CITIZEN CABLES

Safety & Economy Is Our Priority

Technical Catalogue

ISO 9001:2008

Members of Citizen Group

Citizen Cables Ltd.
Citizen Meter Ltd.
Citizen Marketing Ltd.
Citizen CNG Station
Tecnotrade International Ltd.

Technical Catalogue
Forth Edition : November, 2014

CITIZEN

CITIZEN CABLES LTD.

www.citizencable.com

ISO 9001:2008

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To
CITIZEN CABLES LTD

From the desk of Managing Director

Engr. Mohammad Ali
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Diploma in Industrial Management, UNIDO

Citizen Cables Ltd., one of the leading manufacturers of Electric Cables in Bangladesh. Our factory is now located at B.K. Bari, Rajendrapur, Gazipur. Previously it is known as Fecto Industries Ltd. and managed under Bangladesh Steel and Engineering Corporation (BSEC) owned by Bangladesh Government. The factory is taken by us in 1993. Meanwhile the factory has been modernized & equipped by Japanese Machinery under BMRE programe and capable to manufacture all types of quality Wires & Cables upto 11KV and conductors upto 132KV in conformity with the latest version of National & International Standards. Various types & sizes of Domestic Cables, LT Power Cables & HT Power Cables with Copper/Aluminium Conductor and both PVC & XLPE Insulation are included in our product list. We follow the standards likes IEC, BS, VDE, ASTM, IS, BDS etc for our products and also meet up the specific requirements of the customer.

We use electrolytically refined oxygen free copper rod of 99.99% purity ensuring the quality of Cables as International Standard. It is a professionally managed organization coupled with latest technologies for Cable production.

Quality and reliability has always been main emphasis. All Citizen Brand Cables are tested as per requirements of Standard Specifications. Both Type & Routine Tests are carried out in our well equipped Modern Testing Laboratory by qualified Engineers. Our products has thoroughly been tested and approved by Bangladesh Standard & Testing Institution (BSTI) and Bureau of Research.

Citizen Brand Cables are approved and being widely used by PWD, PDB, DPDC, REB, MES, DCC, CAAB, CPA, HED, NHA, Facilities Department and other Govt. & Autonomous Bodies. Our Cables are also used in various Private Sectors like Industries, Housing Apartments, Shopping Complex and Individual owners.

Our company has achieved prestigious ISO 9001:2008 Certificate from Bureau Veritus Quality International (BVQI), U.K. for its adherence to the strict Quality Management System.

All of our Cables duly marked with Citizen Cable and wrapped with Citizen Cable printed cellophane. Our marketing network having technical knowledge how are always ready to provide necessary pre and after Sales services.

We are strongly committed to provide Quality Cables to our valued Customers at large and earn their ultimate satisfaction.

ISO 9001:2008

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CODE DESIGNATION FOR CABLES

Abbreviation	Interpretation
N	According TO VDE Standard
B	According TO British Standard
Y	Insulation or sheath of Thermoplastic based on PVC
A	Aluminium
NA	Cable with Al Conductor
A	Insulated Single Core Cable
M	Sheathed Cable
MH	Medium Hand-held Equipment Cable
I	International Colour Code
F	Flat Cable
E	Earth Continuity Conductor
FG	Galvanized Steel Flat wire armouring
C	Concentric Conductor of Copper
RG	Galvanized Steel Round wire armouring
Gb	Helical Galvanized Steel Tape
I	According to BS-2004 (Imperial Systems)
re	Conductor of Single Solid wire having Circular Cross section
rm	Conductor of Multiple Stranded wires having Circular Cross section
sm	Conductor of Multiple Stranded wires having Sector Shaped Cross-section
cm	Compacted Circular Stranded Conductor
se	Sector Shaped Solid
2X	Cross-linked Polytheylene (XLPE)
S	Shield of Copper
SW	For Multi core Cables with Individual Screens
Ra	Round Aluminium wire armoured
H	Non-metallic Semi-conducting Screen Over Conductor & over insulation
2Y	Polythylene (PE) Insulation
-J	with green-yellow earth wire
-O	without green-yellow earth wire
-JZ	core numbering with one core green-yellow
-OZ	core numbering without one core green-yellow

CODE DESIGNATION FOR CABLES

Abbreviation	Interpretation
BDS	Bangladesh Standard
IEC	International Electrotechnical Commission
VDE	Union of German Electrical Engineer
BS	British Standard
ASTM	American Society for Testing and Material
ICEA	Inuslated Cable Engineers Association
NEMA	National Electric Manufacturers Association
JIS	Japanese Industrial Standard
SNI	Standards National Indonesia
DIN	Deutsche Industrial Norms
ANSI	Ameriacan national Standard Institution (USA)
AS	Australian Standard (Australia)
BSI	British Standard Institution (Great Britain)
BV	Bureau Veritas (France)
CATV	Community Antenna Television (International)
CEBEC	Committee Electrotecnique Beige (Belgium)
CEE	International Commission on Rules for the Approval of Electrical Equipment
CEI	Commission Electrotechnique International
CENELEC	Comittee European de Normalization Electrotechnique
CSA	Canadian Standard Association (Canada)
DEMKO	Denmarks Electric Material Kontrol
DKE	Deutsches Electrotecnique Kommission in DIN & VDE (Germany)
EN	European Standards (Germany)
HN	Harmonisation des Normes (France)
IEE	Institute of Electrical Engineers (Great Britain)
IEEE	Institute of Electrical & Electronics Engineers (Great Britain)
ISO	International Organization for Standardization
MIL	Military Specification (USA)
NEC	National Electrical Code (USA)
NF	Normes Francaises (France)
NFC	Normes Francaises Class C (France)
SAE	Society of Automotive Engineers
SEK	Svenska Elcktriska Kommission (Sweden)
SEV	Switzerlands Elctrotechnical Verein (Switzerland)
UL	Underwriters Laboratories (USA)
UNI	Unificazione National Italiana (Italy)
VDEW	Verband Deutscher Elektrotechniker W (Germany)

PRODUCT RANGE

PVC Insulated/Skin Coated Copper/Aluminium House Wiring/Domestic Cables

PVC/XLPE Insulated, PVC Sheathed Power and Control Cables with or without Armour

XLPE Insulated, PVC Sheathed Power Cables up to 33 KV

Various Types of FR, FRLS, LSHF Cables

Various Types of PE insulated Telecommunication Cables, Co-axial Cables, Drop Wires

Copper Wire Braided, Al-Mylar Tape Shielded, Pair Shielded and Overall Shielded Cables

Pre-Assembled Insulated Aluminium Cables with ACSR messenger wire

Bare Aluminium & Copper Conductors and Wires with or without Annealing

Insulated or Bare Aluminium Stranded Conductors (AAC)

Aluminium Conductor Steel Re-Inforced (ACSR)

All Aluminium Alloy Conductors (AAAC)

Customized Cables, Wires, and Conductors as per Customers Requirement

PRODUCT DESIGN

Our expert team is able to design and customize cables to suit specific customers requirement.To ensure the quality of our cables, our qualified engineers use the latest technology and equipments to test and monitor the entire production process. In today's market no product can expect sell effectively if it is not rooted in sound engineering designed. **CITIZEN CABLES** are designed and manufactured with the latest national and international standards.

PRODUCT TEST

Using the latest technology and equipment **CITIZEN CABLES LTD.** carries out a full range of Routine and Type Tests as per BS, IEC,VDE and other National and International Standards. In the manufacturing process we maintain stringent quality assurance procedures to give long term reliability and peace of mind.

FACTORS TO BE CONSIDERED IN CABLES SELECTION PROCESS

Installation: The area of installation whether indoor, outdoor, underground, or aerial is critical in the choice of cable because the exposures to various elements may affect the performance and safety of cable.This is where the characteristics of insulation play an important part.

Voltage Rating: Determines the size of the conductor and the thickness and type of insulation.

Conductor Size: The current load, KVA load and kilowatt load are governed by voltage drop besides the heating and power factors. These must be known before determining the conductor size.

Ampacity Limitation: The maximum current a cable can safely carry without exceeding the capacity of the insulation or jacketed material.

External Condition: The presence of other sources of heat located in the installation, such as pipes, corrosive agents, structural materials and other cables can cause increase in the temperature of cables.

Optimum cable performance can be obtained from a cable such as **CITIZEN CABLES**, with access to the latest developments in conductor, insulation, and protective materials technology. Our experienced Technical staff can provide guidance on cable selection and installation and can ensure that you get the right cables for your job.

OPERATING CHARACTERISTICS OF CABLES

The construction data and current rating of cables are shown in tables are based on standard conditions of installations as provided below

BASIC DATA:

1. Max. Conductor Temperature	:	70°C for PVC	90°C for XLPE
2. Max. Conductor Temperature during short Circuit	:	160°C for PVC	250°C for XLPE
3. Thermal Resistivity of dielectric cm/W	:	650°C for PVC	350°C for XLPE
4. Thermal Resistivity of soil (moist area) cm/W	:	100°C	
5. Ground Temperature	:	30°C	
6. Ambient Air Temperature	:	35°C	
7. Duration of Short circuit	:	1 second	

8. Depth of laying in the Ground

— 700 mm	: LT Cables Up to 1.2 KV
— 900 mm	: 3.3 KV to 12 KV
— 1050 mm	: 5 KV to 36 KV

9 Installation of Cables

- Single Core cables installed in Trefoil formation or Flat Formation
- Multi core cables installed in single

10. Recommended Minimum Bending Radius

- Upto 1.2KV for smaller (>20mm) single and Multi core cables	: [8 -10] X D
-Upto1.2KV For Larger Multi core cables	: 12 XD
-Upto1.2KV For Larger Single core Cables	: 15 XD
- 3.3 KV Upto 12KV For Single and Multicore cables	: 15 XD
- Above 12 KV upto 36KV for Multicore Cables	: 18 X D
- Above 12 KV upto 36KV for single core Cables	: 20 XD

Meter Marking

According to the standard cables with diameter > 10 mm must carry a meter mark.The marks may have a tolerance of 1%, but they are not calibrated. Incomplete or missing marks (on short distances) may not be claimed. For defining the delivery length only calibrated measuring equipment has to be used.

HEALTH, SAFETY & ENVIRONMENT

To maintain health and safety standards, regular training is provided to all of our employees that covers special hazards, how to protect oneself, causes accidents at work, preventing slips and falls and how to use tools and machine safety. **CITIZEN CABLES LTD.** uses only tried and tested materials and follow the processes in full compliance with all relevant National and International Standards to protect and preserve the environment.

PVC / XLPE INSULATED DOMESTIC & LT POWER CABLES

LOW VOLTAGE CABLES - CONSTRUCTION

Low voltage cables are manufactured with PVC, PE and XLPE insulations for various applications within voltage range from 300V to 1000V category.

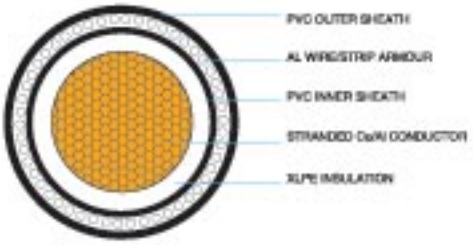
APPLICATIONS:
Extensively used for power distribution, control, instrumentation, communication, signaling and data transmission applications

PVC, as insulation and sheath compounds, has the following superior features:
- Strong and made for easy processing
- Resistant to water, moisture, oils and chemicals
- PVC black compound can resist ultraviolet degradation
- Specially formulated PVC is flame retardant and reduces emission of halogens and smoke.

PE, as insulation, has the following superior features:
- Good for low distortion and high speed data transmission
- Used for precision audio, pulse or R.F. signal transmission
- Good for all modern electronic equipments where high speed data processing is required
- Low capacitance, with high speed signal processing in computer, Telephone etc.

XLPE, as insulation has the following superior features:
- Low dielectric loss
- Higher temperature rating and higher emergency overload rating .
- High continuous current rating
- Superior short circuit rating
- Much better insulation resistance
- Higher resistance to moisture
- Resistant to chemicals and corrosive gases
- Exhibits better properties, such as resistance to vibration, impact, ageing and hot deformation
- termination and jointing methods are easy, as compared to other cables

SINGLE CORE LT CABLE



THREE CORE LT CABLE

CONDUCTORS
The conductor is made either of Copper or Aluminum as per the requirement by following standard specifications. While designing, flexibility and compactness are carefully worked out by choice of wires, drawn bright and smooth. Under strict supervision, stranding and compacting is carried out by skilled operators to bring out a smooth surface so as to ensure minimum stress development on the surface of the conductor.

INSULATION
High quality PVC base compound is used for voltages up to 1.2 KV PVC cables, high quality unfilled PE compound is used for processing of low voltage (up to 500V), data processing and communication cables and high quality Cross Linked Polyethylene unfilled compound is used for low voltage and High voltage cables also.

LAYING UP
In multicore cables, cores are laid up as per the colour scheme and interstices are filled up wherever necessary to make the laid up cable circular.

LOW VOLTAGE CABLES - CONSTRUCTION

INNER SHEATH

For all cables having two or more cores and single core armoured cables, a common covering is applied over single core or the laid up cores either by extruded sheath of PVC Compound or wrapping of thermoplastic or proofed tapes.

ARMOURING

For multicore cables, wire armouring is applied over the inner sheath, where the fictitious diameter over the inner sheath does not exceed 15mm. The diameter above this armouring can be applied by either round steel wires or flat steel wires'or double steel tapes' However non magnetic Aluminum wire armouring is applied over single core cables.

OUTER SHEATH

Extruded over armour	:	in armoured cables
Over Inner sheath	:	in multicore unarmoured cables
Over Insulation	:	in single core cables

It is always kept Black in colour for outdoor exposure. Any other colour can be provided for indoor use. Normally tough outer sheath of Heat resisting PVC compound (Type ST2) is extruded over all the XLPE cables. In special cases when required by the customers fire resistant (FR) or fire resistant low smoke (FRLS) PVC outer sheath cables are also supplied.

CORE IDENTIFICATION

Cores are identified by the colour scheme of insulation. The following colour scheme is normally adopted for power cables as per IEC specification. Any other colour scheme also can be offered as per other international standards like BS, VDE, etc. on request.

1 Core	:	Red, Yellow, Blue, Brown, Green, Black and Yellow-Green
2 Cores	:	Red and Black
3 Cores	:	Red, Yellow and Blue
4 Cores	:	Red, Yellow, Blue and Black
5 Cores	:	Red, Yellow, Blue, Black and Grey

For cables having more than 5 cores, black or white coloured cores with no. printing will be provided. Communication and data processing cables are having their own colour schemes.

TESTING AND QUALITY ASSURANCE

The various tests carried on Low Voltage cables are classified in three different groups

ROUTINE TESTS

The following tests constitute Routine Tests which are carried out on each and every length of cable as per relevant specification.

- Conductor Resistance Test
- High Voltage Test

TYPE TESTS

These tests are carried out on samples taken from each production lot as per relevant specification. They are carried out to prove conformity as regards the general qualities and design to the particular type of cables

ACCEPTANCE TESTS

These tests are carried out as per relevant specification in the presence of the concerned Inspecting Authority for Testing, Approval and Release of material offered for inspection.

Type : BYA/BAYA

Standard : BDS 900 & BS 6004

Voltage : 450/750V

SINGLE CORE

Applicaton: Suitable for surface mounted or concealed steel conduits or trunking. Also suitable for field protected installation in and appliance up to 1000 V a.c or upto 750 V to earth d.c.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation.*

Colour of Insulation: *Red / Black / Blue / Yellow / Green*

Table : 01

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Overall diameter		Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 35°C in conduit		Current rating at 35°C in air	
				lower limit	upper limit	Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
1x1.0	1/1.13	re	0.7	2.5	3.0	16	-	18.1	-	13	-	16	-
1x1.0	3/0.65	rm	0.7	2.5	3.0	17	-	18.1	-	13	-	16	-
1x1.3	3/0.74	rm	0.7	2.6	3.2	20	12	14.03	22.95	15	10	19	12
1x1.5	1/1.38	re	0.7	2.6	3.2	22	-	12.1	-	16	-	20	-
1x1.5	7/0.52	rm	0.7	2.7	3.3	23	13	12.1	18.1	16	11	20	13
1x1.5	3/0.80	rm	0.7	2.7	3.3	23	13	12.1	18.1	16	11	20	13
1x2.0	3/0.91	rm	0.8	3.1	3.8	30	17	9.11	15.18	20	13	25	15
1x2.5	1/1.78	re	0.8	3.2	3.9	32	-	7.41	-	22	-	28	-
1x2.5	7/0.67	rm	0.8	3.3	4.0	33	19	7.41	12.1	22	15	28	18
1x3.0	7/0.74	rm	0.8	3.5	4.3	40	21	5.99	9.84	26	17	31	20
1x4.0	7/0.85	rm	0.8	3.8	4.6	51	31	4.61	7.41	30	20	37	24
1x4.5	7/0.91	rm	0.8	3.9	4.7	56	32	3.89	6.51	32	21	39	25
1x6.0	7/1.04	rm	0.8	4.3	5.2	71	40	3.08	4.61	38	25	47	31
1x7.0	7/1.12	rm	1.0	4.5	5.8	85	43	2.61	4.29	42	27	51	33
1x9.5	7/1.32	rm	1.0	5.4	6.5	113	55	1.86	3.09	50	32	61	39
1x10	7/1.35	rm	1.0	5.6	6.7	117	64	1.83	3.08	52	34	63	41
1x14.5	7/1.63	rm	1.0	6.2	7.5	164	76	1.23	2.03	65	40	79	50
1x16	7/1.70	rm	1.0	6.4	7.8	179	92	1.15	1.91	70	45	85	55
1X25	7/2.14	rm	1.2	8.1	9.7	276	138	0.727	1.20	91	60	110	72
1x35	min. 6	rm	1.2	9.0	10.9	373	175	0.524	0.868	112	73	136	88
1x50	min. 6	rm	1.4	10.8	12.8	532	250	0.387	0.641	136	88	164	107
1x70	min. 12	rm	1.4	12.1	14.6	732	332	0.268	0.443	173	112	207	137
1x95	min. 15	rm	1.6	14.1	17.1	985	430	0.193	0.320	216	140	253	165
1x120	min. 18/15	rm	1.6	15.6	18.8	1227	532	0.153	0.253	244	158	291	188
1x150	min. 18/15	rm	1.8	17.3	20.9	1535	665	0.124	0.206	-	-	333	217
1x185	min. 30	rm	2.0	19.3	23.3	1891	824	0.0991	0.164	-	-	381	248
1x240	min. 34/30	rm	2.2	22.0	26.6	2458	1050	0.0754	0.125	-	-	452	295
1x300	min. 34/30	rm	2.4	24.5	29.6	3055	1312	0.0601	0.100	-	-	526	342
1x400	min. 53	rm	2.6	27.5	33.2	4078	1720	0.047	0.0778	-	-	639	416
1x500	min. 53	rm	2.8	30.5	36.9	5048	2104	0.0366	0.0605	-	-	752	489
1x630	min. 53	rm	2.8	34.0	41.1	6363	2550	0.0283	0.0469	-	-	855	556

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

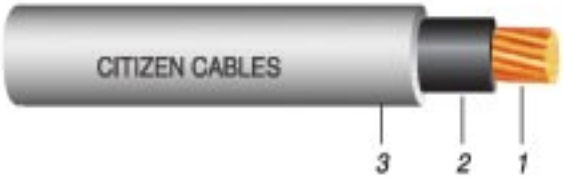
Note : 1. Current ratings are valid for cables laid under defined conditions at page no-58. For current ratings at deviated conditions apply correction as given on page no-58.

Type : BYM/BAYM
Standard : BDS 900 & BS 6004
Voltage : 300/500 V
SINGLE CORE

Applicaton: Suitable for fixed installations in dry or damp premises clipped direct to a surface or on a cable tray unenclosed and also for use in non metallic conduit (PVC).

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. Gray PVC outer Sheath*

Colour of Sheath: *Grey*



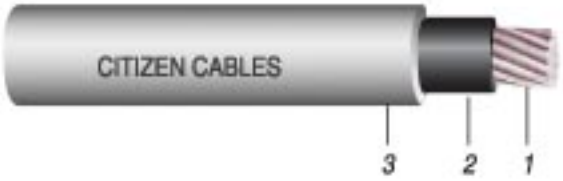


Table : 02

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Overall diameter		Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 35°C in conduit		Current rating at 35°C in air	
					lower limit	upper limit	Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
1x1.0	1/1.13	re	0.6	0.8	3.8	4.5	25	-	18.1	-	13	-	16	-
1x1.0	3/0.65	rm	0.6	0.8	3.8	4.5	26	-	18.1	-	13	-	16	-
1x1.3	3/0.74	rm	0.7	0.8	4.2	4.9	34	26	14.03	22.95	15	10	19	12
1x1.5	1/1.38	re	0.7	0.8	4.2	4.9	32	-	12.1	-	16	-	20	-
1x1.5	7/0.52	rm	0.7	0.8	4.2	4.9	33	27	12.1	18.1	16	11	20	14
1x1.5	3/0.80	rm	0.7	0.8	4.2	4.9	33	27	12.1	18.1	16	11	20	14
1x2.0	3/0.91	rm	0.7	0.8	4.6	5.4	44	32	9.11	15.18	20	12	25	15
1x2.5	1/1.78	re	0.8	0.8	4.8	5.8	45	-	7.41	-	22	-	28	-
1x2.5	7/0.67	rm	0.8	0.8	4.8	5.8	46	36	7.41	12.1	22	15	28	19
1x3.0	7/.074	rm	0.8	0.8	5.1	6.1	60	41	5.99	9.84	26	17	31	20
1x4.0	7/0.85	rm	0.8	0.9	5.4	6.8	73	48	4.61	7.41	30	21	37	25
1x4.5	7/0.91	rm	0.8	0.9	5.6	7.0	81	52	3.89	6.51	32	22	39	26
1x6.0	7/1.04	rm	0.8	0.9	6.0	7.4	96	59	3.08	4.61	38	26	47	32
1x7.0	7/1.12	rm	0.8	0.9	6.5	7.8	107	64	2.61	4.29	42	27	51	33
1x9.5	7/1.32	rm	1.0	0.9	7.0	8.7	145	82	1.86	3.09	50	32	61	40
1x10	7/1.35	rm	1.0	0.9	7.2	8.8	147	84	1.83	3.08	52	36	63	43
1x14.5	7/1.63	rm	1.0	1.0	8.0	10.0	206	113	1.23	2.03	65	40	79	50
1x16	7/1.70	rm	1.0	1.0	8.40	10.5	218	117	1.15	1.91	70	46	85	55
1x25	7/2.14	rm	1.2	1.1	10.0	12.5	328	169	0.727	1.2	91	59	110	72
1x35	19/1.53	rm	1.2	1.1	11.0	13.5	432	211	0.524	0.868	112	73	136	88

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-58. For current ratings at deviated conditions apply correction factors as given on page no-58.

Type : BYM/BAYM
Standard : BDS 900 & BS 6004
Voltage : 300/500 V
TWO CORE & THREE CORE

Applicaton: Suitable for fixed installations in dry or damp premises clipped direct to a surface or on a cable tray unenclosed and also for use in non metallic conduit (PVC).

