conform to IEC 60502-1

THREE CORE

For outdoor and indoor installations in damp and wet locations

Type	: CU/PVC/PVC/SWA/PVC
Standard	: BS 6346 and IEC 60502-1
Nominal Voltage	: 600/1000 volt
Conductor	: Plain annealed copper wires
Insulation	: PVC compound Type 5 HR 85°C
Armouring	: Steel round wire
Sheathing	: PVC compound Type 9
Packing	: non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Area of Conductor	Maximum Conductor Resistance at 20°C	Thickness of Insulation	Thickness of Extruded Bedding	Diameter of Armour Wire	Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length
sqmm	ohm/km	mm	mm	mm	mm	mm	kg/km	Meter ±5%
1.5*	12.1	0.7	0.8	0.9	1.4	13.4	340	1000
1.5	12.1	0.7	0.8	0.9	1.4	13.8	360	1000
2.5*	7.41	0.8	0.8	0.9	1.4	14.7	410	1000
2.5	7.41	0.8	0.8	0.9	1.4	15.0	430	1000
4	4.61	0.8	0.8	0.9	1.4	16.4	520	1000
6	3.08	0.8	0.8	1.25	1.5	18.5	720	1000
10	1.83	1.0	0.8	1.25	1.6	21.2	970	1000
16	1.15	1.0	0.8	1.25	1.6	23.4	1250	1000
25	0.727	1.2	1.0	1.6	1.7	25.8	1670	500
35	0.524	1.2	1.0	1.6	1.8	28.3	2060	500
50	0.387	1.4	1.0	1.6	1.9	32.0	2620	500
70	0.268	1.4	1.2	2.0	2.0	35.5	3580	500
95	0.193	1.6	1.2	2.0	2.1	40.5	4590	500
120	0.153	1.6	1.2	2.0	2.2	43.7	8490	500
150	0.124	1.8	1.4	2.5	2.4	48.0	6950	500
185	0.0991	2.0	1.4	2.5	2.5	52.5	8280	250
240	0.0754	2.2	1.6	2.5	2.6	60.0	10350	250
300	0.0601	2.4	1.6	2.5	2.8	63.8	12490	250
400	0.0470	2.6	1.6	2.5	3.0	72.0	15570	200
500	0.0366	2.8	1.8	3.15	3.6	79.0	19920	200

*Circular solid conductor (Class 1)
Conductor including 16sqmm. and above shaped stranded conductor (Class 2)
Cables upto and including 6sqmm. generally to BS 6346 and IEC 60502-1
Cables 10sqmm to 400sqmm conform generally to BS 6346
500sqmm cable conform to IEC 60502-1

FOUR CORE WITH REDUCED NEUTRAL

For outdoor and indoor installations in damp and wet locations

Type	: CU/PVC/PVC/SWA/PVC
Standard	: BS 6346 and IEC 60502-1
Nominal Voltage	: 600/1000 volt
Conductor	: Plain annealed copper wires
Insulation	: PVC compound Type 5 HR 85°C
Armouring	: Steel round wire
Sheathing	: PVC compound Type 9
Packing	: non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Area of Conductor		Maximum Conductor Resistance at 20°C		Thickness of Insulation		Thickness of Extruded Bedding	Diameter of Armour Wire	Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length
Phase	Neutral	Phase	Neutral	Phase	Neutral						
sqmm	sqmm	ohm/km	ohm/km	mm	mm	mm	mm	mm	mm	kg/km	Meter ±5%
10	6	1.83	3.08	1.0	1.0	1.0	1.25	1.8	23.0	1085	1000
16	10	1.15	1.83	1.0	1.0	1.0	1.6	1.8	26.1	1530	500
25	16	0.727	1.15	1.2	1.0	1.0	1.6	1.8	28.0	1940	500
35	16	0.524	1.15	1.2	1.0	1.0	1.6	1.8	31.5	2360	500
50	25	0.387	0.727	1.4	1.2	1.0	1.6	1.9	35.0	3030	500
70	35	0.268	0.524	1.4	1.2	1.2	2.0	2.0	39.5	4140	500
95	50	0.193	0.387	1.6	1.4	1.2	2.0	2.2	45.0	5350	500
120	70	0.153	0.268	1.6	1.4	1.4	2.5	2.3	49.0	6870	500
150	70	0.124	0.268	1.8	1.4	1.4	2.5	2.4	54.0	8090	500
185	95	0.0991	0.193	2.0	1.6	1.4	2.5	2.5	59.0	9710	250
240	120	0.0754	0.153	2.2	1.6	1.6	2.5	2.7	65.0	11980	250
300	150	0.0601	0.124	2.4	1.8	1.6	2.5	2.9	71.0	14630	250
400	185	0.0470	0.0991	2.6	2.0	1.8	3.15	3.1	80.0	18980	200

All Conductor upto 16sqmm. and above shaped stranded conductor (Class 2)
*Cables conform to IEC 60502-1

FOUR CORE

For outdoor and indoor installations in damp and wet locations

Type	: CU/PVC/PVC
Standard	: BS 6346 and IEC 60502-1
Nominal Voltage	: 600/1000 volt
Conductor	: Plain annealed copper wires
Insulation	: PVC compound Type 5 HR 85°C
Sheathing	: PVC compound Type 9
Packing	: non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Area of Conductor	Maximum Conductor Resistance at 20°C	Thickness of Insulation	Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length
sqmm	ohm/km	mm	mm	mm	kg/km	Meter ±5%
1.5*	12.1	0.7	1.8	12.0	205	1000
1.5	12.1	0.7	1.8	12.5	215	1000
2.5*	7.41	0.8	1.8	13.5	260	1000
2.5	7.41	0.8	1.8	14.0	280	1000
4	4.61	0.8	1.8	15.0	365	1000
6	3.08	0.8	1.8	16.5	460	1000
10	1.83	1.0	1.8	19.5	690	1000
16	1.15	1.0	1.8	22.0	980	500
25	0.727	1.2	1.8	23.5	1290	500
35	0.524	1.2	1.8	27.0	1710	500
50	0.387	1.4	1.9	30.5	2300	500
70	0.268	1.4	2.0	33.5	3120	500
95	0.193	1.6	2.2	39.0	4270	500
120	0.153	1.6	2.3	42.0	5250	500
150	0.124	1.8	2.5	46.5	6500	500
185	0.0991	2.0	2.6	51.0	7990	250
240	0.0754	2.2	2.8	56.5	10240	250
300	0.0601	2.4	3.1	63.0	12820	250
400	0.0470	2.6	3.3	71.0	16380	200
500	0.0366	2.8	3.6	79.0	20510	200

*Circular solid conductor (Class 1)
Conductor including 16sqmm. and above shaped stranded conductor (Class 2)
Cables upto and including 6sqmm. generally to BS 6346 and IEC 60502-1
Cables 10sqmm to 400sqmm conform generally to BS 6346
500sqmm cable conform to IEC 60502-1