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. PVC inner Sheath 4. Gray PVC outer Sheath*

Colour of Sheath: *Grey*

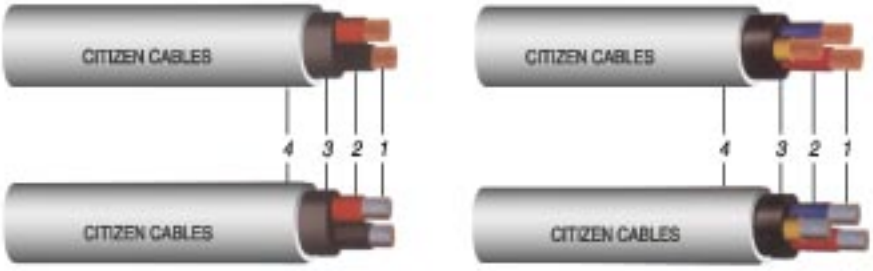


Table : 03

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Overall diameter		Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in conduit		Current rating at 35°C in air	
					lower limit	upper limit	Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
2x1.0	1/1.13	re	0.6	1.2	7.6	8.8	93	-	18.1	-	13	-	15	-
2x1.0	3/0.65	rm	0.6	1.2	7.6	8.8	102	-	18.1	-	13	-	15	-
2x1.5	1/1.38	re	0.7	1.2	8.4	10	119	-	12.1	18.1	16	11	18	13
2x1.5	7/0.52	rm	0.7	1.2	9.0	10.2	121	100	12.1	18.1	16	11	18	13
2x1.5	3/0.80	rm	0.7	1.2	9.0	10.2	121	100	12.1	18.1	16	11	18	13
2x2.5	1/1.78	re	0.8	1.2	9.6	11.5	165	-	7.41	12.1	22	16	26	18
2x2.5	7/0.67	rm	0.8	1.2	10.4	11.8	167	134	7.41	12.1	22	16	26	18
2x4	7/0.85	rm	0.8	1.2	10.5	12.5	228	178	4.61	7.41	30	21	33	23
2x6	7/1.04	rm	0.8	1.2	11.5	14.0	294	219	3.08	4.61	37	26	43	30
2x10	7/1.35	rm	1.0	1.4	15.0	17.5	485	359	1.83	3.08	50	35	60	42
2x16	7/1.70	rm	1.0	1.4	16.5	20.0	673	471	1.15	1.91	66	43	80	52
2x25	7/2.14	rm	1.2	1.4	20.5	24.0	1004	685	0.727	1.20	75	49	88	57
2x35	19/1.53	rm	1.2	1.6	23.0	27.5	1347	906	0.524	0.868	92	60	108	70
3x1.0	1/1.13	re	0.6	1.2	7.8	9.2	106	-	18.1	-	11	-	12	-
3x1.0	3/0.65	rm	0.7	1.2	7.8	9.2	115	-	18.1	-	11	-	12	-
3x1.5	1/1.38	re	0.7	1.2	8.8	10.5	139	-	12.1	18.1	15	10	16	11
3x1.5	7/0.52	rm	0.7	1.2	9.2	10.8	142	111	12.1	18.1	15	10	16	11
3x1.5	3/0.80	rm	0.8	1.2	9.2	10.8	142	111	12.1	18.1	15	10	16	11
3x2.5	1/1.78	re	0.8	1.2	10.0	12.0	195	-	7.41	12.1	20	14	22	15
3x2.5	7/0.67	rm	0.8	1.2	10.5	12.5	198	149	7.41	12.1	20	14	22	15
3x4	7/0.85	rm	0.8	1.2	11.0	13.0	268	193	4.61	7.41	27	19	30	21
3x6	7/1.04	rm	0.8	1.4	12.5	15.5	386	273	3.08	4.61	33	23	37	26
3x10	7/1.35	rm	1.0	1.4	15.5	19.0	590	400	1.83	3.08	46	32	51	36
3x16	7/1.70	rm	1.0	1.4	18.0	21.5	856	553	1.15	1.91	58	38	67	44
3x25	7/2.14	rm	1.2	1.6	22.0	26.0	1272	794	0.727	1.20	66	43	77	50
3x35	19/1.53	rm	1.2	1.6	24.5	29.0	1685	1023	0.524	0.868	81	53	90	59

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-58. For current ratings at deviated conditions apply correction factors as given on page no-58.

Type : BYM/BAYM

Standard : BDS 900 & BS: 6004

Voltage : 300/500 V

FOUR CORE

Applicaton: Suitable for fixed installations in dry or damp premises clipped direct to a surface or on a cable tray unenclosed and also for use in non metallic conduit (PVC).

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. PVC Inner Sheath 4. Gray outer Sheath*

Colour of Sheath: *Grey*

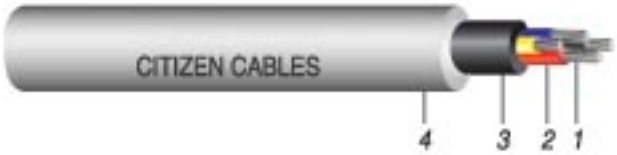


Table : 04

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Overall diameter		Approx. weight of cable		Max. DC resistance of conductor at 20° C		Current rating at 35° C in conduit		Current rating at 35° C in air	
					lower limit	upper limit	Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
4x1.0	1/1.13	re	0.6	1.2	8.4	9.8	124	-	18.1	-	11	-	12	-
4x1.0	3/0.65	rm	0.6	1.2	8.4	9.8	151	-	18.1	-	11	-	12	-
4x1.5	1/1.38	re	0.7	1.2	9.6	11.5	164	-	12.1	18.1	15	10	16	11
4x1.5	7/0.52	rm	0.7	1.2	10.0	12.0	168	127	12.1	18.1	15	10	16	11
4x1.5	3/0.80	rm	0.7	1.2	10.0	12.0	168	127	12.1	18.1	15	10	16	11
4x2.5	1/1.78	re	0.8	1.2	11.0	13.0	224	-	7.41	12.1	20	14	22	15
4x2.5	7/0.67	rm	0.8	1.2	11.5	13.5	228	161	7.41	12.1	20	14	22	15
4x4	7/0.85	rm	0.8	1.4	12.0	14.5	342	241	4.61	7.41	27	19	30	21
4x6	7/1.04	rm	0.8	1.4	14.0	17.0	464	314	3.08	4.61	33	23	37	26
4x10	7/1.35	rm	1.0	1.4	17.0	20.5	719	466	1.83	3.08	46	32	51	36
4x16	7/1.70	rm	1.0	1.4	20.0	23.5	1051	647	1.15	1.91	58	38	67	44
4x25	7/2.14	rm	1.2	1.6	24.5	28.5	1600	963	0.727	1.20	66	43	77	50
4x35	19/1.53	rm	1.2	1.6	27.0	32.0	2085	1202	0.524	0.868	81	53	90	59

Type : BYFYE

Standard : BDS 900 & BS 6004

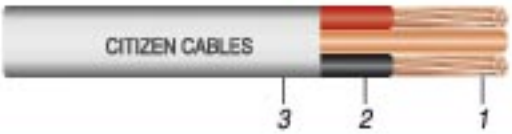
Voltage : 300/500 V

TWO CORE

Applicaton: Suitable for fixed installations in dry or damp premises and for installation, on boards and in channels or embedded in plaster.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation & Cores Laid in Flat Form With ECC 3. Grey PVC outer Sheath*

Colour of Sheath: *Grey*



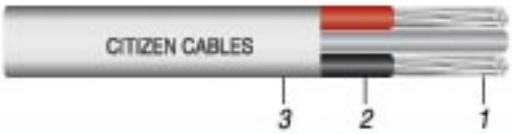


Table : 05

PHYSICAL & ELECTRICAL DATA										
Nominal Cross Sectional Area of conductor	No. & approx. diameter of wire	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Max overall dimentions	No. & nominal Diameter of wires in ECC	Max. DC resistance of conductor at 20° C	Approx. weight of cable	Current rating	
									Enclosed in conduit at 35° C	Clipped to surface or cable tray at 35° C
core x mm²	nos./mm	-	mm	mm	mm	no/mm	ohm/km	kg/km	amps	amps
2x1.0	1/1.13	re	0.6	0.9	9.2x5.0	1/1.13	18.1	68	13	15
2x1.5	1/1.38	re	0.6	0.9	10.2x5.4	1/1.13	12.1	81	16	18
2x2.5	1/1.78	re	0.7	1.0	12.0x6.4	1/1.13	7.41	114	22	26
2x4.0	7/0.85	rm	0.8	1.0	13.5x7.2	1/1.38	4.61	177	30	33
2x6.0	7/1.04	rm	0.8	1.1	15.5x8.0	1/1.78	3.08	244	37	43

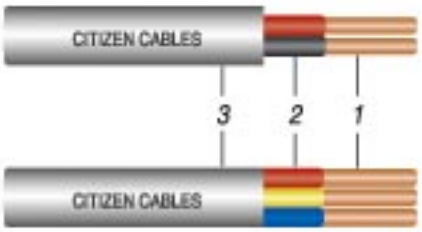
Note : 1. Current ratings are valid for cables laid under defined conditions at page no-58. For current ratings at deviated conditions apply correction factors as given on page no-58.

Type : BYFY/BAYFY
Standard : BDS 900 & BS: 6004
Voltage : 300/500 V
TWO CORE & THREE CORE

Applicaton: Suitable for fixed installations in dry or damp premises clipped direct to a surface or on a cable tray unenclosed and also for use in non metallic conduit (PVC).

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation & Cores Laid in Flat Form 3. Gray PVC outer Sheath*

Colour of Sheath: *Grey*



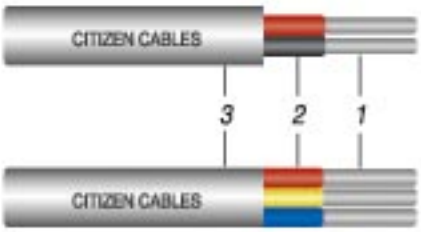


Table : 06

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 35°C in conduit		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm		mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
2x1.0	1/1.13	re	0.6	0.9	7.4x4.7	53	-	18.1	-	13	-	15	-
2x1.0	3/0.65	rm	0.6	0.9	7.6x4.8	58	-	18.1	-	13	-	15	-
2x1.3	3/0.74	rm	0.7	0.9	8.3x5.3	69	52	14.03	22.95	15	9	17	11
2x1.5	1/1.38	re	0.7	0.9	8.4x5.4	65	-	12.10	18.10	16	13	18	15
2x1.5	7/0.52	rm	0.7	0.9	8.4x5.4	67	46	12.10	18.10	16	13	18	15
2x1.5	3/0.80	rm	0.7	0.9	8.4x5.4	67	46	12.10	18.10	16	13	18	15
2x2.0	3/0.91	rm	0.7	0.9	9.4x5.8	92	65	9.11	15.18	20	14	23	16
2x2.5	1/1.78	re	0.8	1.0	9.6x6.2	98	-	7.41	12.10	22	16	26	20
2x2.5	7/0.67	rm	0.8	1.0	9.6x6.2	99	67	7.41	12.10	22	16	26	20
2x3.0	7/0.74	rm	0.8	1.0	11.2x6.7	127	89	5.99	9.84	24	17	28	21
2x4.0	7/0.85	rm	0.8	1.0	11.5x7.2	152	102	4.61	7.41	30	22	33	26
2x4.5	7/0.91	rm	0.8	1.0	11.8x7.5	165	108	3.89	6.51	32	23	38	27
2x6.0	7/1.04	rm	0.8	1.1	13.0x8.0	205	130	3.08	4.61	37	27	43	35
3x1.0	1/1.13	re	0.6	0.9	9.8x4.7	76	-	18.1	-	11	-	12	-
3x1.0	3/0.65	rm	0.6	0.9	10.4x4.8	87	-	18.1	-	11	-	12	-
3x1.5	1/1.38	re	0.7	0.9	11.5x5.4	77	-	12.1	18.1	15	12	16	13
3x1.5	7/0.52	rm	0.7	0.9	11.5x5.4	96	68	12.1	18.1	15	12	16	13
3x1.5	3/0.80	rm	0.7	0.9	11.5x5.4	96	68	12.1	18.1	15	12	16	13
3x2.5	1/1.78	re	0.8	0.9	13.5x6.2	97	-	7.41	12.1	20	16	22	17
3x2.5	7/0.67	rm	0.8	1.0	13.5x6.2	145	99	7.41	12.1	20	16	22	17
3x4	7/0.85	rm	0.8	1.1	16.5x7.4	229	154	4.61	7.41	33	24	30	25
3x6	7/1.04	rm	0.8	1.1	18.0x8.0	301	188	3.08	4.61	37	30	37	30

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-58. For current ratings at deviated conditions apply correction factors as given on page no-58.

Type : NYY/NAYY
Standard : VDE 0271
Voltage : 600/1000 V
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. Black PVC outer Sheath*

Colour of Sheath: *Black*

Table : 07

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Overall diameter (approx.)	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
1x1.5	1/1.38	re	0.8	1.8	6.6	55	-	12.1	18.1	27	-	22	-
1x1.5	7/0.52	rm	0.8	1.8	6.8	58	-	12.1	18.1	27	-	22	-
1x2.5	1/1.78	re	0.8	1.8	7.2	70	-	7.41	12.1	36	-	30	-
1x2.5	7/0.68	rm	0.8	1.8	7.4	75	-	7.41	12.1	36	-	30	-
1x4	7/0.85	rm	1.0	1.8	8.2	106	80	4.61	7.41	47	37	39	31
1x6	7/1.04	rm	1.0	1.8	8.7	132	92	3.08	4.61	59	48	50	41
1x10	7/1.35	rm	1.0	1.8	9.7	182	118	1.83	3.08	78	60	69	53
1x16	7/1.70	rm	1.0	1.8	10.7	252	150	1.15	1.91	100	78	94	73
1x25	7/2.14	rm	1.2	1.8	12.4	363	202	0.727	1.2	130	101	125	97
1x35	min. 6	rm	1.2	1.8	13.7	470	248	0.524	0.868	155	120	160	124
1x50	min. 6	rm	1.4	1.8	15.6	645	332	0.387	0.641	185	144	195	151
1x70	min. 12	rm	1.4	1.8	17.3	858	420	0.268	0.443	225	175	245	190
1x95	min. 15	rm	1.6	1.8	19.4	1129	530	0.193	0.32	270	210	300	232
1x120	min. 18/15	rm	1.6	1.8	21	1384	628	0.153	0.253	310	240	350	272
1x150	min. 18/15	rm	1.8	1.8	23.1	1709	780	0.124	0.206	350	270	405	314
1x185	min. 30	rm	2.0	2.0	25.6	2097	932	0.0991	0.164	390	302	460	357
1x240	min. 34/30	rm	2.2	2.0	28.6	2708	1190	0.0754	0.125	450	349	555	430
1x300	min. 34/30	rm	2.4	2.0	31.3	3405	1248	0.0601	0.1	515	386	640	448
1x400	min. 53	rm	2.6	2.2	35.3	4406	1952	0.047	0.0778	585	439	770	540
1x500	min. 53	rm	2.8	2.2	38.0	5436	2340	0.0366	0.0605	680	510	900	630
1x630	min. 53	rm	2.8	2.2	42.0	6780	2780	0.0283	0.0469	800	600	1030	721
1x800	min. 53	rm	2.8	2.4	46.2	8510	3195	0.0221	0.0367	945	708	1160	812
1x1000	min. 53	rm	3.0	2.6	51.1	10530	3350	0.0176	0.0291	1095	821	1310	917

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.
2. For Compact Conductors and lugs refer to page no-70-71.

Type : YY/AYY
Standard : IEC 60502-1
Voltage : 600/1000 V
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. Black PVC outer Sheath*

Colour of Sheath: *Black*

Table : 08

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
1x1.5	1/1.38	re	0.8	1.4	6.0	50	-	12.1	18.1	27	-	22	-
1.x1.5	7/0.52	rm	0.8	1.4	6.3	53	-	12.1	-	27	-	22	-
1x2.5	1/1.78	re	0.8	1.4	6.5	65	-	7.41	-	36	-	30	-
1x2.5	7/0.68	rm	0.8	1.4	6.7	68	-	7.41	-	36	-	30	-
1x4	7/0.85	rm	1.0	1.4	7.7	95	64	4.61	7.41	47	37	39	31
1x6	7/1.04	rm	1.0	1.4	8.4	120	75	3.08	4.61	59	48	50	41
1x10	7/1.35	rm	1.0	1.4	9.2	171	97	1.83	3.08	78	60	69	53
1x16	7/1.70	rm	1.0	1.4	10.5	246	127	1.15	1.91	100	78	94	73
1x25	7/2.14	rm	1.2	1.4	11.6	348	175	0.727	1.2	130	101	125	97
1x35	min. 6	rm	1.2	1.4	12.7	453	218	0.524	0.868	155	120	160	124
1x50	min. 6	rm	1.4	1.4	14.5	624	290	0.387	0.641	185	144	195	152
1x70	min. 12	rm	1.4	1.4	16.1	831	362	0.268	0.443	225	175	245	191
1x95	min. 15	rm	1.6	1.5	18.2	1104	488	0.193	0.32	270	210	300	233
1x120	min. 18/15	rm	1.6	1.5	19.7	1357	580	0.153	0.253	310	240	350	272
1x150	min. 18/15	rm	1.8	1.6	21.9	1689	708	0.124	0.206	350	270	405	314
1x185	min. 30	rm	2.0	1.7	24.1	2070	875	0.0991	0.164	390	302	460	358
1x240	min. 34/30	rm	2.2	1.8	26.9	2650	1115	0.0754	0.125	450	349	555	431
1x300	min. 34/30	rm	2.4	1.9	29.8	3289	1375	0.0601	0.1	515	386	640	448
1x400	min. 53	rm	2.6	2.0	33.5	4314	1720	0.047	0.0778	585	439	770	540
1x500	min. 53	rm	2.8	2.1	38.0	5350	2125	0.0366	0.0605	680	510	900	630
1x630	min. 53	rm	2.8	2.2	42.0	6780	2620	0.0283	0.0469	800	600	1030	721
1x800	min. 53	rm	2.8	2.3	46.2	8510	3195	0.0221	0.0367	945	708	1160	812
1x1000	min. 53	rm	3.0	2.4	51.1	10530	3890	0.0176	0.0291	1095	821	1310	917

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.
2. For Compact Conductors and lugs refer to page no-70-71.

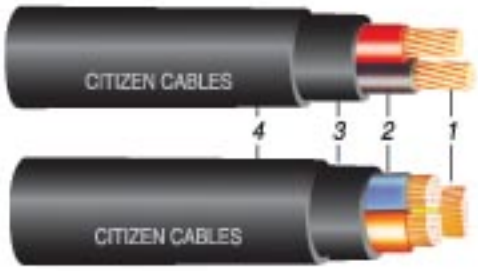
Type : NYY/YY
NAYY/AYY

Standard : VDE-0271 & IEC-60502-1
Voltage : 600/1000 V
TWO CORE & THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. PVC inner Sheath 4. Black PVC outer Sheath*

Colour of Sheath: *Black*



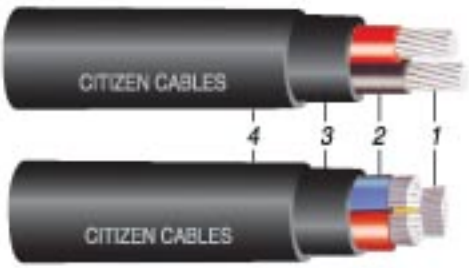


Table : 09

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
2x1.5	1/1.38	re	0.8	1.8	11.0	165	-	12.1	18.1	25	-	19	-
2x1.5	7/0.52	rm	0.8	1.8	11.2	170	-	12.1	18.1	25	-	19	-
2x2.5	7/1.78	re	0.8	1.8	12.4	205	-	7.41	12.10	34	-	27	-
2x2.5	7/0.67	rm	0.8	1.8	12.8	215	-	7.41	12.10	34	-	27	-
2x4	7/0.85	rm	1.0	1.8	14.5	305	223	4.61	7.41	44	35	35	28
2x6	7/1.04	rm	1.0	1.8	15.6	375	257	3.08	4.61	55	45	45	37
2x10	7/1.35	rm	1.0	1.8	17.5	509	314	1.83	3.08	74	57	62	48
2x16	7/1.70	rm	1.0	1.8	19.5	691	390	1.15	1.91	97	75	84	65
2x25	7/2.14	rm	1.2	1.8	23.5	1044	518	0.727	1.20	125	97	110	86
2x35	19/1.53	rm	1.2	1.8	26.0	1330	620	0.524	0.868	150	117	140	109
3x1.5	1/1.38	re	0.8	1.8	11.5	195	-	12.1	18.1	22.0	-	16	-
3x1.5	7/0.52	rm	0.8	1.8	11.8	200	-	12.1	18.1	22.0	-	16	-
3x2.5	1/1.78	re	0.8	1.8	12.7	250	-	7.41	12.1	30.0	-	23	-
3x2.5	7/0.67	rm	0.8	1.8	13.2	260	-	7.41	12.1	30.0	-	23	-
3x4	7/0.85	rm	1.0	1.8	15.0	360	260	4.61	7.41	38	30	32	25
3x6	7/1.04	rm	1.0	1.8	16.4	460	305	3.08	4.61	48	39	41	34
3x10	7/1.35	rm	1.0	1.8	18.5	625	379	1.83	3.08	64	49	56	43
3x16	7/1.70	rm	1.0	1.8	21.0	920	480	1.15	1.91	83	64	75	58
3x25	7/2.14	rm	1.2	1.8	25.0	1320	652	0.727	1.20	110	86	98	76
3x35	min. 6	sm	1.2	1.8	24.2	1400	804	0.524	0.868	130	101	120	93
3x50	min. 6	sm	1.4	1.8	25.9	1815	1045	0.387	0.641	155	120	150	116
3x70	min. 12	sm	1.4	2.0	29.2	2444	1325	0.268	0.443	190	148	190	148
3x95	min. 15	sm	1.6	2.1	33.4	3350	1735	0.193	0.320	225	175	230	179
3x120	min. 18/15	sm	1.6	2.2	36.3	4110	2040	0.153	0.253	260	202	270	210
3x150	min. 18/15	sm	1.8	2.3	39.5	5100	2475	0.124	0.206	295	229	305	237
3x185	min. 30	sm	2.0	2.5	43.5	6260	3040	0.0991	0.164	330	257	350	272
3x240	min. 34/30	sm	2.2	2.7	48.8	7900	3795	0.0754	0.125	385	299	410	318
3x300	min. 34/30	sm	2.4	2.9	54.1	10000	4700	0.0601	0.100	425	329	470	364

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : NYY/YY
NAYY/AYY

Standard : VDE-0271 & IEC-60502-1
Voltage : 600/1000 V, 720/1200 V
THREE & HALF CORE, FOUR CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. PVC inner Sheath 4. Black PVC outer Sheath*

Colour of Sheath: *Black*

Table : 10

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. dia. of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25+16	min. 6, min. 6	rm/rm	1.2, 1.0	1.8	27.0	1400	910	0.727/1.15	1.20/1.91	110	86	98	76
3x35+16	min. 6, min. 6	sm/rm	1.2, 1.0	1.8	26.2	1580	920	0.524/1.15	0.868/1.91	130	101	120	93
3x50+25	min. 6, min. 6	sm/rm	1.4, 1.2	1.9	28.5	2180	1200	0.387/0.727	0.641/1.20	155	120	150	116
3x70+35	min. 12, in. 6	sm/rm	1.4, 1.2	2.0	32.5	2910	1505	0.268/0.524	0.443/0.868	190	148	190	148
3x95+50	min. 15, min. 6	sm/rm	1.6, 1.4	2.2	38.0	3950	2000	0.193/0.387	0.32/0.641	225	175	230	179
3x120+70	min. 18*15, min. 12	sm/rm	1.6, 1.4	2.3	40.8	5050	2390	0.153/0.268	0.253/0.443	260	202	270	210
3x150+70	min. 18*15, min. 12	sm/rm	1.8, 1.4	2.4	45.0	6020	2830	0.124/0.268	0.206/0.443	295	229	305	237
3x185+95	min. 30, min. 15	sm/rm	2.0, 1.6	2.6	50.5	7450	3510	0.0991/0.193	0.164/0.320	330	257	350	272
3x240+120	min. 34/30, min. 18/15	sm/rm	2.2, 1.6	2.8	56.0	9650	4360	0.0754/0.153	0.125/0.253	385	299	410	318
3x300+150	min. 34/30, min. 18/15	sm/rm	2.4, 1.8	3.0	63.0	12100	5404	0.0601/0.124	0.100/0.206	425	329	470	364

Table : 11

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
4x1.5	1/1.38	re	0.8	1.8	12.5	230		12.1	18.1	22		16	
4x1.5	7/0.52	rm	0.8	1.8	13.0	235		12.1		22		16	
4x2.5	1/1.78	re	0.8	1.8	14.0	305		7.41	12.1	30		23	
4x2.5	7/0.67	rm	0.8	1.8	14.6	312		7.41		30		23	
4x4	7/0.85	rm	1.0	1.8	16.2	430	290	4.61	7.41	38	30	32	25
4x6	7/1.04	rm	1.0	1.8	17.5	540	345	3.08	4.61	48	39	41	34
4x10	7/1.35	rm	1.0	1.8	20.0	760	480	1.83	3.08	64	49	56	43
4x16	7/1.70	rm	1.0	1.8	23.2	1135	660	1.15	1.91	83	64	75	58
4x25	7/2.14	rm	1.2	1.8	27.6	1600	900	0.727	1.2	110	86	98	76
4x35	min. 6	sm	1.2	1.8	26.4	1800	965	0.524	0.868	130	101	120	93
4x50	min. 6	sm	1.4	1.9	29.0	2460	1310	0.387	0.641	155	120	150	116
4x70	min. 12	sm	1.4	2.1	33.5	3250	1700	0.268	0.443	190	148	190	148
4x95	min. 15	sm	1.6	2.2	38.4	4400	2190	0.193	0.32	225	175	230	179
4x120	min. 18/15	sm	1.6	2.4	41.0	5500	2605	0.153	0.253	260	202	270	210
4x150	min. 18/15	sm	1.8	2.5	45.2	6800	3210	0.124	0.206	295	229	305	237
4x185	min. 30	sm	2.0	2.7	50.5	8350	3890	0.0991	0.164	330	257	350	272
4x240	min. 34/30	sm	2.2	2.9	56.0	10700	4925	0.0754	0.125	385	299	410	318
4x300	min. 34/30	sm	2.4	3.1	64.0	13200	5950	0.0601	0.100	425	329	470	364

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : NYRaY/YRaY
NAYRaY/AYRaY
Standard : VDE-0271 & IEC-60502-1
Voltage : 600/1000 V
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. Round Aluminium Armour 4. Black PVC outer Sheath*

Colour of Sheath: *Black*

Table : 12

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & approx. dia. of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Diameter of round armour wire	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos.	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
1x35	min. 6	rm	1.2	1.25	1.8	17.3	615	290	0.524	0.868	155	120	160	124
1x50	min. 6	rm	1.4	1.25	1.8	19.3	770	370	0.387	0.641	185	144	195	152
1x70	min. 12	rm	1.4	1.25	1.8	20.8	1000	455	0.268	0.443	225	175	245	191
1x95	min. 15	rm	1.6	1.25	1.8	23.3	1265	570	0.193	0.320	270	210	300	233
1x120	min. 18/15	rm	1.6	1.6	1.8	25.5	1575	680	0.153	0.253	310	240	350	272
1x150	min. 18/15	rm	1.8	1.6	1.8	27.5	1915	800	0.124	0.206	350	270	405	314
1x185	min. 30	rm	2.0	1.6	1.8	29.5	2325	950	0.0991	0.164	390	302	460	358
1x240	min. 34/30	rm	2.2	1.6	1.9	32.3	2920	1195	0.0754	0.125	450	349	555	431
1x300	min. 34/30	rm	2.4	2.0	2.0	36.0	3620	1485	0.0601	0.100	515	386	640	448
1x400	min. 53	rm	2.6	2.0	2.1	40.1	4675	1873	0.0470	0.0778	585	439	770	540
1x500	min. 53	rm	2.8	2.0	2.2	43.6	5725	2270	0.0366	0.0605	680	510	900	630
1x630	min. 53	rm	2.8	2.0	2.4	47.2	7025	2760	0.0283	0.0469	800	600	1030	721
1x800	min. 53	rm	2.8	2.5	2.5	54.4	8920	3465	0.0221	0.0367	945	708	1160	812
1x1000	min. 53	rm	3.0	2.5	2.7	59.3	11020	4250	0.0176	0.0291	1095	821	1310	917

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.
2. For Compact Conductors and lugs refer to page no-70-71.

Type : NYFGbY/YFGY
NAYFGbY/AYFGY

Standard : VDE-0271 & IEC-60502-1

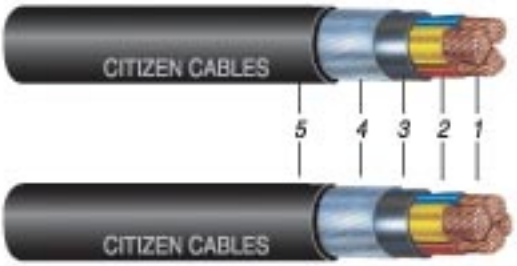
Voltage : 600/1000 V

THREE CORE & FOUR CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. PVC inner sheath 4. Galv. Steel Strip armour 5. PVC outer Sheath*

Colour of Sheath: *Black*



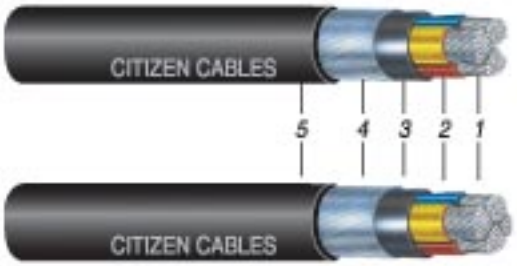


Table : 13

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & approx. dia. of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Dimension of steel strip armour	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25	7/2.14	rm	1.2	4x0.8	1.8	27.0	1800	1281	0.727	1.20	110	86	98	76
3x35	min. 6	sm	1.2	4x0.8	1.8	26.0	1900	1330	0.524	0.868	130	101	120	93
3x50	min. 6	sm	1.4	4x0.8	1.9	28.0	2500	1600	0.387	0.641	155	120	150	116
3x70	min. 12	sm	1.4	4x0.8	2.0	31.0	3115	1963	0.268	0.443	190	148	190	148
3x95	min. 15	sm	1.6	4x0.8	2.2	36.4	4325	2478	0.193	0.320	225	175	230	179
3x120	min. 18/15	sm	1.6	4x0.8	2.3	39.0	5220	2835	0.153	0.253	260	202	270	210
3x150	min. 18/15	sm	1.8	4x0.8	2.4	43.0	6375	3336	0.124	0.206	295	229	305	237
3x185	min. 30	sm	2.0	4x0.8	2.6	47.0	7650	3995	0.0991	0.164	330	257	350	272
3x240	min. 34/30	sm	2.2	4x0.8	2.8	53.0	9650	4864	0.0754	0.125	385	299	410	318
3x300	min. 34/30	sm	2.4	4x0.8	3.0	58.5	12080	5819	0.0601	0.100	425	329	470	364
4x25	min. 6	rm	1.2	4x0.8	1.8	30.0	2100	1500	0.727	1.200	110	86	98	76
4x35	min. 6	sm	1.2	4x0.8	1.8	29.2	2400	1580	0.524	0.868	130	101	120	93
4x50	min. 6	sm	1.4	4x0.8	1.9	32.8	3280	2165	0.387	0.641	155	120	150	116
4x70	min. 12	sm	1.4	4x0.8	2.1	37.5	4285	2614	0.268	0.443	190	148	190	148
4x95	min. 15	sm	1.6	4x0.8	2.2	42.0	5500	3227	0.193	0.320	225	175	230	179
4x120	min. 18/15	sm	1.6	4x0.8	2.3	44.4	6800	3687	0.153	0.253	260	202	270	210
4x150	min. 18/15	sm	1.8	4x0.8	2.4	48.5	8180	4365	0.124	0.206	295	229	305	237
4x185	min. 30	sm	2.0	4x0.8	2.7	54.0	10250	5134	0.0991	0.164	330	257	350	272
4x240	min. 34/30	sm	2.2	4x0.8	2.9	60.8	12900	6292	0.0754	0.125	385	299	410	318
4x300	min. 34/30	sm	2.4	4x0.8	3.1	67.5	15400	7394	0.0601	0.100	425	329	470	364

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : NYFGbY/YFGY
NAYFGbY/AYFGY

Standard : VDE-0271 & IEC-60502-1

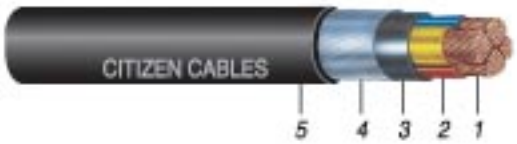
Voltage : 600/1000 V

THREE & HALF CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. PVC inner sheath 4. Galv. Steel Strip armour 5. PVC outer Sheath*

Colour of Sheath: *Black*



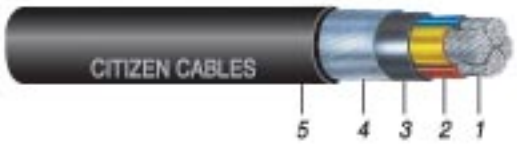


Table : 14

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & approx. dia. of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Dimension of steel strip armour	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25+16	min. 6	rm/rm	1.2	4x0.8	1.8	28.9	2010	1434	0.727/1.15	1.20/1.91	110	86	98	76
	min. 6		1.0	4x0.8										
3x35+16	min. 6	sm/rm	1.2	4x0.8	1.8	28.3	2130	1402	0.524/1.15	0.868/1.91	130	101	120	93
	min. 6		1.0	4x0.8										
3x50+25	min. 6	sm/rm	1.4	4x0.8	1.9	32.2	3060	1804	0.387/0.727	0.641/1.20	155	120	150	116
	min. 6		1.2	4x0.8										
3x70+35	min. 12	sm/rm	1.4	4x0.8	2.0	36.1	3950	2176	0.268/0.524	0.443/0.868	190	148	190	148
	min. 6		1.2	4x0.8										
3x95+50	min. 15	sm/rm	1.6	4x0.8	2.2	41.0	5110	2775	0.193/0.387	0.32/0.641	225	175	230	179
	min. 6		1.4	4x0.8										
3x120+70	min. 18/15	sm/rm	1.6	4x0.8	2.3	44.4	6490	3323	0.153/0.268	0.253/0.443	260	202	270	210
	min. 12		1.4	4x0.8										
3x150+70	min. 18/15	sm/rm	1.8	4x0.8	2.4	48.3	7300	3723	0.124/0.268	0.206/0.443	295	229	305	237
	min. 12		1.4	4x0.8										
3x185+95	min. 30	sm/rm	2.0	4x0.8	2.6	53.5	9050	5019	0.0991/0.193	0.164/0.320	330	257	350	272
	min. 15		1.6	4x0.8										
3x240+120	min. 34/30	sm/rm	2.2	4x0.8	2.8	59.5	11100	5812	0.0754/0.153	0.125/0.253	383	299	410	318
	min. 18/15		1.6	4x0.8										
3x300+150	min. 34/30	sm/rm	2.4	4x0.8	3.0	68.0	14400	7009	0.0601/0.124	0.100/0.206	425	329	470	364
	min. 18/15		1.8	4x0.8										

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : NYRGbY/YRGY
NAYRGbY/AYRGY

Standard : VDE-0271 & IEC-60502-1

Voltage : 600/1000 V

THREE CORE & FOUR CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. PVC inner sheath 4. Round Galv. Steel wire armour 5. PVC outer Sheath*

Colour of Sheath: *Black*

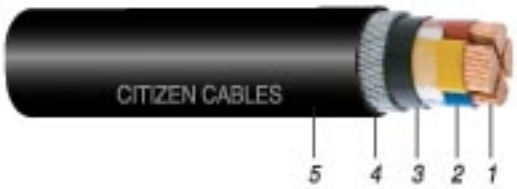


Table : 15

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & approx. dia. of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Diameter of round armour wire	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25	min. 6	rm	1.2	1.6	1.8	28.5	1755	1276	0.727	1.20	110	86	98	76
3x35	min. 6	sm	1.2	1.6	1.9	27.8	2080	1415	0.524	0.868	130	101	120	93
3x50	min. 6	sm	1.4	1.6	2.0	30.7	2650	1698	0.387	0.641	155	120	150	116
3x70	min. 12	sm	1.4	2.0	2.1	34.6	3700	2362	0.268	0.443	190	148	190	148
3x95	min. 15	sm	1.6	2.0	2.3	39.0	4750	2943	0.193	0.320	225	175	230	179
3x120	min. 18/15	sm	1.6	2.0	2.4	42.1	5660	3382	0.153	0.253	260	202	270	210
3x150	min. 18/15	sm	1.8	2.5	2.5	47.3	7265	4413	0.124	0.206	295	229	305	237
3x185	min. 30	sm	2.0	2.5	2.7	50.5	8660	5149	0.0991	0.164	330	257	350	272
3x240	min. 34/30	sm	2.2	2.5	2.9	57.0	10819	6245	0.0754	0.125	385	299	410	318
3x300	min. 34/30	sm	2.4	2.5	3.1	61.0	12993	7204	0.0601	0.100	425	329	470	364
4x25	min. 6	rm	1.2	1.6	1.8	30.0	2135	1497	0.727	1.200	110	86	98	76
4x35	min. 6	sm	1.2	1.6	1.9	30.1	2620	1733	0.524	0.868	130	101	120	93
4x50	min. 6	sm	1.4	2.0	2.0	34.5	3525	2257	0.387	0.641	155	120	150	116
4x70	min. 12	sm	1.4	2.0	2.2	39.5	4675	2892	0.268	0.443	190	148	190	148
4x95	min. 15	sm	1.6	2.5	2.3	45.2	6450	4044	0.193	0.320	225	175	230	179
4x120	min. 18/15	sm	1.6	2.5	2.5	48.6	7640	4601	0.153	0.253	260	202	270	210
4x150	min. 18/15	sm	1.8	2.5	2.6	52.0	9150	5348	0.124	0.206	295	229	305	237
4x185	min. 30	sm	2.0	2.5	2.8	58.3	11050	6369	0.0991	0.164	330	257	350	272
4x240	min. 34/30	sm	2.2	2.5	3.0	63.0	13850	7751	0.0754	0.125	385	299	410	318
4x300	min. 34/30	sm	2.4	2.5	3.2	70.1	17300	9581	0.0601	0.100	425	329	470	364

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : NYRGbY/YRGY
NAYRGbY/AYRGY

Standard : VDE-0271 & IEC-60202-1

Voltage : 600/1000 V

THREE & HALF CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. PVC Insulation 3. PVC inner sheath 4. Round Galv. Steel Wire armour 5. PVC outer Sheath*

Colour of Sheath: *Black*

Table : 16

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & approx. dia. of wire Cu/Al	Shape of Conductor	Diameter of round armour wire	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25+16	min. 6	rm/rm	1.6	1.2	1.8	30.8	2010	1590	0.727/1.15	1.20/1.91	110	86	98	76
	min. 6			1.0										
3x35+16	min. 6	sm/rm	1.6	1.2	1.9	30.1	2465	1698	0.524/1.15	0.868/1.91	130	101	120	93
	min. 6			1.0										
3x50+25	min. 6	sm/rm	2.0	1.4	2.0	33.5	3250	2140	0.375/0.727	0.641/1.20	155	120	150	116
	min. 6			1.2										
3x70+35	min. 12	sm/rm	2.0	1.4	2.2	38.7	4310	2752	0.268/0.524	0.443/0.868	190	148	190	148
	min. 6			1.2										
3x95+50	min. 15	sm/rm	2.0	1.6	2.3	43.3	5601	3480	0.193/0.387	0.32/0.641	225	175	230	179
	min. 6			1.4										
3x120+70	min. 18/15	sm/rm	2.5	1.6	2.5	48.0	7159	4435	0.153/0.268	0.253/0.443	260	202	270	210
	min. 12			1.4										
3x150+70	min. 18/15	sm/rm	2.5	1.8	2.6	51.2	8347	5049	0.124/0.268	0.206/0.443	295	229	305	237
	min. 12			1.4										
3x185+95	min. 30	sm/rm	2.5	2.0	2.8	56.1	10000	5888	0.0991/0.193	0.164/0.320	330	257	350	272
	min. 15			1.6										
3x240+120	min. 34/30	sm/rm	2.5	2.2	3.0	62.3	12383	7049	0.0754/0.153	0.125/0.253	385	299	410	318
	min. 18/15			1.6										
3x300+150	min. 34/30	sm/rm	2.5	2.4	3.1	68.2	15100	8380	0.0601/0.124	0.100/0.206	425	329	470	364
	min. 18/15			1.8										

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : NYCY/YCY

Standard : VDE-0271 & IEC-60502-1

Voltage : 600/1000 V

THREE & HALF CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper Conductor 2. PVC Insulation 3. PVC inner sheath 4. Concentric copper conductor 5. PVC outer Sheath*

Colour of Sheath: *Black*

Table : 17

PHYSICAL DATA								ELECTRICAL DATA		
Cross Sectional Area	No. of wires Cu	Wires Shaped	No. & dia. of concentric conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. cable diameter	Approx. weight of cable	Max. DC resistance of conductor at 20°C	Current rating at 30°C in ground	Current rating at 35°C in air
mm²	nos./mm	-	no./mm	mm	mm	mm	kg/km	ohm/km	amps	amps
3x25+16	min. 6	rm	80/0.50	1.2	1.8	24.3	1302	0.727/1.15	110	98
3x35+16	min. 6	sm	80/0.50	1.2	1.8	26.2	1623	0.524/1.15	130	120
3x50+25	min. 6	sm	50/0.80	1.4	1.9	30.4	2266	0.387/0.727	155	150
3x70+35	min. 12	sm	70/0.80	1.4	2.1	33.7	3011	0.268/0.524	190	190
3x95+50	min. 15	sm	59/1.05	1.6	2.2	38.4	4005	0.193/0.387	225	230
3x120+70	min. 18	sm	71/1.13	1.6	2.4	42.1	5031	0.153/0.268	260	270
3x150+70	min. 18	sm	71/1.13	1.8	2.5	45.3	6013	0.124/0.268	295	305
3x185+95	min. 30	sm	67/1.35	2.0	2.7	50.1	7458	0.0991/0.193	330	350
3x240+120	min. 34	sm	67/1.53	2.2	2.9	55.8	9497	0.0754/0.153	385	410
3x300+150	min. 34	sm	80/1.56	2.4	3.2	61.3	11730	0.0601/0.124	425	470

Type : SERVICE DROP CABLES

DUPLEX / QUADUPLEX

Voltage : 400 V

Applicaton: Suitable for outdoor as a service drop cable

Construction: *1. Annealed Copper / Aluminium Conductor 2. PVC Insulation 3. Two/Four cores laid up.*

Table : 18

A. DUPLEX CABLES

PHYSICAL DATA						ELECTRICAL DATA			
Cross Sectional Area	No. & approx. dia. of wire Cu/Al	Nominal thickness of insulation	Approx. Cable diameter	Approx. weight of cable		Max. DC resistance at 20°C		Current rating at 35°C	
				Cu	Al	Cu	Al	Cu	Al
mm²	nos./mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps
2.5 re/2.5 re	1.78/1.78	1.6	10.0	93		7.41/7.41		27	
4 rm/4 re	7x0.85/2.26	1.6	11.6	132		4.61/4.61	7.41/7.41	35	
6 rm/6 re	7x1.05/2.77	1.6	12.8	178		3.08/3.08	4.61/4.61	45	
6 rm/6 rm	7x1.05/7x1.05	1.6	12.9	180	105	3.08/3.08	4.61/4.61	45	37
10 rm/10 rm	7x1.35/7x1.35	1.6	14.6	262	136	1.83/1.83	3.08/3.08	62	47
16 rm/16 rm	7x1.71/7x1.71	1.6	16.6	382	180	1.15/1.15	1.91/1.91	84	65
25 rm/25 rm	7x2.14/7x2.14	1.6	19.2	563	244	0.727/0.727	1.20/1.20	110	85

B. QUADUPLEX CABLES

mm²	nos./mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps
3X4 rm/4 re	7x0.85/2.26	1.6	14.0	264		4.61/4.61	7.41/7.41	32	
3x6 rm/6 re	7x1.05/2.77	1.6	15.4	352		3.08/3.08	4.61/4.61	41	
3x6 rm/6 rm	7x1.05/7x1.05	1.6	15.5	356	205	3.08/3.08	4.61/4.61	41	34
3x10 rm/10 rm	7x1.35/7x1.35	1.6	17.6	524	270	1.83/1.83	3.08/3.08	56	43
3x16 rm/16 rm	7x1.71/7x1.71	1.6	20.0	765	360	1.15/1.15	1.91/1.91	75	58
3x25 rm/25 rm	7x2.14/7x2.14	1.6	23.1	1127	488	0.727/0.727	1.20/1.20	98	76

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : Telephone Cables

Standard : VDE-0815

Voltage : 200 V

Applicaton: Suitable for telecommunication and signal circuits. They are suitable for expose or concealed conduit installation permissible voltage 200 V.