FOUR CORE

For outdoor and indoor installations in damp and wet locations

Type	: CU/PVC/PVC/SWA/PVC
Standard	: BS 6346 and IEC 60502-1
Nominal Voltage	: 600/1000 volt
Conductor	: Plain annealed copper wires
Insulation	: PVC compound Type 5 HR 85°C
Armouring	: Steel round wire
Sheathing	: PVC compound Type 9
Packing	: non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Area of Conductor	Maximum Conductor Resistance at 20°C	Thickness of Insulation	Thickness of Extruded Bedding	Diameter of Armour Wire	Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length
sqmm	ohm/km	mm	mm	mm	mm	mm	kg/km	Meter ±5%
1.5*	12.1	0.7	0.8	0.9	1.4	14.0	380	1000
1.5	12.1	0.7	0.8	0.9	1.4	14.5	400	1000
2.5*	7.41	0.8	0.8	0.9	1.4	15.5	470	1000
2.5	7.41	0.8	0.8	0.9	1.4	16.5	490	1000
4	4.61	0.8	0.8	1.25	1.5	18.5	710	1000
6	3.08	0.8	0.8	1.25	1.5	20.0	830	1000
10	1.83	1.0	0.8	1.25	1.6	22.5	1135	1000
16	1.15	1.0	1.0	1.6	1.7	26.5	1655	500
25	0.727	1.2	1.0	1.6	1.8	28.0	2045	500
35	0.524	1.2	1.0	1.6	1.9	31.2	2560	500
50	0.387	1.4	1.2	2.0	2.0	36.5	3520	500
70	0.268	1.4	1.2	2.0	2.1	39.5	4460	500
95	0.193	1.6	1.2	2.0	2.2	44.5	5770	500
120	0.153	1.6	1.4	2.5	2.4	50.0	7360	500
150	0.124	1.8	1.4	2.5	2.5	53.5	8770	250
185	0.0991	2.0	1.4	2.5	2.6	59.0	10540	250
240	0.0754	2.2	1.6	2.5	2.8	65.0	13060	250
300	0.0601	2.4	1.6	2.5	3.0	70.5	15890	250
400	0.0470	2.6	1.8	3.15	3.3	80.0	10730	200
500	0.0366	2.8	1.8	3.15	3.9	89.0	25420	200

*Circular solid conductor (Class 1)
Conductor including 16sqmm. and above shaped stranded conductor (Class 2)
Cables upto and including 6sqmm. generally to BS 6346 and IEC 60502-1
Cables upto and including 400sqmm conform generally to BS 6346
500sqmm cable conform to IEC 60502-1

FOUR CORE

For outdoor and indoor installations in damp and wet locations

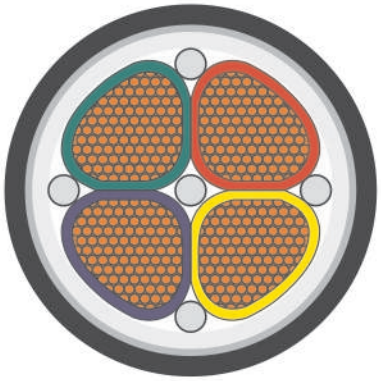
Type	: AL/PVC/PVC/SWA/PVC
Standard	: IEC 60502-1
Nominal Voltage	: 600/1000 volt
Conductor	: Aluminum wires
Insulation	: PVC compound Type 5 HR 85°C
Armouring	: Steel round wire
Sheathing	: PVC compound Type 9
Packing	: non returnable wood drums as per customer requirement

TECHNICAL INFORMATION

Nominal Area of Conductor	Maximum Conductor Resistance at 20°C	Thickness of Insulation	Thickness of Extruded Bedding	Diameter of Armour Wire	Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length
sqmm	ohm/km	mm	mm	mm	mm	mm	kg/km	Meter ±5%
25	1.20	1.2	1.0	1.6	1.8	28.0	1425	500
35	0.868	1.2	1.0	1.6	1.9	31.5	1720	500
50	0.641	1.4	1.2	2.0	2.1	37.0	2400	500
70	0.443	1.4	1.2	2.0	2.2	40.0	2840	500
95	0.320	1.6	1.2	2.5	2.4	45.5	3920	500
120	0.253	1.6	1.4	2.5	2.5	50.0	4450	500
150	0.206	1.8	1.4	2.5	2.7	52.5	5060	500
185	0.164	2.0	1.6	2.5	2.9	59.5	6090	500
240	0.125	2.2	1.6	2.5	3.1	65.5	7320	250
300	0.100	2.4	1.6	2.5	3.3	70.6	8610	250
400	0.0778	2.6	1.8	3.15	3.6	80.0	11190	200
500	0.0605	2.8	1.8	3.15	3.9	89.0	13710	200

All the conductor shaped stranded (Class 2).

Multicore Cable



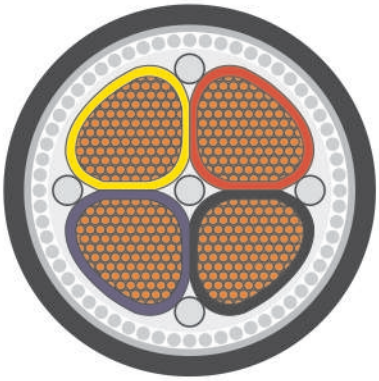
For outdoor and indoor installations in damp and wet locations

Type	:	AL /XLPE /STA/PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Drawn Aluminum Wires
Insulation	:	XLPE compound (or PVC or LSHF)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S. Tape	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
3*50	1.0	0.20	1.9	27.5	1000	0.641	165	129	152
3*70	1.1	0.20	2.0	30.5	1200	0.443	200	164	187
3*95	1.1	0.20	2.2	34.5	1660	0.320	239	193	228
3*120	1.2	0.50	2.3	39.0	2350	0.253	268	222	263
3*150	1.4	0.50	2.5	42.5	2770	0.206	302	252	310
3*185	1.6	0.50	2.6	47.2	3340	0.1640	331	281	351
3*240	1.7	0.50	2.8	52.0	4285	0.1250	388	328	421
3*300	1.8	0.50	3.0	58.0	5030	0.1000	445	369	497
3*400	2.0	0.50	3.3	65.5	6230	0.0778	513	433	573
3*500	2.2	0.50	3.5	72.5	7550	0.0605	581	497	655
3*50+25	1.0/0.9	0.20	1.9	30.0	1210	0.641/1.20	165	129	152
3*70+35	1.1/0.9	0.20	2.1	33.5	1510	0.443/0.868	200	164	187
3*95+50	1.1/1.0	0.50	2.2	38.5	1970	0.320/0.641	239	193	228
3*120+70	1.2/1.1	0.50	2.3	42.5	2700	0.253/0.443	268	222	263
3*150+70	1.4/1.1	0.50	2.5	47.0	3190	0.206/0.443	302	252	310
3*185+95	1.6/1.1	0.50	2.7	51.5	3520	0.164/0.320	331	281	351
3*240+120	1.7/1.2	0.50	2.9	58.0	4610	0.125/0.253	388	328	421
3*300+150	1.8/1.4	0.50	3.0	63.5	5930	0.100/0.206	445	369	497
3*400+185	2.0/1.6	0.50	3.4	70.0	7210	0.0778/0.164	513	433	573
3*500+240	2.0/1.7	0.50	3.6	78.0	9045	0.0605/0.125	581	497	655
4*50	1.0	0.20	2.0	30.5	1215	0.6410	165	129	152
4*70	1.1	0.20	2.2	34.5	1590	0.4430	200	164	187
4*95	1.1	0.50	2.3	40.5	2550	0.3200	239	193	228
4*120	1.2	0.50	2.5	44.0	3030	0.2530	268	222	263
4*150	1.4	0.50	2.6	49.0	3680	0.2060	302	252	310
4*185	1.6	0.50	2.8	53.6	4370	0.1640	331	281	351
4*240	1.7	0.50	3.0	60.5	4435	0.1250	388	328	421
4*300	1.8	0.50	3.2	66.0	6130	0.1000	449	369	497
4*400	2.0	0.50	3.5	74.0	7560	0.0778	513	433	573
4*500	2.3	0.50	3.8	83.0	9990	0.0605	581	497	655