Construction: *1. Annealed Copper Conductor 2. PE Insulation & multi pair laid up 3. PT/PE Tapping 4. PVC outer sheath.*

Colour of Sheath: *Black*

Table : 19

PE Insulated PVC Sheathed Telecommunication Cables						
Number of core	Nominal Cross Sectional Area	Number and size of Wires	Nominal thickness of insulation	Nominal thickness of sheath	Approximate overall diameter	Approximate weight
	mm^2	n/mm	mm	mm	mm	kg/km
1 Pair (2 core)	0.125	1/0.4	0.2	0.8	4.2	20.2
2 Pair (4 core)	0.125	1/0.4	0.2	0.8	4.3	24.4
3 Pair (6 core)	0.125	1/0.4	0.2	1.0	5.0	35.1
4 Pair (8 core)	0.125	1/0.4	0.2	1.2	6.6	54.3
5 Pair (10 core)	0.125	1/0.4	0.2	1.2	7.1	62.1
6 Pair (12 core)	0.125	1/0.4	0.2	1.4	7.7	73.3
7 Pair (14 core)	0.125	1/0.4	0.2	1.4	8.12	81
8 Pair (16 core)	0.125	1/0.4	0.2	1.4	8.25	82.5
10 Pair (20 core)	0.125	1/0.4	0.2	1.4	9.65	108
15 Pair (30 core)	0.125	1/0.4	0.2	1.4	12.7	147
20 Pair (40 core)	0.125	1/0.4	0.2	1.6	13.4	185
30 Pair (60 core)	0.125	1/0.4	0.2	1.6	15.00	303
1 Pair (2 core)	0.282	1/0.6	0.2	0.8	4.20	23.5
2 Pair (4 core)	0.282	1/0.6	0.2	0.8	4.32	30.0
3 Paid (6 core)	0.282	1/0.6	0.2	1.0	5.08	43.5
4 Pair (8 core)	0.282	1/0.6	0.2	1.2	6.60	65.5
5 Pair (10 core)	0.282	1/0.6	0.2	1.2	7.20	76.0
6 Pair (12 core)	0.282	1/0.6	0.2	1.4	7.80	90.0
7 Pair (14 core)	0.282	1/0.6	0.2	1.4	8.12	103.5
8 Pair (16 core)	0.282	1/0.6	0.2	1.4	8.25	107.0
10 Pair (20 core)	0.282	1/0.6	0.2	1.4	9.65	142.0
15 Pair (30 core)	0.282	1/0.6	0.2	1.4	12.82	275.0
20 Pair (40 core)	0.282	1/0.6	0.2	1.6	14.23	350.0
30 Pair (60 core)	0.282	1/0.6	0.2	1.6	16.77	413.0
50 Pair (100 core)	0.282	1/0.6	0.2	1.6	20.20	535.0
100 Pair (200 core)	0.282	1/0.6	0.2	1.6	27.00	942.0

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Type : Jumper Wire, Drop Wire & Coaxial Cable
Standard : ITD S/WJ-1D1C 1994
Voltage : 200 V
MULTICORE

Applicaton: Suitable for telecommunication and signal circuits. They are suitable for expose or concealed conduit installation permissible voltage 200 V.

Construction: *1. Annealed Copper Conductor 2. PE Insulation*

Table : 20

A. Jumper Wire

PHYSICAL DATA					
Number of core	Nominal Cross Sectional Area	Number and size of Wires	Nominal thickness of insulation	Approximate overall diameter	Approximate weight
	mm²	no./mm	mm	mm	kg/km
2 core (1 pair)	0.123	9/0.132	0.2	2.3	6
4 core (2 pair)	0.123	9/0.132	0.2	2.8	12
6 core (3 pair)	0.123	9/0.132	0.2	3.5	18
8 core (4 pair)	0.123	9/0.132	0.2	2.65	24
10 core (5 pair)	0.123	9/0.132	0.2	4.00	30

B. PVC Insulated Drop Wire

PHYSICAL DATA				
Number of core	Number and size of Wires	Thickness of insulation	Approx. overall diameter	Approx. weight
	no./mm	mm	mm	kg/km
2 core (1 pair)	1/0.60	0.787	4.11x2.31	19.0
2core (1 pair)	1/0.90	1.05	6.3x3.0	31.5

C. PE Insulated Drop Wire

PHYSICAL DATA				
Number of core	Number and size of Wires	Thickness of insulation	Approx. overall diameter	Approx. weight
	no./mm	mm	mm	kg/km
2 core (1 pair)	1/0.60	0.787	4.11x2.31	12
2core (1 pair)	1/0.90	1.05	6.3x3.0	25

D. PE Insulated PVC Sheathed co-Axial Cables

Applicaton: Plain annealed copper conductor, polythylene insulated with screen braided and PVC sheathed for use as aerial downleads in local and fringe reception areas at both Very High Frequency and Ultra High Frequency.

Code No.	Nominal Cross Sectional Area of Conductor	No. and Nominal diameter of wire	Diameter of wire with dielectric insulation	Screen braid	Nominal thickness of sheath	Approx. overall diameter	Impedence	Approximate weight
	mm²	no./mm	mm		mm	mm	ohm	kg/km
3/C	0.2	1/0.5	3.00	PAC	0.9	5.40	75	33
4/C	0.42	1/0.73	3.81	PAC	1.0	6.35	75	50
5/C	0.64	1/0.90	4.20	PAC	1.2	7.20	75	60
RG-6	0.78	1/1.00	4.30	PAC	1.2	7.50	75	69
6/C	1.23	1/1.25	5.46	PAC	1.2	8.20	75	80
RG-11	2.09	1/1.63	6.65	PAC	1.2	9.80	75	114

Type : NYYF
Standard : VDE-0271 & IEC-60502-1
Vlotage : 600/1000 V
SINGLE CORE & TWO CORE

Applicaton: Suitable for temporary installations for power connection, decorative illumination, temporary site illumination.

Construction: *1. Annealed Flexible Copper Conductor 2. PVC Insulation 3. PVC inner sheath 4. Black PVC outer Sheath*

Colour of Sheath: *Black*

Table : 21

A. SINGLE CORE

PHYSICAL DATA						ELECTRICAL DATA	
Nominal Cross Sectional Area of Conductor	No. & Maximum Diameter of wire	Nominal thickness of Insulation	Nominal thickness of Sheath	Approx. overall Diameter	Approx. weight of cable	Max. DC resistance of conductor at at 20° C	Current rating at 35°C
mm²	nos./mm	mm	mm	mm	kg/km	ohms/km	Amps
1x4 rm	53/0.31	1.0	1.8	8.5	105	4.95	41
1x6 rm	80/0.31	1.0	1.8	9.1	135	3.3	52
1x10 rm	76/0.41	1.0	1.8	10.2	185	1.91	72
1x16 rm	122/0.41	1.0	1.8	11.8	260	1.21	98
1x25 rm	190/0.41	1.2	1.8	13.6	370	0.78	131
1x35 rm	266/0.41	1.2	1.8	15.2	480	0.554	167
1x50 rm	379/0.41	1.4	1.8	17.6	668	0.386	204
1x70 rm	343/0.51	1.4	1.8	19.2	880	0.272	256
1x95 rm	465/0.51	1.6	1.8	21.8	1160	0.206	314
1x120 rm	588/0.51	1.6	1.8	24	1420	0.161	366
1x150 rm	735/0.51	1.8	1.8	26.5	1772	0.129	423

B. TWO CORE

PHYSICAL DATA						ELECTRICAL DATA	
Nominal Cross Sectional Area of Conductor	No. & Maximum Diameter of wire	Nominal thickness of Insulation	Nominal thickness of Sheath	Approx. overall Diameter	Approx. weight of cable	Max. DC resistance of conductor at at 20° C	Current rating at 35°C
mm²	nos./mm	mm	mm	mm	kg/km	ohms/km	Amps
2x4 rm	53/0.31	1.0	1.8	13.8	290	4.95	37
2x6 rm	80/0.31	1.0	1.8	15.2	375	3.30	48
2x10 rm	76/0.41	1.0	1.8	16.9	502	1.91	66
2x16 rm	122/0.41	1.0	1.8	19.0	700	1.21	90
2x25 rm	190/0.41	1.2	1.8	22.4	1060	0.78	121
2x35 rm	266/0.41	1.2	2.0	24.7	1360	0.554	154

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : NYYF

Standard : VDE-0271 & IEC-60502-1

Vlotage : 600/1000 V

THREE CORE & FOUR CORE

Applicaton: Suitable for temporary installations for power connection, decorative illumination, temporary site illumination.

Construction: *1. Annealed Flexible Copper Conductor 2. PVC Insulation 3. PVC inner sheath 4. Black PVC outer Sheath*

Colour of Sheath: *Black*

Table : 22

A. THREE CORE

PHYSICAL DATA						ELECTRICAL DATA	
Nominal Cross Sectional Area of Conductor	No. & Maximum Diameter of wire	Nominal thickness of Insulation	Nominal thickness of Sheath	Approx. overall Diameter	Approx. weight of cable	Max. DC resistance of conductor at at 20°C	Current rating at 35°C
mm²	nos./mm	mm	mm	mm	kg/km	ohms/km	Amps
3X4 rm	53/0.31	1.0	1.8	14.6	350	4.95	33
3x6 rm	80/0.31	1.0	1.8	16	450	3.30	53
3x10 rm	76/0.41	1.0	1.8	18	630	1.91	58
3x16 rm	122/0.41	1.0	1.8	20.4	940	1.21	78
3x25 rm	190/0.41	1.2	1.8	25.4	1320	0.78	102
3x35 rm	266/0.41	1.2	2.0	28.5	1760	0.554	125

B. FOUR CORE

PHYSICAL DATA						ELECTRICAL DATA	
Nominal Cross Sectional Area of Conductor	No. & Maximum Diameter of wire	Nominal thickness of Insulation	Nominal thickness of Sheath	Approx. overall Diameter	Approx. weight of cable	Max. DC resistance of conductor at at 20°C	Current rating at 35°C
mm²	nos./mm	mm	mm	mm	kg/km	ohms/km	Amps
4x4 rm	53/0.31	1.0	1.8	16.6	424	4.95	33
4x6 rm	80/0.31	1.0	1.8	18.4	530	3.30	43
4x10 rm	76/0.41	1.0	1.8	20.7	750	1.91	58
4x16 rm	122/0.41	1.0	1.8	25.0	1145	1.21	78
4x25 rm	190/0.41	1.2	1.8	29.5	1690	0.78	102
4x35 rm	266/0.41	1.2	2.0	32.8	2150	0.554	125

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no- 59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : FLEXIBLE CABLES
Standard : BDS-899 & BS-6500
Voltage : 300/500 V
SINGLE CORE & TWO CORE

Applicaton: Suitable for dry places where mechanical stresses do not exist, at the connections of mobile equipments.

Construction: *1. Annealed Flexible Copper Conductor 2. PVC Insulation 3. Grey PVC outer Sheath*

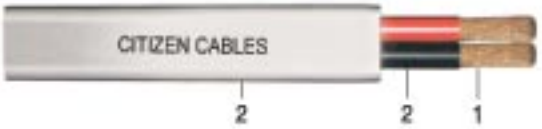


Table : 23

A. SINGLE CORE

PHYSICAL DATA						ELECTRICAL DATA		
Cross Sectional Area of Conductor	No. and size of wires	No. and size of wires	Nominal thickness of Insulation	overall Diameter of each core	Approx. weight	Max. DC resistance of conductor at at 20°C	Current rating at 35°C	
							In conduit	In air
mm²	nos./mm	nos./inch	mm	mm	kg/km	ohms/km	Amps	Amps
0.40	14/0.193	14/.0076	0.6	2.26	8.0	49.25	2	3
0.65	23/0.193	23/.0076	0.6	2.57	12.4	30.31	5	6
1.20	40/0.193	40/.0076	0.6	2.84	16.9	16.42	11	13
2.00	70/0.193	70/.0076	0.6	3.43	23.6	9.85	16	18

B. TWO CORE (T/T)

PHYSICAL DATA						ELECTRICAL DATA		
Cross Sectional Area of Conductor	No. and size of wires	No. and size of wires	Nominal thickness of Insulation	overall Diameter of each core	Approx. weight	Max. DC resistance of conductor at at 20°C	Current rating at 35°C	
							In conduit	In air
mm²	nos./mm	nos./inch	mm	mm	kg/km	ohms/km	Amps	Amps
2x0.40	14/0.193	14/.0076	0.6	2.26	16.0	49.25	2	3
2x0.65	23/0.193	23/.0076	0.6	2.57	24.8	30.31	5	6
2x1.20	40/0.193	40/.0076	0.6	2.84	33.9	16.42	11	13
2x2.00	70/0.193	70/.0076	0.6	3.43	47.2	9.85	16	18

C. TWIN CORE (F/T)

PHYSICAL DATA						ELECTRICAL DATA		
Cross Sectional Area of Conductor	No. and size of wires	Nominal thickness of Insulation	Nominal thickness of Sheath	overall Diameter of each core	Approx. weight	Max. DC resistance of conductor at at 20°C	Current rating at 35°C	
							In conduit	In air
mm²	nos./mm	mm	mm	mm	kg/km	ohms/km	Amps	Amps
2X0.40	14/0.193	0.6	0.8	3.9x6.1	36.0	49.25	3	4
2X0.65	23/0.193	0.6	0.8	4.0x6.4	45.0	30.31	6	8

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-58. For current ratings at deviated conditions apply correction factors as given on page no-58.

Type : FLEXIBLE CABLES

Standard : BDS-899 & BS-6500

Voltage : 300/500 V

TWO CORE & THREE CORE

Applicaton: Suitable for dry places where mechanical stresses do not exist, at the connections of mobile equipments.

Construction: *1. Annealed Flexible Copper Conductor 2. PVC Insulation 3. Grey PVC outer Sheath*

Colour of Sheath: *Grey*

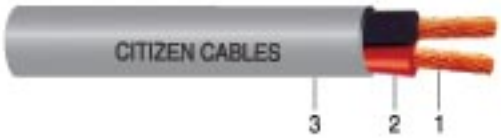


Table : 24

A. TWIN CORE

PHYSICAL & ELECTRICAL DATA								
Nominal Cross Sectional Area of Conductor	No. and Nominal Diameter of Wires	Nominal thickness of Insulation	Nominal thickness of Sheath	Approx. Overall Diameter	Max. DC resistance of conductor at at 20°C	Approx. Weight of Cable	Current rating at 35°C	
							In conduit	In air
nos. x mm²	nos./mm	mm	mm	mm	ohm/km	kg/km	Amps	Amps
2x0.4	14/0.19	0.6	0.8	6.1	47.33	49	3	4
2x0.5	16/0.20	0.6	0.8	6.3	39.00	54	3	4
2x0.65	23/0.19	0.6	0.8	6.5	28.79	60	6	7
2x0.75	24/0.20	0.6	0.8	6.8	26.00	64	7	8
2x1.0	32/0.20	0.6	0.8	7.2	19.50	74	10	11
2x1.2	40/0.19	0.6	0.8	7.4	16.56	78	13	15
2x1.5	30/0.25	0.7	0.8	8.0	13.30	99	15	17
2x2.0	70/0.19	0.7	1.0	9.1	9.46	127	18	20
2x2.5	50/0.25	0.8	1.0	9.8	7.98	151	20	22
2x3.0	110/0.19	0.8	1.1	10.6	6.01	174	24	26
2x4.0	56/0.30	0.8	1.1	11.0	4.95	200	25	27

B. THREE CORE

PHYSICAL & ELECTRICAL DATA								
Nominal Cross Sectional Area of Conductor	No. and Nominal Diameter of Wires	Nominal thickness of Insulation	Nominal thickness of Sheath	Approx. Overall Diameter	Max. DC resistance of conductor at at 20°C	Approx. Weight of Cable	Current rating at 35°C	
							In conduit	In air
nos. x mm²	nos./mm	mm	mm	mm	ohm/km	kg/km	Amps	Amps
3x0.4	14/0.19	0.6	0.8	6.4	47.33	58	2	3
3x0.5	16/0.20	0.6	0.8	6.7	39.00	64	3	4
3x0.65	23/0.19	0.6	0.8	6.9	28.79	71	6	7
3x0.75	24/0.20	0.6	0.8	7.2	26.00	76	7	8
3x1.0	32/0.20	0.6	0.8	7.5	19.50	88	10	11
3x1.2	40/0.19	0.6	0.9	8.0	16.56	99	13	15
3x1.5	30/0.25	0.7	0.9	8.8	13.30	124	15	17
3x2.0	70/0.19	0.7	1.1	10.0	9.46	160	18	20
3x2.5	50/0.25	0.8	1.1	10.4	7.98	183	20	22
3x3.0	110/0.19	0.8	1.2	11.5	6.01	222	24	26
3x4.0	56/0.30	0.8	1.2	12.0	4.95	254	25	27

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-58. For current ratings at deviated conditions apply correction factors as given on page no-58.

Type : FLEXIBLE CABLES

Standard : BDS-899 & BS-6500

Voltage : 300/500 V

FOUR CORE

Applicaton: Suitable for dry places where mechanical stresses do not exist, at the connections of mobile equipments.

Construction: *1. Annealed Flexible Copper Conductor 2. PVC Insulation 3. Grey PVC outer Sheath*

Colour of Sheath: *Grey*

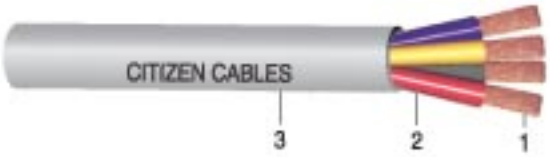


Table : 25

A. FOUR CORE

PHYSICAL & ELECTRICAL DATA								
Nominal Cross Sectional Area of Conductor	No. and Nominal Diameter of Wires	Nominal thickness of Insulation	Nominal thickness of Sheath	Approx. Overall Diameter	Max. DC resistance of conductor at at 20°C	Approx. Weight of Cable	Current rating at 35°	
							In conduit	In air
nos. x mm²	nos./mm	mm	mm	mm	ohm/km	kg/km	Amps	Amps
4x0.4	14/0.19	0.6	0.8	7.0	47.33	68	2	3
4x0.5	16/0.20	0.6	0.8	7.3	39.00	77	3	4
4x0.65	23/0.19	0.6	0.8	7.6	28.79	85	6	7
4x0.75	24/0.20	0.6	0.8	7.8	26.00	93	7	8
4x1.0	32/0.20	0.6	0.9	8.4	19.50	113	10	11
4x1.2	40/0.19	0.6	1.0	8.8	16.56	124	13	15
4x1.5	30/0.25	0.7	1.0	9.8	13.30	158	15	17
4x2.0	70/0.19	0.7	1.1	10.8	9.46	194	18	20
4x2.5	50/0.25	0.8	1.1	11.6	7.98	231	20	22
4x3.0	110/0.19	0.8	1.2	12.5	6.01	274	24	26
4x4.0	56/0.30	0.8	1.2	13.0	4.95	315	25	27

Type : Welding Cables

Voltage : 200 V

SINGLE CORE

Applicaton: Suitable for Welding purpose

Construction: *1. Annealed Flexible Copper Conductor 2. PVC Tapping 3. Black PVC outer sheath*

Colour of Sheath: *Black*

Table : 26

PHYSICAL DATA					ELECTRICAL DATA	
Cross Section	No. and maximum diameter of wire	Nominal thickness of sheath	Approx. outer diameter	Approx. weight of cable	Maximum DC resistance at 20°C	Current rating at maximum duty cycle of 60°%
mm²	no./mm	mm	mm	kg/km	ohm/km	ampere
1x25 rm	190/0.41	2.0	12.30	326.0	0.780	169
1x35 rm	266/0.41	2.0	13.40	430.0	0.554	215
1x50 rm	379/0.41	2.0	15.30	575.0	0.368	264
1x70 rm	343/0.51	2.2	18.00	779.0	0.272	330
1x95 rm	465/0.51	2.2	19.70	935.0	0.206	405
1x120 rm	588/0.51	2.2	23.20	1297.0	0.161	473

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-58. For current ratings at deviated conditions apply correction factors as given on page no-58.

Type : NYY-1

Standard : VDE-0271 & IEC-60502-1
Voltage : 600/1000 V
MULTI CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.
Construction: *1. Annealed Copper Conductor 2. PVC Insulation & multi cores laid 3. PVC /PE Tapping 4. PVC outer sheath*
Core Identification: Numbering
Colour of Sheath: *Black*

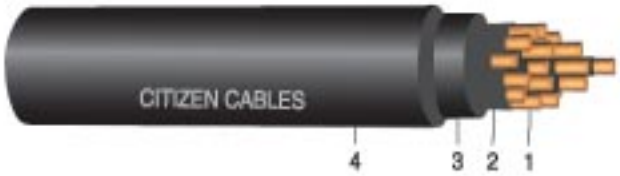


Table : 27

PHYSICAL & ELECTRICAL DATA								
Cross Sectional Area	No. & approx. dia. of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable diameter	Approx. weight of cable	Current rating at 30°C in ground	Current rating at 35°C in air
core x mm²	nos./mm		mm	mm	mm	kg/km	Amps	Amps
5x1.5	1/1.38	re	0.8	1.8	12.6	206	18	13
7x1.5	1/1.38	re	0.8	1.8	13.5	258	16	12
10x1.5	1/1.38	re	0.8	1.8	16.4	351	13	10
12x1.5	1/1.38	re	0.8	1.8	16.9	399	12	9
16x1.5	1/1.38	re	0.8	1.8	18.5	507	11	8
21x1.5	1/1.38	re	0.8	1.8	20.3	635	9	7
24x1.5	1/1.38	re	0.8	2.0	22.4	712	9	7
30x1.5	1/1.38	re	0.8	2.0	23.6	851	8	6
5x2.5	1/1.78	re	0.8	1.8	14.2	289	24	19
7x2.5	1/1.78	re	0.8	1.8	15.3	360	21	17
10x2.5	1/1.78	re	0.8	1.8	18.8	490	18	14
12x2.5	1/1.78	re	0.8	1.8	19.4	567	16	13
16x2.5	1/1.78	re	0.8	1.8	21.3	727	14	11
21x2.5	1/1.78	re	0.8	2.0	23.5	920	13	10
24x2.5	1/1.78	re	0.8	2.0	26.4	1059	12	9
30x2.5	1/1.78	re	0.8	2.0	27.8	1274	10	8
5x4	7/0.85	rm	1.0	1.8	16.8	402	31	25
7x4	7/0.85	rm	1.0	1.8	18.2	544	27	22
10x4	7/0.85	rm	1.0	1.8	22.7	708	23	19
12x4	7/0.85	rm	1.0	1.8	22.4	837	21	17

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Halogen Free Cables

As per customer requirement the following special types of cables are also manufactured as per standard specification.

- LSHF/LSOH/LSZH Cables (Low Smoke Halogen Free Cables)
- Lead Free Cables

Sl. No.	Particulars	Advantages
01	LSHF Cables	• Halogen-Free, no development of corrosive gases • The danger of toxic gases caused by fire is far inferior • In case of burning the cables emit low smoke • Remarkable longer electrical functionality under flame
02	Lead Free Cables	• Better corrosion resistant • Environment friendly due to absence of lead

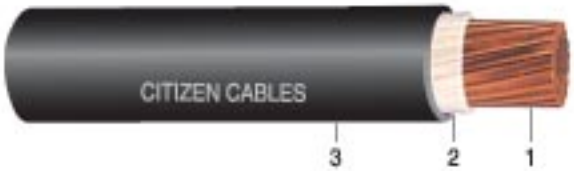
Note : 1. Current ratings are valid for cables laid under defined conditions at page no- 59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : 2xY/A2xY
Standard : IEC 60502-1
Voltage : 600/1000 V
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. XLPE Insulation 3. Black PVC outer Sheath*

Colour of Sheath: *Black*



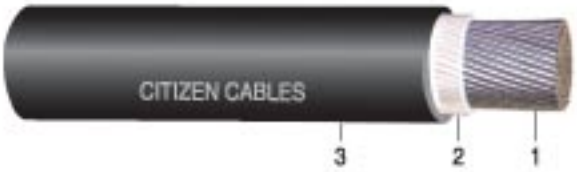


Table : 28

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable Diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in Ground		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
1x1.5	1/1.38	re	0.7	1.4	6.1	50		12.1	18.1	36		30	
1x1.5	7/0.52	rm	0.7	1.4	6.2	52		12.1	18.1	36		30	
1x2.5	1/1.78	re	0.7	1.4	6.5	63		7.41	12.1	47		39	
1x2.5	7/0.68	rm	0.7	1.4	6.6	65		7.41	12.1	47		39	
1x4	7/0.85	rm	0.7	1.4	7.3	95	55	4.61	7.41	59	47	50	39
1x6	7/1.04	rm	0.7	1.4	7.9	107	66	3.08	4.61	78	64	69	56
1x10	7/1.35	rm	0.7	1.4	8.8	155	85	1.83	3.08	100	77	94	72
1x16	7/1.70	rm	0.7	1.4	9.9	227	112	1.15	1.91	130	101	125	97
1x25	7/2.14	rm	0.9	1.4	11.0	324	160	0.727	1.2	155	120	160	125
1x35	min. 6	rm	0.9	1.4	12.1	425	200	0.524	0.868	185	144	195	150
1x50	min. 6	rm	1.0	1.4	13.6	584	258	0.387	0.641	225	175	245	190
1x70	min. 12	rm	1.1	1.4	15.4	788	335	0.268	0.443	270	210	300	233
1x95	min. 15	rm	1.1	1.5	17.1	1041	430	0.193	0.32	310	240	350	272
1x120	min. 18/15	rm	1.2	1.5	18.8	1292	531	0.153	0.253	350	272	405	315
1x150	min. 18/15	rm	1.4	1.6	21.0	1611	640	0.124	0.206	390	302	460	357
1x185	min. 30	rm	1.6	1.6	23.0	1976	775	0.0991	0.164	450	350	555	430
1x240	min. 34/30	rm	1.7	1.7	25.6	2528	965	0.0754	0.125	515	400	640	498
1x300	min. 34/30	rm	1.8	1.8	28.3	3136	1210	0.0601	0.1	585	463	770	537
1x400	min. 53	rm	2.0	1.9	32.0	4130	1525	0.0470	0.0778	680	509	900	626
1x500	min. 53	rm	2.2	2.0	35.4	5134	1890	0.0366	0.0605	800	592	1030	731
1x630	min. 53	rm	2.4	2.2	39.5	6415	2420	0.0283	0.0469	945	696	1160	837
1x800	min. 53	rm	2.6	2.3	45.0	8116	3000	0.0221	0.0367	1095	821	1310	942
1x1000	min. 53	rm	2.8	2.4	50.0	10096	3650	0.0176	0.0291	1270	952	1480	1064

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.
2. For Compact Conductors and lugs refer to page no-70-71.

Type : 2xY/A2xY
Standard : IEC 60502-1
Voltage : 600/1000 V
TWO CORE & THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. XLPE Insulation 3. PVC Inner sheath 4. Black PVC outer Sheath*

Colour of Sheath: *Black*

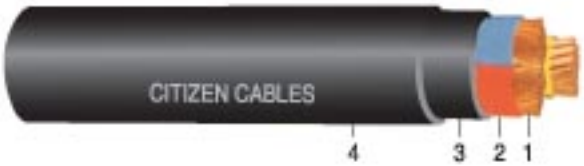


Table : 29

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable Diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C In Ground		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
2x1.5	1/1.38	re	0.7	1.8	11.2	155	-	12.1	18.1	34	-	27	-
2x1.5	7/0.52	rm	0.7	1.8	11.6	162	-	12.1	18.1	34	-	27	-
2x2.5	1/1.78	re	0.7	1.8	12.0	185	-	7.41	12.1	44	-	35	-
2x2.5	7/0.68	rm	0.7	1.8	12.5	195	-	7.41	12.1	44	-	35	-
2x4	7/0.85	rm	0.7	1.8	13.6	276	187	4.61	7.41	55	34	45	31
2x6	7/1.04	rm	0.7	1.8	14.8	349	218	3.08	4.61	74	40	62	40
2x10	7/1.35	rm	0.7	1.8	16.6	478	271	1.83	3.08	97	55	84	53
2x16	7/1.70	rm	0.7	1.8	18.1	654	341	1.15	1.91	125	73	110	70
2x25	7/2.14	rm	0.9	1.8	21.5	996	457	0.727	1.20	150	94	140	96
2x35	19/1.53	rm	0.9	1.8	23.7	1274	576	0.524	0.868	180	114	190	117
3x1.5	1/1.38	re	0.7	1.8	11.8	182	-	12.1	18.1	30	-	23	-
3x1.5	7/0.52	rm	0.7	1.8	12.2	190	-	12.1	18.1	30	-	23	-
3x2.5	1/1.78	re	0.7	1.8	12.7	235	-	7.41	12.1	38	-	32	-
3x2.5	7/0.68	rm	0.7	1.8	13.2	246	-	7.41	12.1	38	-	32	-
3x4	7/0.85	rm	0.7	1.8	14.5	321	213	4.61	7.41	48	34	41	31
3x6	7/1.04	rm	0.7	1.8	15.6	421	252	3.08	4.61	64	40	56	40
3x10	7/1.35	rm	0.7	1.8	17.5	568	320	1.83	3.08	83	55	75	53
3x16	7/1.70	rm	0.7	1.8	19.6	805	410	1.15	1.91	110	73	98	70
3x25	7/2.14	rm	0.9	1.8	23.0	1100	500	0.727	1.20	130	94	120	96
3x35	min. 6	sm	0.9	1.8	22.3	1237	576	0.524	0.868	155	114	150	117
3x50	min. 6	sm	1.0	1.8	25.1	1694	778	0.387	0.641	190	133	190	142
3x70	min. 12	sm	1.1	1.9	28.4	2315	983	0.268	0.443	225	164	230	179
3x95	min. 15	sm	1.1	2.0	32.2	3161	1253	0.193	0.32	260	196	270	221
3x120	min. 18/15	sm	1.2	2.1	35.3	3915	1570	0.153	0.253	295	223	305	257
3x150	min. 18/15	sm	1.4	2.3	38.7	4866	2000	0.124	0.206	330	249	350	292
3x185	min. 30	sm	1.6	2.4	42.5	5978	2470	0.0991	0.164	385	282	410	337
3x240	min. 34/30	sm	1.7	2.6	47.6	7534	3165	0.0754	0.125	425	327	470	400
3x300	min. 34/30	sm	1.8	2.8	53.1	9541	3840	0.0601	0.100	478	368	564	455

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : 2xY/A2xY

Standard : IEC 60502-1

Voltage : 600/1000 V

THREE & HALF CORE, FOUR CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. XLPE Insulation 3. PVC Inner sheath 4. Black PVC outer Sheath*

Colour of Sheath: *Black*

Table : 30

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable Diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in Ground		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25+16	min. 6, min. 6	rm/rm	0.9, 0.7	1.8	21.7	1110	637	0.727/1.15	1.20/1.91	130	94	120	96
3x35+16	min. 6, min. 6	sm/rm	0.9, 0.7	1.8	24.0	1412	702	0.524/1.15	0.868/1.91	155	114	150	117
3x50+25	min. 6, min. 6	sm/rm	1.0, 0.9	1.8	27.0	2035	946	0.387/0.727	0.614/1.20	190	133	190	142
3x70+35	min. 12, min. 6	sm/rm	1.1, 0.9	1.9	30.5	2753	1201	0.268/0.524	0.443/0.868	225	164	230	179
3x95+50	min. 15, min. 6	sm/rm	1.1, 1.0	2.1	34.9	3721	1553	0.193/0.387	0.32/0.641	260	196	270	221
3x120+70	min. 18/15, min. 12	sm/rm	1.2, 1.1	2.2	38.2	4912	1898	0.153/0.268	0.253/0.443	295	223	305	257
3x150+70	min. 18/15, min. 12	sm/rm	1.4, 1.1	2.3	42.1	5673	2334	0.124/0.268	0.206/0.443	330	249	350	292
3x185+90	min. 30, min. 15	sm/rm	1.6, 1.1	2.5	47.3	7105	2831	0.0991/0.193	0.164/0.320	385	282	410	337
3x240+120	min. 34/30, min. 18/15	sm/rm	1.7, 1.2	2.7	53.8	9219	3601	0.0754/0.153	0.125/0.253	425	327	470	400
3x300+150	min. 34/30, min. 18/15	sm/rm	1.8, 1.4	2.9	58.6	11563	4387	0.0601/0.124	0.100/.0206	478	368	564	455

Table : 31

PHYSICAL DATA								ELECTRICAL DATA					
Cross Sectional Area	No. & approx. diameter of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Nominal thickness of sheath	Approx. Cable Diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in Ground		Current rating at 35°C in air	
						Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
4x1.5	1/1.38	re	0.7	1.8	12.1	212		12.1	18.1	30	-	23	-
4x1.5	7/0.52	rm	0.7	1.8	12.4	220		12.1	18.1	30	-	23	-
4x2.5	1/1.78	re	0.7	1.8	13.6	280		7.41	12.1	38	-	32	-
4x2.5	7/0.68	rm	0.7	1.8	14.1	288		7.41	12.1	38	-	32	-
4x4	7/0.85	rm	0.7	1.8	15.4	385	246	4.61	7.41	48	34	41	31
4x6	7/1.04	rm	0.7	1.8	16.8	488	295	3.08	4.61	64	40	56	40
4x10	7/1.35	rm	0.7	1.8	19.2	690	378	1.83	3.08	83	55	75	53
4x16	7/1.70	rm	0.7	1.8	21.5	1060	493	1.15	1.91	110	73	98	70
4x25	7/2.14	rm	0.9	1.8	23.4	1388	516	0.727	1.2	130	94	120	96
4x35	min. 6	sm	0.9	1.8	24.5	1624	735	0.524	0.868	155	114	150	117
4x50	min. 6	sm	1.0	1.9	27.3	2224	970	0.387	0.641	190	133	190	142
4x70	min. 12	sm	1.1	2.0	30.7	3078	1250	0.268	0.443	225	164	230	179
4x95	min. 15	sm	1.1	2.1	35.8	4068	1641	0.193	0.32	260	196	270	221
4x120	min. 18/15	sm	1.2	2.3	38.4	5090	1992	0.153	0.253	295	223	305	257
4x150	min. 18/15	sm	1.4	2.4	42.3	6308	2488	0.124	0.206	330	249	350	292
4x185	min. 30	sm	1.6	2.6	48.0	7974	3042	0.0991	0.164	385	282	410	337
4x240	min. 34/30	sm	1.7	2.8	53.6	10212	3917	0.0754	0.125	425	327	470	400
4x300	min. 34/30	sm	1.8	3.00	59.6	12588	4705	0.0601	0.10	578	368	564	455

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : 2xRaY/A2xRaY
Standard : IEC 60502-1
Voltage : 600/1000 V
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. XLPE Insulation 3. Round Aluminium wire Armour 4. PVC outer Sheath*

Colour of Sheath: *Black*

Table : 32

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & Approx. Dia. of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Diameter of Round Armour Wire	Nominal thickness of sheath	Approx. Cable Diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in Ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
1x35	min. 6	rm	0.9	1.4	1.8	17.3	587	370	0.524	0.868	185	144	195	150
1x50	min. 6	rm	1.0	1.4	1.8	19.3	730	456	0.387	0.641	225	175	245	190
1x70	min. 12	rm	1.1	1.4	1.8	20.8	957	550	0.268	0.443	270	210	300	233
1x95	min. 15	rm	1.1	1.4	1.8	23.3	1202	655	0.193	0.32	310	240	350	272
1x120	min. 18/15	rm	1.2	1.6	1.8	25.5	1510	790	0.153	0.253	350	272	405	315
1x150	min. 18/15	rm	1.4	1.6	1.8	27.5	1837	930	0.124	0.206	390	302	460	357
1x185	min. 30	rm	1.6	1.6	1.8	29.5	2231	1085	0.0991	0.164	450	350	555	430
1x240	min. 34/30	rm	1.7	1.6	1.9	32.3	2798	1335	0.0754	0.125	515	400	640	498
1x300	min. 34/30	rm	1.8	1.6	1.9	36.0	3467	1625	0.0601	0.1	585	463	770	537
1x400	min. 53	rm	2.0	2.0	2.1	40.1	4491	2080	0.0470	0.0778	680	509	900	686
1x500	min. 53	rm	2.2	2.0	2.2	43.6	5509	2505	0.0366	0.0605	800	592	1030	785
1x630	min. 53	rm	2.4	2.0	2.3	47.2	6809	3100	0.0283	0.0469	945	696	1160	855
1x800	min. 53	rm	2.6	2.5	2.5	54.0	8695	3875	0.0221	0.0367	1095	821	1310	925
1x1000	min. 53	rm	2.8	2.5	2.7	58.9	10754	4735	0.0176	0.0291	1270	952	1480	1092

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.
2. For Compact Conductors and lugs refer to page no-70-71.

Type : 2xFGY/A2xFGY

Standard : IEC 60502-1

Voltage : 600/1000 V

THREE CORE & FOUR CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. XLPE Insulation 3. PVC inner sheath 4.Galv. Steel strip Armour 5. PVC outer Sheath*

Colour of Sheath: *Black*

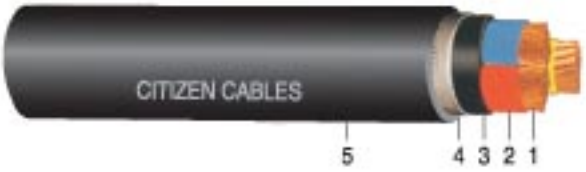


Table : 33

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & Approx. Dia. of wires Cu/Al	Shape of Conductor	Nominal thickness of insulation	Diameter of Flat Armour Wire	Nominal thickness of sheath	Approx. Cable Diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in Ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25	min. 6	rm	0.9	4x0.8	1.8	24.8	1487	1071	0.727	1.20	130	94	120	96
3x35	min. 6	sm	0.9	4x0.8	1.8	25.4	1757	1117	0.524	0.868	155	114	150	117
3x50	min. 6	sm	1.0	4x0.8	1.9	27.2	2329	1394	0.387	0.641	190	133	190	142
3x70	min. 12	sm	1.1	4x0.8	2.0	30.4	2986	1690	0.268	0.443	225	164	230	179
3x95	min. 15	sm	1.1	4x0.8	2.1	35.2	4136	2053	0.193	0.32	260	196	270	221
3x120	min. 18/15	sm	1.2	4x0.8	2.2	38.0	5025	2410	0.153	0.253	295	223	305	257
3x150	min. 18/15	sm	1.4	4x0.8	2.4	42.2	6141	2862	0.124	0.206	330	249	350	292
3x185	min. 30	sm	1.6	4x0.8	2.5	46.0	7368	3398	0.0991	0.164	385	282	410	337
3x240	min. 34/30	sm	1.7	4x0.8	2.7	51.8	9584	4147	0.0754	0.125	425	327	490	400
3x300	min. 34/30	sm	1.8	4x0.8	2.9	56.5	11621	4900	0.0601	0.100	578	368	664	455
4x25	min. 6	rm	0.9	4x0.8	1.8	25.3	1903	1415	0.727	1.20	130	94	120	96
4x35	min. 6	sm	0.9	4x0.8	1.8	27.1	2219	1475	0.524	0.868	155	114	150	117
4x50	min. 6	sm	1.0	4x0.8	2.0	32	3119	1822	0.387	0.641	190	133	190	142
4x70	min. 12	sm	1.1	4x0.8	2.1	35.5	4113	2227	0.268	0.443	225	164	230	179
4x95	min. 15	sm	1.1	4x0.8	2.2	39.7	5378	2702	0.193	0.32	260	196	270	221
4x120	min. 18/15	sm	1.2	4x0.8	2.4	43.6	7140	3168	0.153	0.253	295	223	305	257
4x150	min. 18/15	sm	1.4	4x0.8	2.5	47.5	7868	3720	0.124	0.206	330	249	350	292
4x185	min. 30	sm	1.6	4x0.8	2.7	53	9874	4408	0.0991	0.164	385	282	410	337
4x240	min. 34/30	sm	1.7	4x0.8	2.9	59.8	12412	5347	0.0754	0.125	425	327	490	400
4x300	min. 34/30	sm	1.8	4x0.8	3.1	66.1	14788	6281	0.0601	0.100	578	368	664	445

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : 2xFGY/A2xFGY

Standard : IEC 60502-1

Voltage : 600/1000 V

THREE & HALF CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. XLPE Insulation 3. PVC inner sheath 4.Galv. Steel strip Armour 5. PVC outer Sheath*

Colour of Sheath: *Black*

Table : 34

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & Approx. Dia. of wire Cu/Al	Shape of Conductor	Nominal thickness of insulation	Diameter of Flat Armour Wire	Nominal thickness of sheath	Approx. Cable Diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in Ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25/16	min. 6	rm/rm	0.9	4x0.8	1.8	25.9	1744	1299	0.727/1.15	1.20/1.91	130	94	120	96
	min. 6		0.7											
3x35/16	min. 6	sm /rm	0.9	4x0.8	1.8	27.7	2028	1236	0.524/1.15	0.868/1.91	155	114	150	117
	min. 6		0.7											
3x50/25	min. 6	sm /rm	1.0	4x0.8	1.9	31.2	2915	1507	0.387/0.727	0.641/1.20	190	133	190	142
	min. 6		0.9											
3x70/35	min. 12	sm /rm	1.1	4x0.8	2.0	35.3	3793	1823	0.268/0.524	0.443/0.868	225	164	230	179
	min. 6		0.9											
3x95/50	min. 15	sm /rm	1.1	4x0.8	2.2	40.0	4881	2262	0.193/0.387	0.32/0.641	260	196	270	221
	min. 6		1.0											
3x120/70	min. 18/15	sm /rm	1.2	4x0.8	2.3	43.4	6252	2698	0.153/0.268	0.253/0.443	295	223	305	257
	min. 12		1.1											
3x150/70	min. 18/15	sm /rm	1.4	4x0.8	2.4	47.3	7023	3205	0.124/0.268	0.206/0.443	330	249	350	292
	min. 12		1.1											
3x185/95	min. 30	sm /rm	1.6	4x0.8	2.6	52.7	8975	3808	0.0991/0.193	0.164/0.320	385	282	410	337
	min. 15		1.1											
3x240/120	min. 34/30	sm /rm	1.7	4x0.8	2.8	58.5	10669	4500	0.0754/0.153	0.125/0.253	425	327	490	400
	min. 18/15		1.2											
3x300/150	min. 34/30		1.8	4x0.8	2.9	66.6	13863	5435	0.0601/0.124	0.100/0.206	578	368	664	455
	min. 18/15		1.4											

*** As per customer requirement, we shall provide Fire Resistant (FR) or Fire Resistant Low Smoke (FRLS) cables according to IEC-60332**

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : 2xRGY/A2xRGY

Standard : IEC 60502-1
Voltage : 600/1000 V

THREE CORE, FOUR CORE & THREE & HALF CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper/ Aluminium Conductor 2. XLPE Insulation 3. PVC inner sheath 4.Round Galv. Steel wire Armour 5. PVC outer Sheath*

Colour of Sheath: *Black / Blue / Yellow / Red*

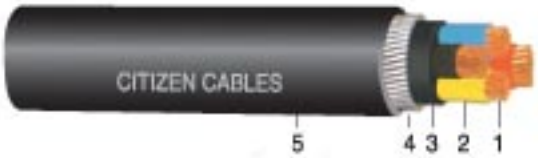


Table : 35

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & Approx. Dia. of wires Cu/Al	Shape of Conductor	Nominal thickness of insulation	Diameter of Round Armour Wire	Nominal thickness of sheath	Approx. Cable Diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in Ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25	min. 6	rm	0.9	1.6	1.8	26.4	1682	1203	0.727	1.20	130	94	120	96
3x35	min. 6	sm	0.9	1.6	1.8	27.0	1991	1332	0.524	0.868	155	114	150	117
3x50	min. 6	sm	1.0	1.6	1.9	29.7	2529	1577	0.387	0.641	190	133	190	142
3x70	min. 12	sm	1.1	2.0	2.1	34.0	3571	2233	0.268	0.443	225	164	230	179
3x95	min. 15	sm	1.1	2.0	2.2	36.8	4561	2756	0.193	0.32	260	196	270	221
3x120	min. 18/15	sm	1.2	2.0	2.3	41.1	5465	3186	0.153	0.253	295	223	305	257
3x150	min. 18/15	sm	1.4	2.5	2.5	46.5	7031	4179	0.124	0.206	330	249	350	292
3x185	min. 30	sm	1.6	2.5	2.6	49.5	8378	4867	0.0991	0.164	385	282	410	337
3x240	min. 34/30	sm	1.7	2.5	2.8	55.8	10453	5879	0.0754	0.125	425	327	490	400
3x300	min. 34/30	sm	1.8	2.5	3.0	59.6	12534	6745	0.0601	0.100	578	368	664	455
4x25	min. 6	rm	0.9	1.6	1.8	28.4	2038	1400	0.727	1.200	130	94	120	96
4x35	min. 6	sm	0.9	1.6	1.9	29.4	2509	1622	0.524	0.868	155	114	150	117
4x50	min. 6	sm	1.0	1.6	2.0	33.9	3364	2096	0.387	0.641	190	133	190	142
4x70	min. 12	sm	1.1	2.0	2.2	38.9	4503	2720	0.268	0.443	225	164	230	179
4x95	min. 15	sm	1.1	2.0	2.3	43.2	6198	3791	0.193	0.320	260	196	270	221
4x120	min. 18/15	sm	1.2	2.0	2.5	47.8	7380	4341	0.153	0.253	295	223	305	257
4x150	min. 18/15	sm	1.4	2.5	2.6	51.2	8838	5036	0.124	0.206	330	249	350	292
4x185	min. 30	sm	1.6	2.5	2.8	57.5	10674	5993	0.0991	0.164	385	282	410	337
4x240	min. 34/30	sm	1.7	2.5	3.0	62.4	13362	7263	0.0754	0.125	425	327	490	400
4x300	min. 34/30	sm	1.8	2.5	3.2	68.9	16888	8969	0.0601	0.100	578	368	664	455

Table : 36

PHYSICAL DATA									ELECTRICAL DATA					
Cross Sectional Area	No. & Approx. Dia. of wires Cu/Al	Shape of Conductor	Nominal thickness of insulation	Diameter of Round Armour Wire	Nominal thickness of sheath	Approx. Cable Diameter	Approx. weight of cable		Max. DC resistance of conductor at 20°C		Current rating at 30°C in Ground		Current rating at 35°C in air	
							Cu	Al	Cu	Al	Cu	Al	Cu	Al
core x mm²	nos./mm	-	mm	mm	mm	mm	kg/km	kg/km	ohm/km	ohm/km	amps	amps	amps	amps
3x25/16	min. 6, min. 6	rm/rm	0.9, 0.7	1.6	1.8	27.5	1919	1337	0.727/1.15	1.20/1.91	130	94	120	96
3x35/16	min. 6, min. 6	sm /rm	0.9, 0.7	1.6	1.8	29.3	2363	1596	0.524/1.15	0.868/1.91	155	114	150	117
3x50/25	min. 6, min. 6	sm /rm	1.0, 0.9	1.6	2.0	31.9	3105	1995	0.387/0.727	0.641/1.20	190	133	190	142
3x70/35	min. 12, min. 6	sm /rm	1.1, 0.9	2.0	2.1	37.9	4153	2595	0.268/0.524	0.443/0.868	225	164	230	179
3x95/50	min. 15, min. 6	sm /rm	1.1, 1.0	2.0	2.2	42.1	5372	3251	0.193/0.387	0.32/0.641	260	196	270	221
3x120/70	min. 18/15, min. 12	sm /rm	1.2, 1.1	2.0	2.4	45.8	6921	4197	0.153/0.268	0.253/0.443	295	223	305	257
3x150/70	min. 18/15, min. 12	sm /rm	1.4, 1.1	2.5	2.5	50.2	8070	4772	0.124/0.268	0.206/0.443	330	249	350	292
3x185/95	min. 30, min. 15	sm /rm	1.6, 1.1	2.5	2.7	55.1	9655	5543	0.0991/0.193	0.164/0.320	385	282	410	337
3x240/120	min. 34/30, min. 18/15	sm /rm	1.7, 1.2	2.5	2.9	61.1	11952	6618	0.0754/0.153	0.125/0.253	425	327	490	400
3x300/150	min. 34/30, min. 18/15	sm/rm	1.8, 1.4	2.5	3.1	67.0	14563	7837	0.0601/0.124	0.100/0.206	578	368	664	455

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

Type : 2xY-1
Standard : IEC 60502-1
Voltage : 600/1000 V
MULTI CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 720/1200 Volts.