Multicore Cable



For outdoor and indoor installations in damp and wet locations

Type	:	AL /XLPE /SWA/PVC
Standard	:	IEC 60502-1
Rated Voltage	:	0.6 / 1 KV
Conductor	:	Drawn Aluminum Wires
Insulation	:	XLPE compound (or PVC or LSHF)
Bedding	:	PVC compound (or LSHF or PE)
Armouring	:	Steel Wire
Jacketing	:	PVC compound (or LSHF or PE)

Technical Information

Nominal Cross Section	Nominal Insulation Thickness	Nominal Diameter of S. Wire	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight	Max DC Resistance at 20°C	CURRENT RATING		
							Laid Direct in ground	Laid in Ducts	Laid in Free Air
n x mm²	mm	mm	mm	mm	kg/km	ohm/km	A	A	A
	ph/N					ph/N			
3*50+25	1.0/0.9	2.00	1.9	31.5	1875	0.641/1.20	165	129	158
3*70+35	1.1/0.9	2.00	2.1	37.0	2510	0.443/0.868	200	164	193
3*95+50	1.1/1.0	2.00	2.2	40.0	2950	0.320/0.641	239	193	234
3*120+70	1.2/1.1	2.50	2.3	44.0	3680	0.253/0.443	268	222	269
3*150+70	1.4/1.1	2.50	2.5	50.0	4520	0.206/0.443	302	252	316
3*185+95	1.6/1.1	2.50	2.7	55.5	5330	0.164/0.320	331	281	357
3*240+120	1.7/1.2	2.50	2.9	60.5	6440	0.125/0.253	388	328	427
3*300+150	1.8/1.4	2.50	3.0	65.5	7410	0.100/0.206	445	369	503
3*400+185	2.0/1.6	3.15	3.3	73.5	9460	0.0778/0.164	513	433	579
3*500+240	2.0/1.7	3.15	3.6	81.5	12280	0.0605/0.125	581	497	661
4*50	1.0	1.60	2.0	32.5	1870	0.6410	165	129	158
4*70	1.1	2.00	2.2	38.5	2665	0.4430	200	164	193
4*95	1.1	2.00	2.3	42.0	3175	0.3200	239	193	234
4*120	1.2	2.50	2.5	47.0	4190	0.2530	268	222	269
4*150	1.4	2.50	2.6	52.0	4910	0.2060	302	252	316
4*185	1.6	2.50	2.8	57.0	5760	0.1640	331	281	357
4*240	1.7	2.50	3.0	64.0	6980	0.1250	388	328	427
4*300	1.8	2.50	3.2	69.0	8150	0.1000	445	369	503
4*400	2.0	3.15	3.6	80.0	11330	0.0778	513	433	579
4*500	2.2	3.15	3.7	86.0	13040	0.0605	581	497	661

MULTICORE CABLE FOR STREET LIGHTING

For outdoor installation in damp and wet location for street lighting

Type	: CU/PVC/ PVC
Standard	: IEC 60502-1
Nominal Voltage	: 600/1000 volt
Conductor	: Soft annealed stranded copper wires
Insulation	: PVC compound Type 5 (HR 85°C)
Jacketing	: PVC compound Type 9 (HR 90°C)
Packing	: Plastic spools-coils or non returnable wood drums as per customer requirements

TECHNICAL INFORMATION

Cable Details	Nominal Area of Conductor		Maximum Conductor Resistance at 20°C		Thickness of Insulation		Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Approx. Gross Weight
	Phase	Neutral & Earth	Phase	Neutral & Earth	Phase	Neutral & Earth				
	Sqmm		ohm/Km		mm		mm	mm	Kg/Km	Kg
2x16+1x10	16	10	1.15	1.83	1.0	1.0	1.8	20.0	740	835
3x25+2x16	25	16	0.727	1.15	1.2	1.0	1.8	28.5	1620	930 (for 500 mtr.)
3x35+2x16	35	16	0.524	1.15	1.2	1.0	1.9	32.5	2075	1200 (for 500 mtr.)

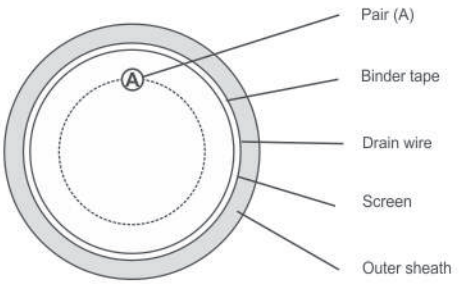
Cable Details	Nominal Area of Conductor	Maximum Conductor Resistance at 20°C	Thickness of Insulation	Thickness of Outer Sheath	Approx. Overall Diameter	Approx. Cable Weight	Approx. Gross Weight
	Sqmm	ohm/Km	mm	mm	mm	Kg/Km	Kg
5x1.5*	1.5	12.1	0.7	1.8	12.8	235	295
5x1.5	1.5	12.1	0.7	1.8	13.0	245	310
5x2.5*	2.5	7.41	0.8	1.8	14.0	290	355
5x2.5	2.5	7.41	0.8	1.8	15.0	320	390
5x4	4	4.61	0.8	1.8	16.5	425	530
5x6	6	3.08	0.8	1.8	18.0	540	670
5x10	10	1.83	1.0	1.8	21.0	840	490 (for 500 mtr.)
5x16	16	1.15	1.0	1.8	24.0	1175	690 (for 500 mtr.)
5x25	25	0.727	1.2	1.9	26.5	1635	930 (for 500 mtr.)
5x35	35	0.524	1.2	2.0	32.0	2320	1320 (for 500 mtr.)

* Circular solid conductors (Class 1)
All other conductors circular stranded (Class 2)

TECHNICAL DATA

UNARMOURED CABLES

Single Pair & Multi Pairs, PE Insulated, Overall Screened & PVC Outer Sheath



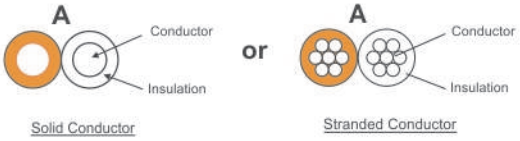


Table 1

Nominal dimensions of 0.5 mm² Class 1 (solid) conductor (1/0.8mm) multipair polyethylene insulated cables

Number of Pairs	No.	1	2	5	10	15	20	30	50
Thickness of outer sheath	mm	0.8	0.8	1.1	1.2	1.2	1.3	1.3	1.5
Nominal overall diameter	mm	5.3	6.1	10.6	14.1	16.3	18.4	22.2	28.1

Table 2

Nominal dimensions of 1 mm² Class 1 (solid) conductor (1/1.13mm) multipair polyethylene insulated cables

Number of Pairs	No.	1	2	5	10	15	20	30	50
Thickness of outer sheath	mm	0.8	0.8	1.2	1.2	1.3	1.5	1.5	2.0
Nominal overall diameter	mm	6.5	7.4	13.2	17.6	20.3	23.4	28	36.5

Table 3

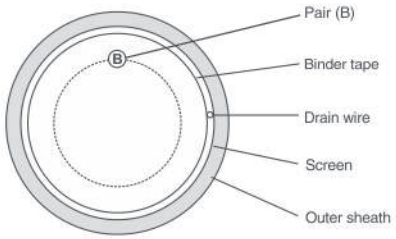
Nominal dimensions of 1.5 mm² Class 2 (solid) conductor (7/0.53mm) multipair polyethylene insulated cables

Number of Pairs	No.	1	2	5	10	15	20	30	50
Thickness of outer sheath	mm	0.8	0.9	1.2	1.3	1.5	1.5	1.7	2.0
Nominal overall diameter	mm	7.4	8.7	15.5	20.6	24.2	27.5	33.5	42.8

TECHNICAL DATA

UNARMOURED CABLES

Single Pair & Multi Pairs, PE Insulated, Individual & Overall Screened, PVC Outer Sheath



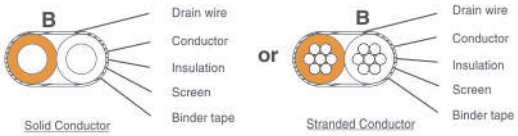


Table 4

Nominal dimensions of 0.5 mm² Class 1 (solid) conductor (1/0.8mm) multipair polyethylene insulated cables								
Number of Pairs	No.	2	5	10	15	20	30	50
Thickness of outer sheath	mm	0.9	1.2	1.2	1.3	1.3	1.5	2
Nominal overall diameter	mm	9.4	12.5	17.3	20.3	22.5	26.9	35.5

Table 5

Nominal dimensions of 1 mm² Class 1 (solid) conductor (1/1.13mm) multipair polyethylene insulated cables								
Number of Pairs	No.	2	5	10	15	20	30	50
Thickness of outer sheath	mm	1.1	1.2	1.3	1.5	1.7	2	2.2
Nominal overall diameter	mm	11.8	15.4	21.6	25.0	28.8	34.4	44.1

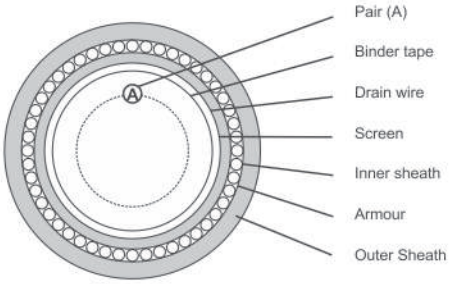
Table 6

Nominal dimensions of 1.5 mm² Class 2 (Stranded) conductor (7/0.53mm) multipair polyethylene insulated cables								
Number of Pairs	No.	2	5	10	15	20	30	50
Thickness of outer sheath	mm	1.2	1.3	1.5	1.7	1.7	2	2.2
Nominal overall diameter	mm	13.6	17.8	25.5	30.0	33.4	40.1	51.5

TECHNICAL DATA

ARMOURED CABLES

Single Pair & Multi Pairs, PE Insulated, Individual & Overall Screened, Armoured & PVC Outer Sheath



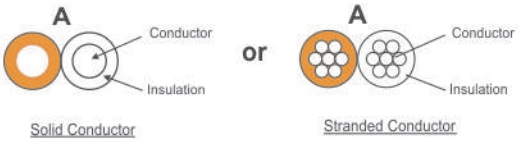


Table 7

Nominal dimensions of 0.5 mm² Class 1 (solid) conductor (1/0.8mm) multipair polyethylene insulated cables

Number of Pairs	No.	1	2	5	10	20	30	50
Thickness of inner sheath/bedding	mm	0.8	0.8	1.1	1.2	1.3	1.3	1.5
Diameter over inner sheath/bedding	mm	5.3	6.1	10.6	14	18.4	22	27.9
Size of Amour wire	mm	0.9	0.9	0.9	1.25	1.6	1.6	1.6
Diameter over Amour	mm	7.1	7.9	12.4	16.5	21.6	25.2	31.1
Thickness of outer sheath	mm	1.3	1.3	1.4	1.6	1.7	1.8	2
Nominal overall diameter	mm	9.8	10.4	15.2	19.6	25.2	28.8	35.3

Table 8

Nominal dimensions of 1 mm² Class 1 (solid) conductor (1/1.13mm) multipair polyethylene insulated cables

Number of Pairs	No.	1	2	5	10	20	30	50
Thickness of inner sheath/bedding	mm	0.8	0.8	1.2	1.2	1.5	1.5	2.0
Diameter over inner sheath/bedding	mm	6.4	7.4	13.2	17.4	23.4	28	36.3
Size of Amour wire	mm	0.9	0.9	1.25	1.25	1.6	1.6	2
Diameter over Amour	mm	8.2	9.2	15.7	19.9	26.6	31.2	40.3
Thickness of outer sheath	mm	1.3	1.4	1.5	1.7	1.8	2	2.2
Nominal overall diameter	mm	10.8	12.1	18.7	23.2	30.2	35.4	45.0

Table 9

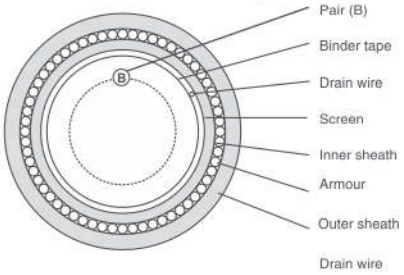
Nominal dimensions of 1.5 mm² Class 2 (Stranded) conductor (7/0.53mm) multipair polyethylene insulated cables