Construction: *1. Annealed Copper Conductor 2. XLPE Insulation & multi cores laid up 3. PVC/PE tapping 4. PVC outer Sheath*

Core Identification : Numbering

Colour of Sheath: *Black*

Table : 37

PHYSICAL DATA							ELECTRICAL DATA	
Cross Sectional Area	No. and approx. Diameter of Wires	Shape of Conductor	Nominal Thickness of Insulation	Nominal Thickness of Sheath	Approximate Cable Diameter	Approximate Weight of Cable	Current rating at 30°C in Ground	Current rating at 35°C in air
core x mm²	nos./mm		mm	mm	mm	kg/km	amps	amps
5x1.5	1/1.38	re	0.7	1.8	11.6	175	20	14
7x1.5	1/1.38	re	0.7	1.8	12.4	215	18	13
10x1.5	1/1.38	re	0.7	1.8	15.2	290	14	11
12x1.5	1/1.38	re	0.7	1.8	15.7	335	13	10
16x1.5	1/1.38	re	0.7	1.8	16.4	410	12	9
21x1.5	1/1.38	re	0.7	1.8	19.0	525	10	8
24x1.5	1/1.38	re	0.7	1.8	21.0	600	10	8
30x1.5	1/1.38	re	0.7	1.8	22.0	720	9	7
5x2.5	1/1.78	re	0.7	1.8	12.8	230	26	21
7x2.5	1/1.78	re	0.7	1.8	13.7	282	23	19
10x2.5	1/1.78	re	0.7	1.8	17.1	388	20	15
12x2.5	1/1.78	re	0.7	1.8	17.4	460	18	14
16x2.5	1/1.78	re	0.7	1.8	18.2	570	15	12
21x2.5	1/1.78	re	0.7	1.8	21.0	750	14	11
24x2.5	1/1.78	re	0.7	1.8	23.5	850	13	10
30x2.5	1/1.78	re	0.7	1.8	24.8	1040	11	9
5x4	7/0.85	rm	0.7	1.8	14.8	335	33	27
7x4	7/0.85	rm	0.7	1.8	16.0	423	29	24
10x4	7/0.85	rm	0.7	1.8	19.9	589	25	21
12x4	7/0.85	rm	0.7	1.8	20.5	684	23	19

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-59. For current ratings at deviated conditions apply correction factors as given on page no-60-63.

XLPE INSULATED HT CABLES

HT CABLES - CONSTRUCTION

Cross Linked Polyethylene Cable i.e. XLPE cable was developed in late 1970 to overcome the susceptibility of PILC Cables to ingress of moisture. There after XLPE has replaced all other materials in almost all voltage applications particularly from 3.3KV to 500KV category. The excellent thermal properties of XLPE Cable permit maximum continuous conductor operating temperature of 90°C and short circuit temperature of 250°C. Moreover, it has low dielectric loss, which does not vary much over the entire operating range. These characteristics, along with the low dielectric constant, make XLPE compound, particularly suitable for high voltage cable applications.

APPLICATIONS:

Extensively used for power Transmission where overhead lines to be discouraged, in Power generating plants, in Industrial plants, suitable to use where power /load/temperature fluctuations are more and in most difficult cable route conditions such as city distribution net work etc.

SINGLE CORE HT XLPE CABLE:

THREE CORE HT XLPE CABLE:

CONDUCTOR

Normally, Round Compact Smooth Conductors are used for High voltage cables to ensure minimum stress development on the surface of the conductor, are made of Copper or Aluminum of sizes between 25 to 630mm2.

TRIPLE EXTRUSION

Extrusion is done in a closed triple crosshead Inner semiconducting compound, XLPE insulating compound and outer semiconducting compound are fed into respective extruders in a contamination-free closed circuit system through preheater and dehumidifier. The quantum and the size of microvoid formation is to be restricted much below specified level by careful process control, and choice of quality compounds.

The Line is operated with X-RAY 8000 (SIKORA) Scanner; display the on-line product parameters, offers following functions: Measurement of

- Outer diameter and ovality
- Wall thickness of outer semiconductor, insulation, and inner semiconductor
- Eccentricity of outer semiconductor, insulation, inner semiconductor
- Core diameter and ovality
- Total wall thickness
- Graphic and numerical display of measuring values about wall thickness and diameter
- Measuring value control
- Comparison of measuring values wall thickness and diameter to nominal values and tolerance limits
- Statistical information and graphical display of selectable measuring values
- Graphical display of scan intensity level
- Serial interface to RS 422

CURING

Curing under oxygen-free nitrogen gas pressure is carried out in Catenary Continuous Vulcanization (CCV) line as per the recommended practice. Longer cooling length under pressure restrict the size of voids to be below micron level while the quantum are further minimized to ensure minimum Partial discharge level, thus guaranteeing longer performance and life of the product.

HT CABLES - CONSTRUCTION

METALLIC SCREENING

Screening with copper tape along with suitable overlap ensures a uniform radial stress distribution around the axis of the cable core, thus ensuring stable performance. As per the customer requirements, suitable screen structure can be designed.

ASSEMBLING

Assembly of cores in a precisely controlled laying up machine with an anti torsion device, so as to avoid any stress formation on the cores and applied screen. Interstices between cores are filled with suitable non-hygroscopic fillers.

INNER SHEATH

Extruded PVC inner sheath is applied over the assembly of the cores. This coating should be free from any pin holes and is impervious to moisture

ARMOURING

Galvanized steel round wire, flat wire or tapes are used to armour the cable with suitable layer and so ensuring required armour resistance value for diverting fault current as per specific requirement. Single core armoured cables are provided with non-magnetic armour consisting of hard drawn round wire or flat tape of aluminum will be provided.

OUTER SHEATH

A tough outer sheath of Heat Resisting PVC compound (Type ST2) or Polyethylene is extruded over the armouring in case of armoured cables or over inner sheath in case of unarmoured cables or over non-magnetic metallic part of insulation screening in case of unarmoured single core cables. It protects the cable from the influence of surrounding affluent like Acids, Alkalis, Salts, emulsions and Organic substances. This is always in RED colour for easy identification.

CORE IDENTIFICATION

In case of multi core cables, core identification is done by providing the coloured (Red, Yellow, Blue) tapes below metallic core screen

TESTING AND QUALITY ASSURANCE

During every stage of production process, quality control personal diligently check and ensure that the cables are produced as per standard norms. No deviations are allowed at any stage in the process.

All cables are produced under advanced manufacturing and testing facilities. The cables are Routine, Acceptance and Type tested in accordance with all relevant specifications.

In order to achieve consistency in quality, in addition to normal tests, rigorous internal quality control measures are affected at every stage of production. Accordingly every batch of raw materials, PVC/XLPE compounds and process cables are tested to check for their physical and electrical properties.

TEST VOLTAGES

The following voltage is applied between conductor and screen / armour

3.6/6 (7.2) KV(E)	12.5 KV (RMS) for 5 minutes
6/10(12)KV(E)	21 KV (RMS) for 5 minutes
8.7/15(17.5) KV(E)	30.5 KV (RMS) for 5 minutes
12/20 (24) KV(E)	42 KV (RMS) for 5 minutes
18/30 (36) KV(E)	63 KV (RMS) for 5 minutes

Type : 2xHSY
Standard : IEC 60502-2
Voltage : 3.6/6(7.2) KV
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 3.8/6.6 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 38

PHYSICAL DATA					ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
								Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
1x25	2.5	1.8	20.0	560	0.7270	0.27	0.433	155	160
1x35	2.5	1.8	21.0	680	0.5240	0.30	0.412	191	190
1x50	2.5	1.8	22.2	820	0.3870	0.33	0.384	226	229
1x70	2.5	1.8	23.8	1065	0.2680	0.37	0.363	280	285
1x95	2.5	1.8	25.5	1350	0.1930	0.42	0.344	332	350
1x120	2.5	1.8	26.5	1555	0.1530	0.46	0.330	378	410
1x150	2.5	1.8	28.0	1850	0.1240	0.49	0.320	425	468
1x185	2.5	1.8	29.7	2240	0.0991	0.54	0.309	480	542
1x240	2.6	1.9	32.5	2830	0.0754	0.58	0.300	554	640
1x300	2.8	2.0	35.5	3480	0.0601	0.60	0.294	625	732
1x400	3.0	2.1	39.5	4370	0.0470	0.64	0.285	716	850
1x500	3.2	2.2	42.6	5480	0.0366	0.65	0.281	792	978
1x630	3.2	2.3	47.3	6970	0.0283	0.73	0.272	902	1130
1x800	3.2	2.4	51.5	8960	0.0221	0.81	0.266	970	1290
1x1000	3.2	2.6	56.0	11150	0.01760	0.90	0.261	1040	1435

Type : 2xHSY
Standard : IEC 60502-2
Voltage : 6/10 (12) KV
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 6.35/11 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 39

PHYSICAL DATA					ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
								Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
1x25	3.4	1.8	22.0	630	0.7270	0.21	0.452	155	160
1x35	3.4	1.8	23.0	750	0.5240	0.23	0.430	191	190
1x50	3.4	1.8	24.2	890	0.3870	0.26	0.401	226	229
1x70	3.4	1.8	25.8	1140	0.2680	0.29	0.379	280	285
1x95	3.4	1.8	27.6	1430	0.1930	0.33	0.359	332	350
1x120	3.4	1.8	29.0	1640	0.1530	0.35	0.344	378	410
1x150	3.4	1.8	30.5	1950	0.1240	0.38	0.333	425	468
1x185	3.4	1.9	32.5	2350	0.0991	0.42	0.323	480	542
1x240	3.4	2.0	35.0	2940	0.0754	0.46	0.312	554	640
1x300	3.4	2.0	37.2	3570	0.0601	0.50	0.301	625	732
1x400	3.4	2.1	40.7	4430	0.0470	0.57	0.290	716	850
1x500	3.4	2.2	43.6	5520	0.0366	0.62	0.283	792	978
1x630	3.4	2.3	47.7	7000	0.0283	0.70	0.274	902	1130
1x800	3.4	2.5	52.0	9020	0.0221	0.77	0.268	970	1290
1x1000	3.4	2.6	56.2	11100	0.0176	0.85	0.262	1040	1435

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-64. For current ratings at deviated conditions apply correction factors as given on page no-64-65.

Type : 2xHSY

Standard : IEC 60502-2
Voltage : 8.7/15 (17.5) KV
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 9.4/16.25 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 40

PHYSICAL DATA					ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
								Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
1x25	4.5	1.8	24.5	720	0.7270	0.17	0.473	157	163
1x35	4.5	1.8	25.4	840	0.5240	0.19	0.451	193	194
1x50	4.5	1.8	26.5	990	0.3870	0.21	0.420	228	232
1x70	4.5	1.8	28.2	1240	0.2680	0.23	0.396	282	288
1x95	4.5	1.8	30.0	1540	0.1930	0.26	0.376	334	353
1x120	4.5	1.9	31.7	1770	0.1530	0.28	0.361	380	413
1x150	4.5	1.9	33.0	2075	0.1240	0.30	0.355	427	471
1x185	4.5	2.0	35.0	2490	0.0991	0.33	0.339	482	545
1x240	4.5	2.0	37.4	3070	0.0754	0.36	0.325	556	643
1x300	4.5	2.1	39.9	3730	0.0601	0.40	0.314	627	735
1x400	4.5	2.2	43.5	4650	0.0470	0.45	0.302	718	853
1x500	4.5	2.3	46.2	5760	0.0366	0.48	0.295	794	981
1x630	4.5	2.4	50.4	7275	0.0283	0.54	0.285	904	1133
1x800	4.5	2.5	54.3	9310	0.0221	0.60	0.277	972	1293
1x1000	4.5	2.7	59.0	11500	0.0176	0.66	0.271	1042	1438

Type : 2xHSYRaY

Standard : IEC 60502-2
Voltage : 3.6/6 (7.2) KV
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 3.8/6.6 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Aluminium wire armour 8. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 41

PHYSICAL DATA						ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Dia. of Al. wire Armour	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
									Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
1x25	2.5	1.6	1.8	26.0	930	0.7270	0.27	0.486	152	157
1x35	2.5	1.6	1.8	27.0	1060	0.5240	0.30	0.463	184	186
1x50	2.5	1.6	1.8	28.0	1230	0.3870	0.33	0.432	221	224
1x70	2.5	1.6	1.8	30.0	1500	0.2680	0.37	0.408	274	279
1x95	2.5	1.6	1.9	32.0	1850	0.1930	0.42	0.388	325	343
1x120	2.5	1.6	1.9	33.5	2060	0.1530	0.46	0.371	370	402
1x150	2.5	1.6	2.0	35.0	2400	0.1240	0.49	0.361	417	459
1x185	2.5	2.0	2.0	37.0	2920	0.0991	0.54	0.352	470	531
1x240	2.6	2.0	2.1	40.3	3560	0.0754	0.58	0.340	543	627
1x300	2.8	2.0	2.2	43.2	4300	0.0601	0.60	0.330	613	717
1x400	3.0	2.0	2.3	47.2	5250	0.0470	0.64	0.319	702	833
1x500	3.2	2.5	2.5	52.0	6650	0.0366	0.65	0.318	776	958
1x630	3.2	2.5	2.6	56.2	7970	0.0283	0.73	0.307	884	1107
1x800	3.2	2.5	2.7	60.2	10365	0.0221	0.81	0.298	951	1264
1x1000	3.2	2.5	2.9	65.0	12750	0.0176	0.90	0.291	1019	1406

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-64. For current ratings at deviated conditions apply correction factors as given on page no-64-65.

Type : 2xHSYRaY
Standard : IEC 60502-2
Voltage : 6/10 (12) KV
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 6.35/11 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Aluminium wire armour 8. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 42

PHYSICAL DATA						ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Dia. of Al. wire Armour	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
									Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
1x25	3.4	1.6	1.8	28.0	1030	0.7270	0.21	0.501	152	157
1x35	3.4	1.6	1.8	29.0	1170	0.5240	0.23	0.478	184	186
1x50	3.4	1.6	1.8	30.0	1330	0.3870	0.26	0.446	221	224
1x70	3.4	1.6	1.9	32.0	1630	0.2680	0.29	0.422	274	279
1x95	3.4	1.6	1.9	34.0	1950	0.1930	0.33	0.400	325	343
1x120	3.4	1.6	2.0	35.5	2200	0.1530	0.35	0.384	370	402
1x150	3.4	2.0	2.1	38.0	2650	0.1240	0.38	0.378	417	459
1x185	3.4	2.0	2.1	40.0	3060	0.0991	0.42	0.364	470	531
1x240	3.4	2.0	2.2	42.3	3740	0.0754	0.46	0.350	543	627
1x300	3.4	2.0	2.2	44.5	4400	0.0601	0.50	0.336	613	717
1x400	3.4	2.0	2.4	48.3	5350	0.0470	0.57	0.323	702	833
1x500	3.4	2.5	2.5	52.5	6700	0.0366	0.62	0.319	776	958
1x630	3.4	2.5	2.6	57.0	7850	0.0283	0.70	0.308	884	1107
1x800	3.4	2.5	2.7	61.0	10450	0.0221	0.77	0.299	951	1264
1x1000	3.4	2.5	2.9	66.0	12810	0.0176	0.85	0.292	1019	1406

Type : 2xHSYRaY
Standard : IEC 60502-2
Voltage : 8.7/15 (17.5) KV
SINGLE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 9.4/16.25KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Aluminium wire armour 8. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 43

PHYSICAL DATA						ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Dia. of Al. wire Armour	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
									Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
1x25	4.5	1.6	1.8	30.5	1160	0.7270	0.17	0.518	154	160
1x35	4.5	1.6	1.9	31.5	1310	0.5240	0.19	0.495	186	188
1x50	4.5	1.6	1.9	33.0	1500	0.3870	0.21	0.462	223	227
1x70	4.5	1.6	1.9	34.5	1770	0.2680	0.23	0.437	276	282
1x95	4.5	2.0	2.0	37.5	2200	0.1930	0.26	0.419	327	346
1x120	4.5	2.0	2.1	39.0	2470	0.1530	0.28	0.403	372	405
1x150	4.5	2.0	2.1	40.5	2800	0.1240	0.30	0.390	418	462
1x185	4.5	2.0	2.2	42.0	3260	0.0991	0.33	0.376	472	534
1x240	4.5	2.0	2.3	45.0	3920	0.0754	0.36	0.362	545	630
1x300	4.5	2.0	2.3	47.2	4600	0.0601	0.40	0.348	614	720
1x400	4.5	2.5	2.5	52.0	5760	0.0470	0.45	0.339	704	836
1x500	4.5	2.5	2.6	55.0	6950	0.0366	0.48	0.329	778	961
1x630	4.5	2.5	2.7	59.3	8560	0.0283	0.54	0.317	886	1110
1x800	4.5	2.5	2.8	63.5	10750	0.0221	0.60	0.308	953	1267
1x1000	4.5	2.5	3.0	68.0	13100	0.0176	0.66	0.300	1021	1409

Note : 1. Current ratings are valid for cables laid under defined conditions at page no- 64. For current ratings at deviated conditions apply correction factors as given on page no-64-65.

Type : 2xSEYY
Standard : IEC 60502-2
Voltage : 3.6/6 (7.2) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 3.8/6.6 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 44

PHYSICAL DATA					ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in Ground at 20°C	Current rating in Air at 30°C
core x mm²	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
3x25	2.5	2.1	42.0	2240	0.7270	0.27	0.387	146	148
3x35	2.5	2.1	44.0	2650	0.5240	0.30	0.369	184	185
3x50	2.5	2.2	47.0	3170	0.3870	0.33	0.343	220	220
3x70	2.5	2.3	51.0	4080	0.2680	0.37	0.325	272	273
3x95	2.5	2.5	55.5	5135	0.1930	0.42	0.309	327	336
3x120	2.5	2.6	58.5	5885	0.1530	0.46	0.297	366	382
3x150	2.5	2.7	62.0	6995	0.1240	0.49	0.289	415	440
3x185	2.5	2.8	66.0	8370	0.0991	0.54	0.280	460	506
3x240	2.6	3.0	72.0	10450	0.0754	0.58	0.273	532	586
3x300	2.8	3.2	79.0	12830	0.0601	0.60	0.267	573	617

Type : 2xSEYY
Standard : IEC 60502-2
Voltage : 6/10 (12) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 6.35/11 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 45

PHYSICAL DATA					ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in Ground at 20°C	Current rating in Air at 30°C
core x mm²	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
3x25	3.4	2.2	46.0	2560	0.7270	0.21	0.410	146	148
3x35	3.4	2.3	48.5	3055	0.5240	0.23	0.391	184	185
3x50	3.4	2.4	51.5	3600	0.3870	0.26	0.364	220	220
3x70	3.4	2.5	55.5	4495	0.2680	0.29	0.344	272	273
3x95	3.4	2.6	59.5	5555	0.1930	0.33	0.327	327	336
3x120	3.4	2.7	63.5	6380	0.1530	0.35	0.314	366	382
3x150	3.4	2.8	66.0	7465	0.1240	0.38	0.304	415	440
3x185	3.4	2.9	70.0	8865	0.0991	0.42	0.295	460	506
3x240	3.4	3.1	76.0	10925	0.0754	0.46	0.284	532	586
3x300	3.4	3.3	82.0	13230	0.0601	0.50	0.275	573	617

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-64. For current ratings at deviated conditions apply correction factors as given on page no-64-65.

Type : 2xSEYY
Standard : IEC 60502-2
Voltage : 8.7/15 (17.5) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 9.4/16.25 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 46

PHYSICAL DATA					ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
								Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
3x25	4.5	2.4	52.5	3075	0.7270	0.17	0.436	148	151
3x35	4.5	2.5	54.5	3540	0.5240	0.19	0.415	186	188
3x50	4.5	2.6	57.0	4120	0.3870	0.21	0.386	222	223
3x70	4.5	2.7	61.0	5095	0.2680	0.23	0.365	274	276
3x95	4.5	2.8	65.0	6190	0.1930	0.26	0.346	329	339
3x120	4.5	2.9	68.0	6995	0.1530	0.28	0.332	368	385
3x150	4.5	3.0	72.0	8110	0.1240	0.30	0.332	417	443
3x185	4.5	3.1	76.5	9550	0.0991	0.33	0.311	462	511
3x240	4.5	3.3	82.5	11720	0.0754	0.36	0.299	534	589
3x300	4.5	3.4	87.0	13960	0.0601	0.40	0.289	575	620

Type : 2xSEYFGY
Standard : IEC 60502-2
Voltage : 3.6/ 6 (7.2) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 3.8/6.6 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Flat Steel wire armour with helical steel tape 8. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 47

PHYSICAL DATA					ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
								Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
3x25	2.5	2.1	43.5	3080	0.7270	0.27	0.387	145	147
3x35	2.5	2.2	46.0	3560	0.5240	0.30	0.369	182	183
3x50	2.5	2.3	49.0	4160	0.3870	0.33	0.343	218	218
3x70	2.5	2.4	53.0	5120	0.2680	0.37	0.325	269	270
3x95	2.5	2.5	57.0	6260	0.1930	0.42	0.310	324	333
3x120	2.5	2.6	60.0	7130	0.1530	0.46	0.298	362	378
3x150	2.5	2.7	64.0	8270	0.1240	0.49	0.289	411	436
3x185	2.5	2.9	68.0	9780	0.0991	0.54	0.281	455	503
3x240	2.6	3.0	74.0	11900	0.0754	0.58	0.273	527	580
3x300	2.8	3.2	80.5	14450	0.0601	0.60	0.267	567	611

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-64. For current ratings at deviated conditions apply correction factors as given on page no-64-65.