Number of Pairs	No.	1	2	5	10	20	30	50
Thickness of inner sheath/bedding	mm	0.8	0.9	1.2	1.3	1.5	1.7	2.0
Diameter over inner sheath/bedding	mm	7.3	8.7	15.4	20.6	27.5	33.3	42.6
Size of Amour wire	mm	0.9	0.9	1.25	1.6	1.6	2	2.5
Diameter over Amour	mm	9.1	10.5	17.9	23.8	30.7	37.3	47.6
Thickness of outer sheath	mm	1.4	1.4	1.6	1.8	2	2.1	2.4
Nominal overall diameter	mm	12.1	13.3	21.0	27.4	34.7	41.6	52.8

TECHNICAL DATA

ARMOURED CABLES

Single Pair & Multi Pairs, PE Insulated, Individual & Overall Screened, Armoured, PVC Outer Sheath



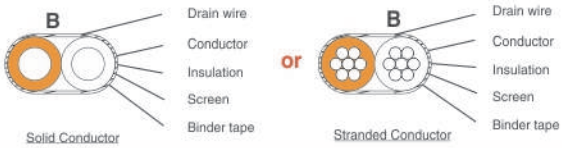


Table 10

Nominal dimensions of 0.5 mm² Class 1 (solid) conductor (1/0.8mm) multipair polyethylene insulated cables

Number of Pairs	No.	2	5	10	15	20	30	50
Thickness of inner sheath/bedding	mm	0.9	1.2	1.2	1.3	1.3	1.5	2
Diameter over inner sheath/bedding	mm	9.3	12.5	17.3	20.1	22.5	26.9	35.1
Size of Amour wire	mm	0.9	1.25	1.25	1.6	1.6	1.6	2
Diameter over Amour	mm	11.1	15	19.8	23.3	25.7	30.1	39.1
Thickness of outer sheath	mm	1.4	1.5	1.7	1.7	1.8	1.9	2.2
Nominal overall diameter	mm	13.8	18.1	23.2	26.7	29.3	34.2	43.3

Table 11

Nominal dimensions of 1.0 mm² Class 1 (solid) conductor (1/1.13mm) multipair polyethylene insulated cables

Number of Pairs	No.	2	5	10	15	20	30	50
Thickness of inner sheath/bedding	mm	1.1	1.2	1.3	1.5	1.7	2	2.2
Diameter over inner sheath/bedding	mm	11.8	15.2	21.6	25.2	28.8	34.4	43.9
Size of Amour wire	mm	0.9	1.25	1.6	1.6	2	2	2.5
Diameter over Amour	mm	13.6	17.7	24.8	28.4	32.8	38.4	48.9
Thickness of outer sheath	mm	1.5	1.6	1.8	1.9	2	2.2	2.5
Nominal overall diameter	mm	16.8	20.7	28.4	32.2	36.7	42.8	54.3

Table 12

Nominal dimensions of 1.5 mm² Class 2 (Stranded) conductor (7/0.53mm) multipair polyethylene insulated cables

Number of Pairs	No.	2	5	10	15	20	30	50
Thickness of inner sheath/bedding	mm	1.2	1.3	1.5	1.7	1.7	2	2.2
Diameter over inner sheath/bedding	mm	13.7	17.8	25.5	29.8	33.4	40	51.2
Size of Amour wire	mm	1.25	1.6	1.6	2	2	2.5	2.5
Diameter over Amour	mm	16.2	21	28.7	33	37.4	45	56.2
Thickness of outer sheath	mm	1.6	1.7	1.9	2	2.1	2.4	2.7
Nominal overall diameter	mm	19.6	24.2	32.5	37.7	41.6	49.9	61.9

PILOT CABLES

Tirupati Plastomatics can manufacture Pilot cables as per client specific requirements.

APPLICATION :

Pilot cables associated with Power distribution and transmission system are used for control, protection, signaling, speech and data transmission purposes. Such systems are mainly operated by the electricity companies. Similar applications occur in many industrial systems also.

ADVANTAGES :

- Customised to suit the application.
- Integrated Power system.
- Induced voltage control.
- Enhanced transmission performance.
- Multifunction use.

Pilot cables are designed to protect the cores from the danger of induced voltages coming from other cable circuits laid in close proximity.

It protects the system from dangerous induced voltages and EMC problems by means of different shielding types which are specifically designed to suit the operating conditions. The screen restricts the over voltage on the cable cores.

We manufacture a broad rage of pilot cables covering both 5 kV and 15 kV levels of induced voltages and providing each customer with numerous and easily customized alternatives.

CABLE DESCRIPTION :

- Coductor : Annealed plain copper conductor (solid/stranded)
- Insulation: PE or PVC.
- Cabling : Multipair or Multicore.
- Screens : Aluminium laminate or Copper laminate or Copper tape
- Armouring : Galvanised steel wire armour.
- Beding / Outer Sheath: PE or PVC.

OVERHEAD CONDUCTORS

INTRODUCTION

Overhead lines are bare conductors that are used for earthing electrical systems (when soft drawn copper is used) and in transmission/distribution of high voltage electricity (when hard drawn copper and aluminum is used). Examples include :

- **AAC (All Aluminum Conductors) used in short spans**
- **AAAC (All - Aluminum - Alloy Conductors)**
- **ACSR (Aluminum Conductor Steel Reinforced) used in large spans**
- **ACAR (Aluminum Conductor, Alloy Reinforced)**

In this catalogue, we cover all technical aspects of Tirupati Plastomatics Pvt. Ltd. Overhead Lines. We included Design Considerations such as conductor size, number of wires, and wire diameter. Cables Electrical Parameters such as Conductor DC Resistance are included as well.

GENERAL INFORMATION

Standards

- The overhead lines described in this catalogue are all standard types, and their performance has been proved in operation.
- Construction and tests are all in accordance with recommendations of IEC, ASTM, DIN, and BS publications where applicable.
- Overhead lines in accordance to customer requirements and needs can be manufactured upon request.

Variation in Production and delivery Options

- The provided data is approximate and subject to manufacturing tolerance
- Delivery length tolerance is ± 5%
- Other overhead line sizes are available upon customer request

Electrical Parameters of Overhead Lines
DC Resistance

- The DC resistance of soft annealed copper conductors is based on 100% conductivity at 20° C with a corresponding resistivity of 0.017241 ohm.mm^2/m and a constant mass temperature coefficient at 20° C per Kelvin of 0.00393
- The DC resistance of hard drawn copper conductors is based on 97% conductivity at 20°C with a corresponding Resistivity of 0.01771 ohm.mm2/m and a constant mass temperature coefficient at 20° C per Kelvin of 0.00381
- The DC resistance of hard drawn aluminum conductors is based on volume resistivity of 0.028264 ohm.mm^2/m and a constant mass temperature coefficient at 20° C per Kelvin of 0.00403°C

BARE COOPER CONDUCTORS

For grounding electrical systems and equipment

Standard	:	IEC 60228
Conductor	:	Soft annealed stranded copper wires
Packing	:	Coils or Non returnable wooden drums as per customer requirements

TECHNICAL INFORMATION

Nominal Cross Section	Number & nominal wire diameter	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C
mm^2	NR x mm	mm	Kg/km	ohm/km
4	7x0.84	2.50	35	4.610
6	7x1.03	3.10	50	3.080
10	7x1.33	4.00	90	1.830
16	7x1.67	5.00	140	1.150
25	7x2.11	6.30	220	0.727
35	7x2.48	7.44	300	0.524
50	19x1.76	8.80	415	0.387
70	19x2.12	10.55	595	0.268
95	19x2.48	12.40	820	0.193
120	37x2.00	14.00	1060	0.153
150	37x2.22	15.60	1290	0.124
185	37x2.48	17.36	1600	0.0991
240	61x2.22	20.00	2130	0.0754
300	61x2.48	22.32	2645	0.0601
400	61x2.82	25.40	3455	0.0470
500	61x3.17	28.60	4365	0.0366

BARE COPPER CONDUCTORS

For transmission and distribution in electrical networks

Standard	:	DIN 48201-Part-1
Conductor	:	Hard drawn stranded copper wires
Packing	:	Non returnable wooden drums as per customer requirements

TECHNICAL INFORMATION

Nominal Cross Section	Number & nominal wire diameter	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C	Calculated Breaking Load
mm^2	NR x mm	mm	Kg/km	ohm/km	KN
10	7x1.35	4.05	90	1.8060	4.1
16	7x1.70	5.1	145	1.1385	6.5
25	7x2.10	6.3	220	0.7461	9.9
35	7x2.50	7.5	310	0.5264	14.0
50	19x1.80	9.0	435	0.3759	19.8
70	19x2.10	10.5	595	0.2762	26.9
95	19x2.50	12.5	845	0.1949	38.1
120	19x2.80	14.0	1065	0.1554	47.8
150	37x2.25	15.7	1335	0.1238	60.1
185	37x2.50	17.5	1650	0.1003	74.2
240	61x2.25	20.2	2210	0.0753	99.0
300	61x2.50	22.5	2725	0.0610	122.3
400	61x2.89	26.0	3640	0.0456	163.4
500	61x3.23	29.1	4545	0.0365	204.2

ALL ALUMINUM CONDUCTORS (AAC)

For transmission and distribution in electrical networks with relatively short spans

Standard	:	DIN 48201-Part-5, BS 215
Conductor	:	Hard drawn stranded Aluminum wires
Packing	:	Non returnable wooden drums as per customer requirements

TECHNICAL INFORMATION

Acording To DIN 48201

Nominal Cross Section	Number & nominal wire diameter	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C	Calculated Breaking Load
mm²	NR x mm	mm	Kg/km	ohm/km	KN
16	7x1.70	5.1	45	1.8017	2.84
25	7x2.10	6.3	65	1.1807	4.17
35	7x2.50	7.5	95	0.8331	5.78
50	7x3.00	9.0	135	0.5786	7.94
50	19x1.80	9.0	135	0.5949	8.45
70	19x2.10	10.5	180	0.4371	11.32
95	19x2.50	12.5	255	0.3084	15.68
120	19x2.80	14.0	320	0.2459	18.78
150	37x2.25	15.7	405	0.1960	25.30
185	37x2.50	17.5	500	0.1587	30.54
240	61x2.25	20.2	670	0.1191	39.51
300	61x2.50	22.5	825	0.09649	47.70
400	61x2.89	26.0	1105	0.07220	60.86
500	61x3.23	29.1	1380	0.05781	74.67
630	91x2.96	326	1730	0.04625	95.25

Acording To BS 215

Code Name	Nominal Cross Section	Number & nominal wire diameter	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C	Calculated Breaking Load
	mm²	NR x mm	mm	Kg/km	ohm/km	KN
MIDGE	22	7x2.06	6.18	64	1.227	3.99
ANT	50	7X3.10	9.30	145	0.5419	8.28
FLY	60	7x3.40	10.2	174	0.4505	9.90
WASP	100	7x4.39	13.17	290	0.2702	16.0
HORNET	150	19x3.25	16.25	434	0.1825	25.7
CHAFER	200	19x3.78	18.9	587	0.1349	32.4
COCKROACH	250	19x4.22	21.1	731	0.1083	40.0
BUTTERFLY	300	19x4.65	23.25	888	0.08916	48.75
CENTIPEDE	400	19x3.78	26.46	1145	0.06944	56.10

ALUMINUM CONDUCTORS STEEL REINFORCED (ACSR)

For transmission and distribution in electrical networks Over Long Spans

Standard : ASTM B 232
Conductor : A center galvanized steel wire (s) and Hard drawn stranded aluminum wores*
Packing : Non returnable wooden drums as per customer requirements