Type : 2xSEYFGY
Standard : IEC 60502-2
Voltage : 6/10 (12) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 6.35/11 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Flat Steel wire armour with helical steel tape 8. PVC outer sheath.*

Colour of Sheath: *Red*

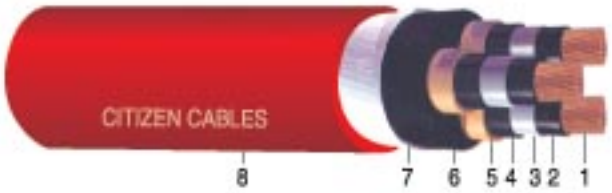


Table : 48

PHYSICAL DATA					ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
								Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
3x25	3.4	2.2	47.5	3460	0.7270	0.21	0.410	145	147
3x35	3.4	2.3	50.5	4020	0.5240	0.23	0.391	182	183
3x50	3.4	2.4	53.5	4630	0.3870	0.26	0.363	218	218
3x70	3.4	2.6	57.0	5570	0.2680	0.29	0.344	269	270
3x95	3.4	2.7	61.5	6765	0.1930	0.33	0.327	324	333
3x120	3.4	2.8	65.0	7750	0.1530	0.35	0.313	362	378
3x150	3.4	2.9	68.0	8830	0.1240	0.38	0.304	411	436
3x185	3.4	3.0	72.5	10320	0.0991	0.42	0.294	455	503
3x240	3.4	3.2	77.5	12470	0.0754	0.46	0.284	527	580
3x300	3.4	3.3	83.0	14900	0.0601	0.50	0.275	567	611

Type : 2xSEYFGY
Standard : IEC 60502-2
Voltage : 8.7/15 (17.5) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 9.4/16.25 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Flat Steel wire armour with helical steel tape 8. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 49

PHYSICAL DATA					ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
								Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
3x25	4.5	2.4	54.0	4100	0.7270	0.17	0.436	145	147
3x35	4.5	2.5	56.0	4620	0.5240	0.19	0.416	184	186
3x50	4.5	2.6	59.0	5250	0.3870	0.21	0.387	220	222
3x70	4.5	2.7	63.0	6280	0.2680	0.23	0.366	271	273
3x95	4.5	2.8	67.0	7500	0.1930	0.26	0.347	326	336
3x120	4.5	2.9	70.5	8420	0.1530	0.28	0.332	364	380
3x150	4.5	3.0	73.5	9550	0.1240	0.30	0.322	413	439
3x185	4.5	3.2	78.0	11100	0.0991	0.33	0.311	457	506
3x240	4.5	3.3	83.5	13400	0.0754	0.36	0.300	530	583
3x300	4.5	3.5	89.0	15700	0.0601	0.40	0.289	570	614

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-64. For current ratings at deviated conditions apply correction factors as given on page no-64-65.

Type : 2xSEYRGY
Standard : IEC 60502-2
Voltage : 3.6/6 (7.2) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 3.8/6.6 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Round Steel wire armour 8. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 50

PHYSICAL DATA						ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Dia. of round steel wire Armour	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in Ground at 20°C	Current rating in Air at 30°C
core x mm²	mm	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
3x25	2.5	2.0	2.2	46.3	3650	0.7270	0.27	0.387	145	147
3x35	2.5	2.0	2.3	48.5	4160	0.5240	0.30	0.369	182	183
3x50	2.5	2.5	2.4	52.5	5190	0.3870	0.33	0.343	218	218
3x70	2.5	2.5	2.5	56.5	6300	0.2680	0.37	0.325	269	270
3x95	2.5	2.5	2.7	61.0	7520	0.1930	0.42	0.310	324	333
3x120	2.5	2.5	2.8	64.3	8440	0.1530	0.46	0.298	362	378
3x150	2.5	2.5	2.9	68.0	9670	0.1240	0.49	0.289	411	436
3x185	2.5	2.5	3.0	72.1	11240	0.0991	0.54	0.281	455	503
3x240	2.6	2.5	3.2	78.0	13560	0.0754	0.58	0.273	527	580
3x300	2.8	3.15	3.4	86.0	17100	0.0601	0.60	0.267	567	611

Type : 2xSEYRGY
Standard : IEC 60502-2
Voltage : 6/10 (12) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 6.35/11KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Round Steel wire armour 8. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 51

PHYSICAL DATA						ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Dia. of round steel wire Armour	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in Ground at 20°C	Current rating in Air at 30°C
core x mm²	mm	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
3x25	3.4	2.0	2.3	50.8	4130	0.7270	0.21	0.410	145	147
3x35	3.4	2.5	2.4	54.5	5195	0.5240	0.23	0.391	182	183
3x50	3.4	2.5	2.5	57.5	5835	0.3870	0.26	0.363	218	218
3x70	3.4	2.5	2.7	61.0	6920	0.2680	0.29	0.344	269	270
3x95	3.4	2.5	2.8	65.5	8140	0.1930	0.33	0.327	324	333
3x120	3.4	2.5	2.9	69.0	9130	0.1530	0.35	0.313	362	378
3x150	3.4	2.5	3.0	72.5	10340	0.1240	0.38	0.304	411	436
3x185	3.4	2.5	3.1	76.5	11940	0.0991	0.42	0.294	455	503
3x240	3.4	3.15	3.3	83.0	15070	0.0754	0.46	0.284	527	580
3x300	3.4	3.15	3.5	89.0	17690	0.0601	0.50	0.275	567	611

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-64. For current ratings at deviated conditions apply correction factors as given on page no-64-65.

Type : 2xSEYRGY
Standard : IEC 60502-2
Voltage : 8.7/15 (17.5) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 9.4/16.25 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Round Steel wire armour 8. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 52

PHYSICAL DATA						ELECTRICAL DATA				
Nominal Conductor Area	Nominal Insulation Thickness	Nominal Dia. of round steel wire Armour	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Capacitance of Cable	Inductance of Cable	Current rating in	
									Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	mm	Kg/Km	Ohm/Km	Micro F/Km	mH/Km	amps	amps
3x25	4.5	2.5	2.5	58.0	5310	0.7270	0.17	0.436	145	147
3x35	4.5	2.5	2.6	60.0	5900	0.5240	0.19	0.416	184	186
3x50	4.5	2.5	2.7	63.0	6590	0.3870	0.21	0.387	220	222
3x70	4.5	2.5	2.8	67.0	7730	0.2680	0.23	0.366	271	273
3x95	4.5	2.5	3.0	71.5	9025	0.1930	0.26	0.347	326	336
3x120	4.5	2.5	3.1	74.5	9990	0.1530	0.28	0.332	364	380
3x150	4.5	2.5	3.2	78.0	11220	0.1240	0.30	0.322	413	439
3x185	4.5	3.15	3.3	83.5	13750	0.0991	0.33	0.311	457	506
3x240	4.5	3.15	3.5	89.5	16190	0.0754	0.36	0.300	530	583
3x300	4.5	3.15	3.6	94.5	78740	0.0601	0.40	0.289	570	614

Type : 2xSEYRGY
Standard : IEC 60502-2
Voltage : 18/30 (36) KV
THREE CORE

Applicaton: Suitable for indoor, outdoor, underground and in water for continuous permissible service voltage of 19/33 KV.

Construction: *1. Annealed Copper Conductor 2. Inner semiconducting layer 3. XLPE Insulation 4. Outer semiconducting layer 5. Metalic screen. 6. Separation Sheath 7. Round Steel wire armour 8. PVC outer sheath.*

Colour of Sheath: *Red*

Table : 53

PHYSICAL DATA						ELECTRICAL DATA		
Nominal Conductor Area	Minimum Insulation Thickness	Nominal dia. of round steel wire armour	Nominal Sheath Thickness	Approx. Overall Dia. of Cables	Approx. Weight of Cables	Maximum DC resistance of conductor at 20°C	Current rating in	
							Ground at 20°C	Air at 30°C
core x mm²	mm	mm	mm	mm	Kg/Km	Ohm/Km	amps	amps
3x70	8.0	3.15	3.4	87.0	11710	0.2680	271	273
3x95	8.0	3.15	3.5	91.0	13180	0.1930	326	336
3x120	8.0	3.15	3.6	94.5	14210	0.1530	364	380
3x150	8.0	3.15	3.7	98.0	15600	0.1240	413	439
3x185	8.0	3.15	3.9	102.0	17470	0.0991	457	506
3x240	8.0	3.15	4.0	107.0	19950	0.0754	530	583
3x300	8.0	3.15	4.2	113.5	22780	0.0601	570	614

Note : 1. Current ratings are valid for cables laid under defined conditions at page no-64. For current ratings at deviated conditions apply correction factors as given on page no-64-65.

OVERHEAD CONDUCTORS

Type : AAC
Standard : BDS-1036, BS-215, Part-1 & IEC-207

Table : 54

All Aluminium Stranded Conductors (AAC)

Code Name	Nominal Aluminium Area	Equivalent Copper Area	Number & Diameter of Al Wires		Overall Diameter of Conductor	Nominal Breaking Load	Max. DC Resistance at 20°C	Approx Weight	Current Rating
-	mm^2	mm^2	no.	mm	mm	kgf	ohm/km	kg/km	amps
MIDGE	22	14.2	7	2.06	6.18	408	1.227	64	114
APHIS	25	16.1	3	3.35	7.20	419	1.081	73	139
GNAT	25	16.1	7	2.21	6.60	468	1.068	74	124
WEEVIL	30	19.4	3	3.66	7.80	496	0.9082	87	144
MOSQUITO	35	22.6	7	2.59	7.80	617	0.7731	102	147
LADYBIRD	40	25.8	7	2.79	8.40	701	0.6694	118	159
ANT	50	32.3	7	3.10	9.30	846	0.5419	145	181
FLY	60	38.7	7	3.40	10.20	1010	0.4505	174	199
BLUEBOTTLE	70	45.2	7	3.66	11.00	1156	0.3884	203	219
EARWIG	75	48.4	7	3.78	11.40	1218	0.3645	216	227
GRASSHOPPER	80	51.6	7	3.91	11.70	1303	0.3405	232	238
CLEGG	90	58.1	7	4.17	12.50	1482	0.2994	264	256
WASP	100	64.5	7	4.39	13.20	1632	0.2702	292	271
BEETLE	100	64.5	19	2.67	13.40	1776	0.2699	293	274
BEE	125	80.6	7	4.90	14.70	2033	0.2169	364	308
CRICKET	150	96.8	7	5.36	16.10	2432	0.1814	436	342
HORNET	150	96.8	19	3.25	16.30	2519	0.1825	435	346
CATERPILLER	175	113	19	3.53	17.70	2920	0.1547	513	380
CHAFER	200	129	19	3.78	18.90	3304	0.1349	588	414
SPIDER	225	145	19	3.99	20.00	3672	0.1214	655	439
COCKROACH	250	161	19	4.22	21.10	4120	0.1083	733	470
BUTTERFLY	300	194	19	4.65	23.30	4966	0.08916	890	528
MOTH	350	226	19	5.00	25.00	5748	0.07709	1029	572
DRONE	350	226	19	3.58	25.10	5858	0.07723	1027	572
LOCUST	400	258	19	5.36	26.80	6601	0.06714	1182	626
CENTIPEDE	400	258	37	3.78	26.50	6434	0.06944	1145	619
MAYBUG	450	290	37	4.09	28.60	7547	0.05921	1340	676
SCORPION	500	323	37	4.27	29.90	8156	0.05445	1461	710
CICADA	600	387	37	4.65	32.60	9682	0.04587	1732	784
TARANTULA	750	484	37	5.23	36.60	12247	0.03628	2192	899

Type : AAC-INS & AAC

Table : 55

A. Insulated All Aluminium Stranded Conductor (AAC-INS)

As Per BS-215, Part-1 & BS-6485

Code Name	Cross Sectional Area of Al	Strands & Wire Diameter	Dia. of Bare Conductor	Minimun Thickness of Insulation	Approx. Overall Diameter	Nominal Breaking Load	Max. DC Resistance at 20°C	Approx Weight	Current Rating
-	mm²	no./mm	mm	mm	mm	kgf	ohm/km	kg/km	amps
MIDGE	23.3	7/2.06	6.18	0.8	8.2	408	1.227	95	106
GNAT	26.9	7/2.21	6.60	0.8	8.6	468	1.068	110	115
MOSQUITO	36.9	7/2.59	7.80	0.8	9.8	617	0.7731	143	134
ANT	52.8	7/3.10	9.30	0.8	11.3	846	0.5419	215	172
FLY	63.6	7/3.40	10.20	0.8	12.2	1010	0.4505	230	191
BLUE BOTTLE	73.6	7/3.66	11.00	0.8	13.0	1156	0.3884	261	210
EARWIG	78.6	7/3.78	11.40	0.8	13.4	1218	0.3645	315	218
GRASSHOPPER	84.1	7/3.91	11.70	0.8	13.8	1303	0.3405	292	228
CLEGG	95.6	7/4.17	12.50	0.8	14.6	1482	0.2994	330	245
WASP	106.0	7/4.39	13.20	0.8	15.6	1632	0.2702	389	260

B. All Aluminium Stranded Conductor (AAC)

As Per BDS-1036, ASTM B231 (Class-A & AA) & IEC-207

Code Name	Nominal Aluminium Area		Number & Diamter of Al. Wires		Overall Diameter of Conductor	Nominal Breaking Load	Max. DC Resistance at 20°C	Approx Weight	Current Rating
-	AWG or MCM	mm	no.	mm	mm	kgf	ohm/km	kg/km	amps
ROSE	4	21.16	7	1.96	5.9	375	1.3620	58	104
IRIS	2	33.61	7	2.47	7.4	574	0.8574	92	136
POPPY	1/0	53.48	7	3.12	9.4	846	0.5390	148	180
ASTER	2/0	67.42	7	3.5	10.5	1066	0.4276	186	207
PHOLX	3/0	85.03	7	3.93	11.8	1291	0.3390	234	237
OXLIP	4/0	107.2	7	4.42	13.3	1628	0.2688	296	273
VALERIAN	250	126.7	19	2.91	14.6	2044	0.2275	348	305
DAISY	266.8	135.2	7	4.96	14.9	2053	0.2133	373	313
PEONY	300	152	19	3.19	16	2404	0.1896	419	340
TULIP	336.4	170.5	19	3.38	16.9	2697	0.1692	470	364
DAFFODIL	350	177.4	19	3.45	17.3	2805	0.1625	490	373
GOLDENTUFT	450	228	19	3.91	19.6	3462	0.1264	629	432
COSMOS	477	242	19	4.02	20.1	3670	0.1193	665	447
ZINNIA	500	253	19	4.12	20.6	3847	0.1137	698	459
DAHLIA	556.5	282	19	4.35	21.8	4282	0.1023	779	489

Type : ACSR

Table : 56

Aluminium Conductor Steel Reinforced (ACSR)

A. As Per BDS-1037, BS-215, Part-2 & IEC 209

Code Name	Cross Sectional Area		No. & Dia of Wire		Overall Diameter of Conductor	Colculated Breaking Lead	Max. DC Resistance at 20°C	Approx. weight of Conductor			Current Rating
	Conductor	Al	Al	Steel				Conductor	Al	Steel	
-	mm²	mm²	mm	mm	mm	kgf	ohm/km	kg/km	kg/km	kg/km	amps
SQUIRREL	24.46	20.97	6/2.11	1/2.11	6.33	806	1.37	85	58	27	109
GOPHER	30.60	26.23	6/2.36	1/2.36	7.08	979	1.093	106	72	34	126
WEASEL	36.86	31.6	6/2.59	1/2.59	7.77	1168	0.9077	108	73	35	134
FOX	42.79	36.66	6/2.79	1/2.79	8.37	1346	0.7827	149	101	48	147
FERRET	49.46	42.39	6/3.00	1/3.00	9.00	1550	0.6766	172	117	55	161
RABBIT	61.67	52.85	6/3.35	1/3.35	10.05	1876	0.5426	215	146	69	185
HORSE	116.16	73.36	12/2.79	7/2.79	13.95	6241	0.3936	538	202	336	268
RACOON	91.92	78.79	6/4.1	1/4.10	12.3	2774	0.3623	321	218	103	231
CAT	110.78	94.96	6/4.5	1/4.50	13.5	3335	0.3006	387	263	124	248
HARE	122.42	104.93	6/4.72	1/4.72	14.16	3671	0.2733	425	289	136	273
DOG	118.53	104.98	6/4.72	7/1.57	14.15	3335	0.2733	395	289	106	273
TIGER	161.85	131.1	30/2.36	7/2.36	16.52	5914	0.2204	603	362	241	323
WOLF	194.94	158.06	30/2.59	7/2.59	18.13	7056	0.1828	726	436	290	355
DINGO	167.46	158.57	18/3.35	1/3.35	16.75	3640	0.1815	506	437	69	349
CARACAL	194.48	184.24	18/3.61	1/3.61	18.05	4181	0.1563	586	508	80	383
PANTHER	261.54	212.06	30/3.00	7/3.00	21.00	9402	0.1363	974	585	289	421
LION	293.87	238.27	30/3.18	7/3.18	22.26	10258	0.1212	1094	657	437	448
ELK	588.46	477.13	30/4.50	7/4.50	31.5	20211	0.06058	2190	1315	875	679

B. As Per BDS-1037, ASTM B 232 & IEC-209

Code Name	Cross Sectional Area		No. & Dia of Wire		Overall Diameter of Conductor	Calculated Breaking Lead	Max. DC Resistance at 20°C	Approx. weight of Conductor			Current Rating
	AWG or	Al	-	-				Conductor	Al	Steel	
-	MCM	mm²	mm	mm	mm	kgf	ohm/km	kg/km	kg/km	kg/km	amps
SWAN	4	21.15	6/2.12	1/2.12	6.36	846	1.356	85	58	27	105
SWALLOW	3	26.65	6/2.38	1/2.38	7.14	1040	1.076	108	73	35	121
SPARROW	2	33.58	6/2.67	1/2.67	8.01	1290	0.853	136	92	44	139
ROBIN	1	42.39	6/3.00	1/3.00	9	1620	0.6765	171	116	55	160
RAVEN	1/0	53.48	6/3.37	1/3.37	10.11	1990	0.5364	216	147	69	183
QUAIL	2/0	67.42	6/3.78	1/3.78	11.34	2400	0.4255	272	185	87	210
PIGEON	3/0	85.03	6/4.25	1/4.25	12.75	3010	0.3373	345	234	111	241
PENGUIN	4/0	107.23	6/4.77	1/4.77	14.31	3790	0.2676	433	294	139	276
WAXWING	266.8	135.16	6/3.09	1/3.09	15.45	3120	0.2133	430	372	58	319
OSTRICH	300	152.00	26/2.73	7/2.12	17.28	5760	0.1906	614	420	194	346
MERLIN	336.4	170.45	18/3.47	1/3.47	17.35	3940	0.1692	543	469	74	366
CHICKADEE	397.5	201.42	18/3.77	1/3.77	18.85	4510	0.1432	642	554	88	403
PELICAN	477	241.68	18/4.14	1/4.14	20.7	5330	0.1193	774	668	106	449
HAWK	477	241.68	26/3.44	7/2.68	21.8	8870	0.11682	977	667	310	455
HEN	477	241.68	30/3.20	7/3.20	22.4	10800	0.1202	1109	337	442	457
GROSBEAK	636	322.46	26/3.97	7/3.09	25.15	11400	0.08989	1302	893	409	538

Type : ACSR & Bare Aluminium Wire

Table : 57

A. Bare ACSR Conductor

1. As Per ASTM B232, IEC 209, BDS-1037

REB Item No.	Size	Code Name	Stranding & Wire Diameter		Overall Diameter	Ultimate Strength	Max. DC Resistance at 20°C	Approx. Weight
			Steel	Aluminium				
			nos./cm	nos./cm	cm	kg	ohm/km	kg/km
D-1	3 AWG	SWALLOW	1/0.2379	6/.23799	0.7137	1014	1.073758	108
D-2	1/0 AWG	RAVEN	1/.3370	6/.33705	1.0109	1926	0.535015	216
D-3	4/0 AWG	PENGUIN	1/.4770	6/.47701	1.43	3760	0.267196	433
D-28	477 MCM	HAWK	7/.2674	26/.3439	2.1793	8845	0.11682	977

2. English Unit Equivalents

REB Item No.	Size	Code Name	Stranding & Wire Diameter		Overall Diameter	Ultimate Strength	Max. DC Resistance at 20°C	Approx. Weight
			Steel	Aluminium				
			nos./inch	nos./inch	inch	lbs	ohm/mile	lbs/mile
D-1	3 AWG	SWALLOW	1/.0937	6/.0937	0.281	2235	1.728	381
D-2	1/0 AWG	RAVEN	1/.1327	6/.1327	0.398	4245	0.861	768
D-3	4/0 AWG	PENGUIN	1/.1878	6/.1878	0.563	8290	0.43	1537
D-28	477 MCM	HAWK	7/.1053	26/.1354	0.858	19500	0.188	3468

B. Bare Aluminium Wire

As Per ASTM B-230, B-531, B-609, B-193 & B-233

REB Item No.	REB Item.	Size	Approximate Dia of Wire	Approximate Conductor Dia	Calculated Breaking Load	Max. DC Resistance at 20°C	Approx. Weight
			nos./mm	mm	kg	ohm/km	kg/km
Hard drawn Aluminium Grounding wire	D-4	4 AWG	1/5.189	5.189	342 (min)	1.336	57.2
Annealed Aluminium Tie Wire	D-5	4 AWG	1/5.189	5.189	167 (max)	1.325	57.2

Type : MHD Copper & Service Drop Cable

Table : 58

A. Bare Copper Conductor and Wire

As Per ASTM B3 & ASTM B2, ASTM B193

Description	REB Item.	Size	Approximate Dia of Wire	Approximate Conductor Dia	Calculated Breaking Load	Max. DC Resistance at 20°C	Approx. Weight
			nos./mm	mm	kg	ohm/km	kg/km
Annealed copper wire	D-6	6 AWG	1/4.115	4.115	346 (max)	1.321	118
MHD stranded copper conductor	D-7	3 AWG	3/3.360	7.254	1070	0.683	239
MHD stranded copper conductor	D-8	1/0 AWG	7/3.119	9.347	2155	0.338	483
MHD stranded copper conductor	D-9	4/0 AWG	7/4.420	13.259	3694	0.166	956
MHD stranded copper conductor	DS-10	2/0 AWG	19/2.130	10.64	2162	0.271	613
MHD stranded copper conductor	DS-9	4/0 AWG	19/2.680	13.41	4371	0.173	970
MHD stranded copper conductor	DS-37	350 MCM	37/2.470	17.30	5662	0.9898	1608
MHD stranded copper conductor	DS-38	500 MCM	37/2.900	20.6	10231	0.0700	2297
MHD stranded copper conductor	D-10	2/0 AWG	7/3.502	10.5	2694	0.2750	616