TECHNICAL INFORMATION

Code Name	Nominal Cross Section	Number & nominal wire diameter N* d (mm)		Approx. Overall diameter	Approx. Conductor weight Kg/km		Max DC Resistance at 20°C	Calculated Breaking Load
Name	mm²	Al	Steel	mm	Al	Steel	ohm/km	KN
GROUSE	40.5	8*2.54	1*4.24	9.3	110	110	0.7112	23.1
PETREL	51.6	12*2.34	7*2.34	11.7	140	235	0.5614	46.2
MINORCA	56.1	12*2.44	7*2.44	12.2	155	255	0.5163	50.2
LEGHORN	68.2	12*2.69	7*2.69	13.45	190	310	0.4248	60.5
GUINEA	80.4	12*2.92	7*2.92	14.6	225	370	0.3605	71.1
DOTTEREL	89.4	12*3.08	7*3.08	15.4	250	410	0.3240	76.9
DORKING	96.5	12*3.20	7*3.20	16	265	445	0.3002	83.1
BRAHMA	102.8	16*2.86	19*2.48	18.1	285	720	0.2819	126.3
COCHIN	107.1	12*3.37	7*3.37	16.9	300	490	0.2707	92.0
TURKEY	13.3	6*1.70	1*1.70	5.0	35	15	2.157	5.3
SWAN	21.2	6*2.12	1*2.12	6.36	60	25	1.3545	8.3
SWANATE	21.1	7*1.96	1*2.61	6.5	60	45	1.3583	10.5
SPARROW	33.6	6*2.67	1*2.67	8.0	90	45	0.8540	12.7
SPARATE	33.5	7*2.47	1*3.30	8.3	90	70	0.8553	16.1
ROBIN	42.4	6*3.00	1*3.00	9.0	115	55	0.6764	15.8
RAVEN	53.5	6*3.37	1*3.37	10.1	150	70	0.5360	19.4
QUAIL	67.4	6*3.78	1*3.78	11.4	190	90	0.4261	23.6
PIGEON	85.1	6*4.25	1*4.25	12.7	235	110	0.337	29.4
PENGUIN	107.2	6*4.77	1*4.77	14.3	295	140	0.2676	37.1
WAXWING	135.0	18*3.09	1*3.09	15.5	375	60	0.2136	30.3
PARTIRIDGE	134.9	26*2.57	7*2.0	16.3	374	175	0.2148	50.2
OSTRICH	152.2	26*2.73	7*2.12	17.3	420	195	0.1904	56.6
MERLIN	170.2	18*3.47	1*3.47	17.4	470	75	0.1694	38.2
LINNET	170.6	26*2.89	7*2.25	18.3	475	215	0.1699	62.8
ORIOLE	170.5	30*2.69	7*2.69	18.8	475	315	0.1703	77.4
CHICKADEE	200.9	18*3.77	1*3.77	18.9	545	85	0.1435	44.3
BRANT	201.6	24*3.27	7*2.18	19.6	560	205	0.1437	64.7
IBIS	201.3	26*3.14	7*2.44	19.8	560	255	0.1439	72.1
LARK	200.9	30*2.92	7*2.92	20.5	560	370	0.1446	90.3
PELICAN	241.70	18*4.14	1*4.14	20.7	657	105	0.1190	52.3
FLICKLER	241.6	24*3.58	7*2.39	21.5	670	245	0.1199	76.8
HAWK	241.7	26*3.44	7*2.67	21.8	670	310	0.1199	86.4
HEN	241.3	30*3.20	7*3.20	22.4	670	440	0.1204	105.2
OSPREY	282.5	18*4.47	1*4.47	22.3	780	125	0.1021	61.0
PARAKEET	282.3	24*3.87	7*2.58	23.2	785	285	0.1026	88.3
DOVE	282.6	26*3.72	7*2.89	23.5	780	360	0.1025	101.1

* Grease may be applied for anti-corrosive purposes if required.

ALUMINUM CONDUCTORS STEEL REINFORCED (ACSR)

TECHNICAL INFORMATION

Code Name	Nominal Cross Section	Number & nominal wire diameter N* d (mm)		Approx. Overall diameter	Approx. Conductor weight Kg/km		Max DC Resistance at 20°C	Calculated Breaking Load
Name	mm²	Al	Steel	mm	Al	Steel	ohm/km	KN
EAGLE	282.6	30*3.45	7*3.45	24.15	775	511	0.1030	122.9
PEACOCK	306.1	24*4.03	7*2.69	24.2	850	310	0.0946	95.9
SWAB	305.8	26*3.87	7*3.01	24.5	850	390	0.0947	108.1
WOODDUCK	307.1	30*3.61	7*3.61	25.3	850	660	0.0946	129.0
TEAL	307.1	30*3.61	19*2.16	25.21	850	550	0.0946	133.4
SWIFT	323.0	36*3.38	1*3.38	23.7	890	70	0.0893	60.7
KINGBIRD	323.0	18*4.78	1*4.78	23.9	890	140	0.0893	69.7
ROOK	323.1	24*4.14	7*2.76	24.8	895	325	0.0897	101.0
GROSSBEAK	322.7	26*3.97	7*3.09	25.12	895	410	0.0900	111.9
SCOTER	322.7	30*3.70	7*3.70	25.9	895	600	0.0900	135.5
EGRET	322.6	30*3.70	19*2.22	25.9	895	575	0.0900	140.6
FLAMINGO	337.3	24*4.23	7*2.82	25.4	935	345	0.859	105.5
GANNET	338.3	26*4.07	7*3.16	25.8	935	430	0.0857	117.3
STILT	363.3	24*4.39	7*2.92	26.3	1005	370	0.0798	113.3
SATRLING	361.9	26*4.21	7*3.28	26.68	1005	460	0.0800	126.0
REDWING	362.1	30*3.92	19*2.35	27.5	1005	645	0.0802	153.7
CUCKOO	402.8	24*4.62	7*3.08	27.72	1115	440	0.0720	123.8
DRAKE	402.6	26*4.44	7*3.45	28.11	1115	510	0.0720	139.7
TERN	402.8	45*3.38	7*2.25	27.03	1120	220	0.0718	97.5
COOT	401.9	36*3.77	1*3.77	26.4	1110	90	0.0717	74.7
CONDOR	402.8	54*3.08	7*3.08	27.72	1116	410	0.0720	124.3
MALLARD	403.8	30*4.14	19*2.48	29.0	1120	720	0.0719	171.2
RUDDY	455.5	45*3.59	7*2.40	28.7	1265	245	0.0636	109.4
CANARY	456.4	54*3.28	7*3.28	29.52	1265	460	0.0635	141.0
RAIL	483.4	45*3.70	7*2.47	29.61	1340	260	0.0599	116.1
CATIBIRD	484.6	36*4.14	1*4.14	29.0	1335	105	0.0595	87.9
CARDINAL	484.5	54*3.38	7*3.38	30.4	1340	490	0.0598	149.7
ORTOLAN	523.9	45*3.85	7*2.57	30.8	1450	285	0.0553	123.3
TANAGER	522.8	36*4.30	1*4.30	30.1	1445	115	0.0551	94.8
CURLEW	522.5	54*3.51	7*3.51	31.59	1440	530	0.0554	161.5
BLUEJAY	564.0	45*4.00	7*2.66	32.0	1565	305	0.0512	132.7
FINCH	565.0	54*3.65	19*2.19	32.8	1570	560	0.0515	174.6
BUNTING	605.8	45*4.14	7*2.76	33.1	1675	325	0.0478	142.4
GRAKCLE	602.8	54*3.77	19*2.27	34.0	1680	600	0.0483	186.9
BITTERN	644.4	45*4.27	7*2.85	43.2	1785	350	0.0450	151.6
PHEASANT	645.1	54*3.90	19*2.34	35.1	1785	640	0.0451	194.1
SKYLARK	643.3	36*4.77	1*4.77	33.4	1775	140	0.0448	116.7
DIPPER	684.2	45*4.40	7*2.93	35.2	1895	370	0.0423	160.7
MARTIN	685.4	54*4.02	19*2.41	36.2	1905	680	0.0425	206.1
BOBOLINK	725.2	45*4.53	7*3.02	36.3	2010	390	0.0399	170.5
PLOWER	726.9	54*4.14	19*2.48	37.2	2020	720	0.0401	218.4
NUTHATCH	746.2	45*4.65	7*3.10	37.2	2120	415	0.0379	177.6
PARROT	766.1	54*4.25	19*2.55	38.2	2130	760	0.0380	230.5
LAPWING	807.5	45*4.78	7*3.18	38.2	2230	435	0.0359	187.4
FALCON	806.2	54*4.36	19*2.62	39.2	2240	800	0.0361	243.0

PVC INSULATED HARD DRAWN COPPER CONDUCTORS

For overhead power lines when crossing telecommunication Lines

Type	:	Type 8 (or Type 16)*
Standard	:	BS 6485
Conductor	:	Hard drawn stranded copper wires
Insulation	:	PVC compound**
Packing	:	Non returnable wooden drums as per customer requiments

TECHNICAL INFORMATION

Type 8

Nominal Cross Section	Number & nominal wire diameter	Minimum insulation Thickness	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C
mm²	NR x mm	mm	mm	kg/km	ohm/km
10	7x1.35	0.8	6.1	117	1.890
16	7x1.70	0.8	7.1	185	1.190
25	7x2.14	0.8	8.4	266	0.749
35	7x2.50	0.8	9.6	360	0.540
50	7x3.0	0.8	11.0	515	0.399
50	19x1.80	0.8	11.1	510	0.399
70	19x2.10	0.8	12.6	566	0.276
95	19x2.50	0.8	14.6	950	0.199
120	19x2.50	0.8	16.2	1185	0.158
150	37x2.25	0.8	17.9	1465	0.128
185	37x2.50	0.8	19.7	1795	0.102

* Insulation color is black for type 8, green for Type 16, or other colors as per customer requirements

** Type 16 (increased insulation thickness) overhead lines are available.

PVC INSULATED HARD DRAWN ALUMINUM CONDUCTORS

For overhead power lines when crossing telecommunication Lines

Type	:	Type 8 (or Type 16)*
Standard	:	BS 6485
Conductor	:	Hard drawn stranded Aluminum wires
Insulation	:	PVC compound**
Packing	:	Non returnable wooden drums as per customer requiments

TECHNICAL INFORMATION

Nominal Cross Section	Number & nominal wire diameter	Minimum insulation Thickness	Approx. Overall diameter	Approx. Conductor weight	Max DC Resistance at 20°C
mm^2	NR x mm	mm	mm	kg/km	ohm/km
16	7x1.70	0.8	7.2	82	1.8017
25	7x2.10	0.8	8.4	118	1.1807
35	7x2.50	0.8	9.6	148	1.8331
50	7x3.10	0.8	11.4	200	0.5786
50	19x1.80	0.8	11.0	205	0.5949
70	19x2.10	0.8	12.5	250	0.4371
95	19x2.50	0.8	14.5	340	0.3084
120	19x2.80	0.8	16.0	410	0.2459
150	37x2.25	0.8	17.8	515	0.1960
185	37x2.50	0.8	19.6	600	0.1587

* Insulation color is black for type 8, green for Type 16, or other colors as per customer requirements

** Type 16 (increased insulation thickness) overhead lines are available.

CERTIFICATIONS

Certificate of Registration

MOODY INTERNATIONAL

This is to certify that the
Quality Management System of :

Tirupati Plastomatics Pvt. Ltd.

B-141 A, Road No. 90, VKI Area, Jaipur

has been assessed and found compliant with the requirements of :

ISO 9001:2008

Approval is hereby granted for registration on the prescribed terms and conditions rules and conditions are observed at all times.

Certification Scope:

Manufacturing and Supply of PVC/XLPE/Fire Retardant/Polyethylene Insulated, Aluminium/Aluminium Alloy/Copper Conductor Cables, Unsheathed/Sheathed, Armoured/Unarmoured, Screened/Unscreened Type including Power, Control, Submersible, Telecom, Coaxial, Radio Frequency, Computer, HF, VHF, UHF, Railway Signalling (Indoor/outdoor) Aerial Bunched, PUF Cables for Telecommunication including (4X Quad) and Dry (4Quad) Cable, ACSR, AAC, AAAC, Conductor

Certificate No.: LJA-0013.06

Original Issue Date: 20 Aug 2003

Issue Date: 12 Jan 2012

Expiry Date: 16 Jul 2012

Moody International Certification Ltd.

Certificate of Registration

MOODY INTERNATIONAL

This is to certify that the
Occupational Health and Safety Management System of :

Tirupati Plastomatics Pvt. Ltd.

B-141 A, Road No. 90, VKI Area, Jaipur 302 013, Rajasthan, - India

has been assessed and registered against the requirements of :

BS OHSAS 18001:2007

Approval is hereby granted for registration on the prescribed terms and conditions rules and conditions are observed at all times.

Certification Scope:

Manufacturing and Supply of PVC/XLPE/Fire Retardant/Polyethylene Insulated, Aluminium/Aluminium Alloy/Copper Conductor Cables, Unsheathed/Sheathed, Armoured/Unarmoured, Screened/Unscreened Type including Power, Control, Submersible, Telecom, Coaxial, Radio Frequency, Computer, HF, VHF, UHF, Railway Signalling (Indoor/outdoor) Aerial Bunched, PUF Cables for Telecommunication including (4X Quad) and Dry (4Quad) Cable, ACSR, AAC, AAAC, Conductor.

Certificate No.: LJA-U-0013.10

Issue Date: 15 February 2010

Expiry Date: 14 February 2013

Pankaj Rai
Country Head
(Certification in Training)
(Moody International)

For any Queries contact Moody International Certification India (+91-0141-4113000)

Certificate of Registration

MOODY INTERNATIONAL

This is to certify that the
Environmental Management System of :

Tirupati Plastomatics Pvt. Ltd.

B-141 A, Road No. 90, VKI Area, Jaipur 302 013, Rajasthan, - India

has been assessed and found compliant with the requirements of :

ISO 14001: 2004

Approval is hereby granted for registration on the prescribed terms and conditions rules and conditions are observed at all times.

Certification Scope:

Manufacturing and Supply of PVC/XLPE/Fire Retardant/Polyethylene Insulated, Aluminium/Aluminium Alloy/Copper Conductor Cables, Unsheathed/Sheathed, Armoured/Unarmoured, Screened/Unscreened Type including Power, Control, Submersible, Telecom, Coaxial, Radio Frequency, Computer, HF, VHF, UHF, Railway Signalling (Indoor/outdoor) Aerial Bunched, PUF Cables for Telecommunication including (4X Quad) and Dry (4Quad) Cable, ACSR, AAC, AAAC, Conductor

Certificate No.: E-LJA-0014.08

Issue Date: 15 February 2010

Expiry Date: 14 February 2013

Pankaj Rai
Authorised Signatory

Moody International Certification Ltd.

Tirupati Plastomatics Pvt. Ltd.

(Integrated Management System (IMS) Certified Company)

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Brand Name:
Gemini Cables

QUALITY ASSURED COMPANY
ISO 9001:2000

ENVIRONMENTAL MANAGEMENT SYSTEM
ISO 14001:2000

SAFETY ASSURED COMPANY
OHSAS 18001:2007

Printed by : Hareshwar Printers # 9829066769