B. Pre-assembled XLPE Insulated Aluminium Conductors with ACSR Messenger Wire

As Per ASTM B231, B232, ICEA-S-66-524 (NEMA WC7)
Duplex & Quaduplex Cables

REB Item no.	Conductor AWG		Conductor Code Name		Number of Phase	Conductor Stranding & Approximate Diameter			Insulation Thickness (XLPE)	Overall Conductor Diameter		Max. DC Resistance at 20°C		Approx. weight
	Phase	Neutral	Phase	Neutral		Phase AL	Neutral AL	Neutral Steel		Insulated phase each	Neutral	Phase	Neutral	
						nos./mm	nos./mm	nos./mm	mm	mm	mm	ohm/km	ohm/km	kg/km
D-11	6	6	PEACHBELL	TURKEY	1	7/1.56	6/1.68	1/1.68	45/1.143	6.97	5.04	2.169	2.1526	114
D-12	3	3	LILY	SWALLOW	1	7/2.20	6/2.38	1/2.38	45/1.143	8.89	7.14	1.0709	1.074	212
D-14	3	3	LILY	SWALLOW	3	7/2.20	6/2.38	1/2.38	45/1.143	8.89	7.14	1.0709	1.074	420
D-15	1/0	1/0	POPPY	RAVEN	3	7/3.12	6/3.37	1/3.37	60/1.524	12.41	10.11	0.5344	0.5344	835
D-20	4	4	ROSE	SWAN	3	7/1.96	6/2.12	1/2.12	45/1.143	8.17	6.36	1.3551	1.3522	340
D-24	4/0	4/0	OXLIP	PENGUIN	3	7/4.42	6/4.77	1/4.77	60/1.524	16.31	14.31	0.2667	0.2667	1580
D-25	6	6	PEACHBELL	TURKEY	3	7/1.56	6/1.68	1/1.68	45/1.143	6.91	5.04	2.169	2.157	230

TYPE : MHD INS COPPER & AAC

Table : 59

A. Medium Hard Drawn XLPE Insulated Copper Conductor

As Per ASTM B2 & B8, ICEA-S-66-524 (NEMA WC7)

REB Item No.	Conductor Size	Number of Strands/mm	Insulation Thickness	Overall Diameter	Nominal Length		Approx. Weight	
			mils	mils	meter	feet	kgs	lbs
D-16	3 AWG	3/3.36	60	405	304.8	1000	88	194
D-17	1/0 AWG	7/3.12	62	481	804.7	2640	436	961
D-18	4/0 AWG	7/4.42	62	630	536.4	1760	563	1242
D-19	1000 MCM	61/3.25	94	1306	228.6	750	1108	2442

B. Bare Aluminium Alloy Conductor

As Per ASTM B 98-90 & B 399-97

REB Item No.	Size	Code Name	Number of Strand	Strand Diameter		Conductor Overall Diameter		Conductor DC Resistance at 20°C		Ultimate Conductor Strength	Approx. Weight
	kcmills			inch	mm	inch	mm	ohm/mile	ohm/km	kg	kg/km
D-29	77.47	AMES	7	0.1052	2.67	0.316	8.01	1.373	0.8532	1274	107.5
D-30	123.2	AZUSA	7	0.1327	3.37	0.398	10.11	0.861	0.5350	1937	171.0
D-31	246.9	ALLIANCE	7	0.1878	4.77	0.563	14.31	0.4308	0.2678	3884	342.6
D-32	559.5	DARIEN	19	1.1716	4.36	0.858	21.80	0.1900	0.1180	8522	776.3

TECHNICAL INFORMATION

CURRENT CARRYING CAPACITY OF CABLES MADE ACCORDING TO BDS 900 & BS6004

1. DEFINED CONDITIONS :

The basis of the current ratings of cables has been so chosen for normal ambient temperature of 35° C and for normal laying conditions as follows:

A. For Groups of unenclosed systems of single core cables :

1) The horizontal clearance between the systems is around 150 mm and not less than six times the individual cables diameter or one time the overall width of the individual system
2) The vertical clearance between systems is not less than 150 mm.
3) If the numbers of systems are more four, they are installed in a horizontal plane.

B. For Groups of unenclosed multi core cables:

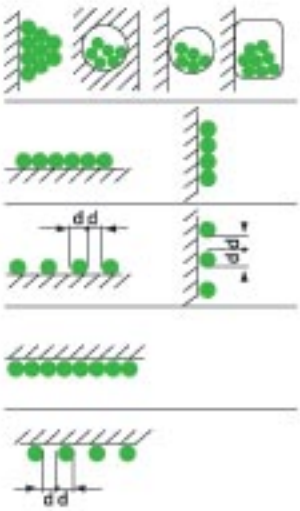
1) The horizontal clearance between the systems is around 150 mm and not less than six times the individual cables diameter
2) The vertical clearance between cables is not less than 150 mm
3) If the numbers of cables are more than four, they are installed in a horizontal plane

2. DEVIATED CONDITIONS

If the actual conditions of installations are not same as normal conditions the current rating given are to be multiplied with the rating factors as given below:

Ambient Temperature °C	25	30	35	40	45	50	55	60
Rating factors for cables having excess-current protection which will operate within four hours at 1.5times of the designed load current.	1.13	1.06	1.0	0.93	0.84	0.76	0.65	0.53
Rating factors for cables having no excess current protection as above	1.05	1.03	1.0	0.97	0.94	0.91	0.79	0.65

Rating Factors for the Grouping of Cables



Number of multicore cables or number of alternating and rotary current circuits for single-core cables (2 and 3 current carrying conductors)	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20
Laid in bundles directly on the wall, on the floor, in electro-installation ducts or conduits and on or in the wall	1.0	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 on the wall or on the floor in contact with one another	1.0	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.70						
Single-layer on the wall or on the floor. Distance between two cables: diameter of cable	1.0	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 under the ceiling in contact with one another	0.95	0.81	0.72	0.68	0.66	0.64	0.63	0.62	0.61						
Single-layer under the ceiling. Distance between two cables: diameter of cable	0.95	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85

1) according to IECTC 64 (Sec) 261.edition March 1979

CURRENT CARRYING CAPACITY OF CABLES MADE ACCORDING TO VDE 0271, IEC 60502-1

The current carrying capacity of cables should be limited in such a degree that all locations in cable system which causes the generated heat under given proportions to lead safely in the environment.

The heat flow depends on the inner heat-resistance between conductor and outer surface of the cable and as well as from the heat emission to the surroundings.

DEFINED CONDITIONS:

The basis of the current ratings has been so chosen that they, without considering any multiplication factor, are suitable for cable laid in our country under the following defined conditions:

Indication for calculation :

a) Cable Laying in Ground:

1) Temperature of the soil at the depth of laying = 30° C
2) Depth of laying = 70 cm
3) Cable way is covered with layers of sand and brick.
4) Thermal resistivity of the soil at continuous full loading of the cables = 120° C cm/W.
5) One single core d.c. cable installed separately, or one multi core cable installed separately, or three single core cables in three phase system installed in flat formation with clearance of 7 cm. or in trefoil formation, touching each other.
6) The cable way is through a pipe of length not more than 6 meters.

b) Cables Laying in Air:

1) Ambient air temperature = 35° C
2) One single core d.c cable installed separately free in air, or, one multi core cable-installed separately free in air, or, one three phase system, comprising cable three single core cables installed separately free in air in flat formation with a clearance of one diameter between individual single-core cables or in trefoil formation each individual single core cable being in touch with each other.
3) One single core d.c. cable, one multi core cable or one three phase system of three single core cables installed free in air with minimum clearance of.

a) 2 cm from floor, wall or roof of the room.
b) Twice the cable diameter between two cables and four times the cables diameter between two systems.
c) 30 cm vertically between layers installed one above the other.

4) Cable is protected against radiation of heat from sun or any other source.

Key Information for Current Carrying Capacity of Cable:

- Radiation of heats and solar influence must be taken into consideration, where a good air circulation is needed.
- A sufficient large distance is to be retained between the cables and the heating elements, because badly insulated heating elements often raise additionally the temperature of the cable
- Distance between the cable and the wall,floor or ceiling = 2 cm
- Distance between the cables being laid one above the other = 2 x D
- Distance between the cable systems being laid one above the other = 20 cm
- Distance between the cables being laid side by side = 2 x D
- Approx. Value of Specific Ground Thermal Resistivity

Very moist area	= 70° C. cm/w
Moist area	=100° C cm/w
Dry area	=200° C.cm/w
Very dry area	=300° C.cm/w

DEVIATED CONDITIONS FOR UNDERGROUND

If the actual condition of cable laying are not same as normal condition, the current rating vlaue of cables are to be multplied with rating factors given in the following tables :

Variation of Depth of Laying (Twin or Multi-Core Cables)

	Depth of Laying in cm									
	< 70	< 90	< 105	< 120	< 150	< 180	< 270	< 360	< 450	540 or more
Rating Factor	1	0.99	0.98	0.97	0.96	0.95	0.92	0.91	0.90	0.89

Rating Factors for Cables Laid in Sand

Condition of Laying		
Punned down sand and cover of bricks	Single-Core or multi- core cable laid in ground and added mechanical protection for cables with air gilled hollow.	Single-core or multi-core cables direct in the ground with added mechanical protection and hollow filled with sand.
Conversion factors for above		
1	0.80	0.86

Variation of Specific Thermal Resistivity of Soil for Cables : Factor A

	Specific Thermal Resistivity of Soil on °C Cm/W						
	70	100	120	150	200	250	300
25 mm^2 & Below	1.18	1.07	1	0.93	0.83	0.77	0.71
35 mm^2 to 95 mm^2	1.22	1.08	1	0.93	0.82	0.75	0.69
120 mm^2 to 240 mm^2	1.23	1.08	1	0.93	0.82	0.74	0.69
3OOmm^2 & Above	1.25	1.09	1	0.93	0.82	0.74	0.69

Variation of Specific Thermal Resistivity of Soil for Cables : Factor B

	Voltage E/Eo kV	Specific thermal resistivity of soil on °C Cm/W						
		70	100	120	150	200	250	300
3 and 4 core cable	1/0.6	1	1	1	1	1	1	1
Twin core cable	1/0.6	0.97	0.99	1	1	1.01	1.01	1.02
Single core D.C.	1/0.6	0.97	0.99	1	1	1.01	1.01	1.02
3 core cable with each core shielded	6/3.5 10/5.8	0.96	0.99	1	1.01	1.02	1.03	1.04
3 unarmoured single core cable	1/0.6 6/3.5 10/5.8	1.01	1	1	0.98	0.97	0.97	0.96

For Variation of specific Thermal Resistivity of Soil, PVC Cables from 120 °C cm/Wand current rating values in Table :9 to 21 are to be multiplied by both the factor A and B to obtain the actual rating.

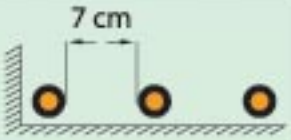
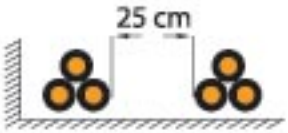
Variation Factors for Ambient Temperature of Cables Laid in Underground

	Voltage Eo/E kV	Ambient Temperature °C								
		15	20	25	30	35	40	45	50	55
Rating factor	0.6/1.0	1.18	1.12	1.07	1.00	0.95	0.87	0.79	0.70	0.60

Group Rating Factors for Multicore and Single - Core D.C. Cables in the Ground

Condition of laying		No. of Systems or Cables						
		2	3	4	5	6	8	10
Cables laid direct in the Ground in flat formation, clearance 7 cm (thickness of a brick) between the cables		0.85	0.75	0.68	0.64	0.60	0.56	0.53

Group Rating Factors for Single - Core Cables in Three - Phase System in the Ground

Condition of laying		No. of Systems or Cables		
		2	3	4
Cables laid direct in the ground in flat formation, clearance 7 cm between systems and also between individual cables in each system		0.82	0.74	0.68
Cables laid direct in the ground in trefoil formation, touching each other, clearance 25 cm between systems		0.85	0.77	0.72

Multi-core Cable in Steel or Earthenware Pipe

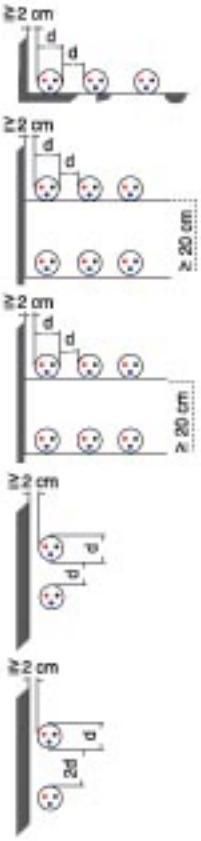
	One Multi-core cable in each pipe									
	Number of Pipe									
	1	2	3	4	5	6	7	8	9	10
Rating factor	0.82	0.74	0.70	0.67	0.65	0.63	0.62	0.60	0.59	0.58

DEVIATED CONDITIONS FOR AIR:

Rating Factors for Variation of Ambient Temperature for Cables Laid in Air

	Voltage Eo/E kV	Ambient Temperature °C						
		25	30	35	40	45	50	55
Rating factor	0.6/1.0	1.13	1.06	1.00	0.93	0.84	0.76	0.65

Group Rating Factors for Multicore Cables Laid in Air.



Multicore Cables in Air
Arrangement of cables

Distance = Cable diameter d
Distance from the wall ≥2 cm

Number of cables side by side		1	2	3	6	9
Laid on the ground		0.95	0.90	0.88	0.85	0.84
	Number of troughts					
Laid on cable troughs (restricted air circulation)	1	0.95	0.90	0.88	0.85	0.84
	2	0.90	0.85	0.83	0.81	0.80
	3	0.88	0.83	0.81	0.79	0.78
	6	0.86	0.81	0.79	0.77	0.76
	Number of racks					
Laid on cable racks	1	1.00	0.98	0.96	0.93	0.92
	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
Number of cables laid one above the other		1	2	3	6	9
Arranged on structures or on the wall		1.00	0.93	0.90	0.87	0.86

Arranged where reduction of current is not necessary. Number of cables laid side by side is not restricted.
This applies only when the cable temperature has no effect on the ambient temperature.

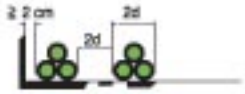
Multicore Cables in Air
Arrangement of cables

Cables touching each other
Cable in contact with the wall

Number of cables side by side		1	2	3	6	9
Laid on the ground		0.90	0.84	0.80	0.75	0.73
	Number of troughts					
Laid on cable troughs (restricted air circulation)	1	0.95	0.84	0.80	0.75	0.73
	2	0.95	0.80	0.76	0.71	0.68
	3	0.95	0.78	0.74	0.70	0.68
	6	0.95	0.76	0.72	0.68	0.66
	Number of racks					
Laid or, cable racks	1	0.95	0.84	0.80	0.75	0.73
	2	0.95	0.80	0.76	0.71	0.69
	3	0.95	0.78	0.74	0.70	0.68
	6	0.95	0.76	0.72	0.68	0.66
Number of cables laid one above the other		1	2	3	6	9
Arranged on structures or on the wall		0.95	0.78	0.73	0.68	0.66

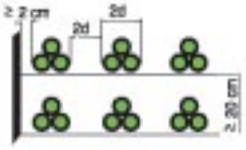
Arranged where reduction of current is not necessary. Number of cables laid side by side is not restricted.
This applies only when the cable temperature has no effect on the ambient temperature.

Group Rating Factors for Single - Core Cables in Three - Phase System in Air

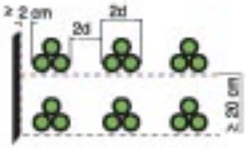


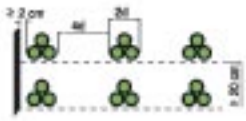
Single-core cable in air, trefoil formation

Arrangement of cables — Cables laid in trefoil formation = 2d
Distance from the wall > 2 cm



Number of systems laid in flat formation		1	2	3
Laid on the ground		0.95	0.90	0.88
	Number of troughs			
Laid on cable troughs (restricted air circulation)	1	0.95	0.90	0.88
	2	0.90	0.85	0.83
	3	0.88	0.89	0.81
	6	0.86	0.81	0.79
	Number of racks			
Laid on cable racks	1	1.00	0.98	0.96
	2	1.00	0.95	0.93
	3	1.00	0.94	0.92
	6	1.00	0.93	0.90





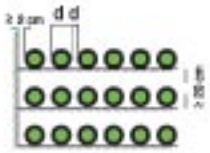
Arrangement where reduction of current is not necessary

This applies only when the cable temperature has no effect on the ambient temperature.

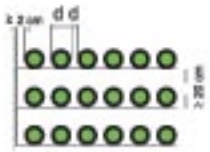
	1	2	3
Number of systems laid one above the other Arranged on structures or on the wall	0.89	0.86	0.84

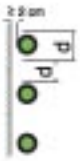
Single - core cables in air, Flat formation

Arrangement of cables — Cables laid in Flat formation = d
Distance from the wall > 2 cm



Number of systems		1	2	3
Laid on the floor		0.92	0.89	0.88
	Number of troughs			
Laid on cable troughs	1	0.92	0.89	0.88
	2	0.87	0.84	0.83
	3	0.84	0.82	0.81
	6	0.82	0.80	0.79
Laid on cable racks	Number of racks			
	1	1.00	0.97	0.96
	2	0.97	0.94	0.93
	3	0.96	0.93	0.92
	6	0.94	0.91	0.90





	1	2	3
Number of systems laid one above the other arranged on structures or on the wall	0.94	0.91	0.89

CURRENT CARRYING CAPACITY OF CABLES MADE ACCORDING TO IEC 60502-2

DEFINED CONDITIONS :

1. Maximum continuous conductor temperature 90°C
2. Ground temperature 20°C
3. Thermal resistivity of soil 100°C. cm/W
4. Ambient Air temperature 30°C
5. Depth of laying for direct burial in ground
   a) For cables up to 6/10(12) KV grade 900mm
   b) For cables up to 8.7/15(17.5) KV grade 1050mm
6. Type of installation :
   a) Single core cables installed in Trefoil formation
   b) Multicore cables installed singly.

DEVIATED CONDITIONS :

A. CABLES LAID DIREC IN GROUND

a) Correction factors for variation in ground Temperature :

Ground Temperature : (°C)	15	20	25	30	35	40	45
Rating Factor	1.04	1.00	0.96	0.93	0.89	0.85	0.81

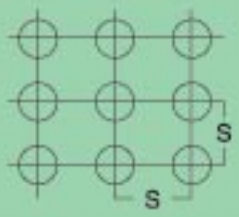
b) Correction factors for variation in Thermal resistivity of soil :

Thermal Resistivity of soil (°C.cm/W)	100	120	150	200	250	300
Rating Factor	1.00	0.94	0.84	0.75	0.68	0.62

c) Correction factors for various depth of Laying :

Depth of Laying (cm)	Up to 6/10 KV	8.7/15 KV
90	1.00	-
105	0.99	1.00
120	0.98	0.99
150	0.96	0.97
180 & above	0.95	0.96

d) Correction factors for grouping of cables :

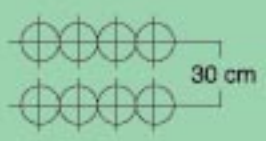
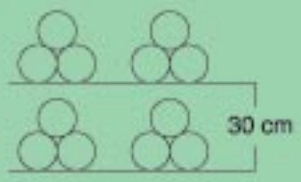
Number of cables/circuits in group	Multicore cables in horizontal formation			Multicore cables in tier formation 			Multicore cables in trefoil touching formation (Three Cables per circuit)		
	Touching	s=15 cm	s=30 cm	Touching	s=15 cm	s=30 cm	Touching	s=15 cm	s=30 cm
2	0.79	0.82	0.86	-	-	-	0.78	0.82	0.85
3	0.69	0.72	0.76	-	-	-	0.68	0.71	0.76
4	0.62	0.66	0.72	0.60	0.64	0.69	0.61	0.65	0.71
6	0.54	059	0.65	0.51	0.55	0.60	0.53	0.57	0.64

B. CABLES LAID ON RACKS IN AIR

a) Correction factors for variation in ambient Air Temperature :

Ambient Air Temperature (°C)	20	25	30	35	40	45	50
Rating Factor	1.07	1.04	1.00	0.96	0.91	0.86	0.83

b) Correction factors for grouping of cables :

Number of cables/circuits in group	Multicore cables in (touching) 				Multicore cables (Spacing between cables equal to diameter of cable)				Single core cables in trefoil touching formation spacing between circuit equal to twice the diameter of cable 			
	Number of racks				Number of racks				Number of racks			
	1	2	3	6	1	2	3	6	1	2	3	6
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	0.84	0.80	0.78	0.76	0.98	0.95	0.94	0.93	0.98	0.95	0.94	0.93
3	0.80	0.76	0.74	0.72	0.96	0.93	0.82	0.90	0.96	0.93	0.92	0.90
6	0.76	0.71	0.70	0.68	0.93	0.90	0.89	0.87	-	-	-	-

MAXIMUM SHORT CIRCUIT CURRENT RATING OF CONDUCTOR

Maximum Conductor temperature under normal operation = 90°C
Maximum Conductor temperature during short circuit = 250°C

Conductor temperature at the begining of short circuit (°C)	90	80	70	65	60	50
Short circuit current (A/mm²)	143	149	154	157	159	165

The short circuit current for any duration (up to 5 sec) can be obtained from the following formula :

$$Isc(t) = \frac{Isc(1)}{\sqrt{t}}$$

Where Isc(1) = short circuit current at 1 sec.
t = duration of short circuit (sec)

VOLTAGE DROP FOR HT CABLES (VOLTAGE UP TO 17.5 KV)

A. VOLTAGE DROP PER CORE / PER AMP. / PER KM.

1. For Single core cables

Conductor Area	3.6/6(7.2) KV		6/10(12) KV		8.7/15(17.5) KV	
	Unarmoured	Armoured	Unarmoured	Armoured	Unarmoured	Armoured
Noxmm²	V/core/A	V/core/A	V/core/A	V/core/A	V/core/A	V/core/A
1 x 25	0.948	0.950	0.949	0.951	0.950	0.952
1 x 35	0.688	0.691	0.689	0.692	0.691	0.694
1 x 50	0.514	0.517	0.515	0.519	0.516	0.520
1 x 70	0.364	0.369	0.366	0.370	0.367	0.372
1 x 95	0.271	0.277	0.273	0.279	0.276	0.282
1 x 120	0.223	0.229	0.225	0.231	0.228	0.234
1 x 150	0.189	0.196	0.191	0.199	0.195	0.202
1 x 185	0.161	0.169	0.163	0.172	0.166	0.174
1 x 240	0.135	0.144	0.138	0.147	0.141	0.150
1 x 300	0.121	0.129	0.122	0.131	0.125	0.134
1 x 400	0.108	0.117	0.109	0.118	0.113	0.123
1 x 500	0.100	0.111	0.101	0.111	0.104	0.114
1 x 630	0.093	0.103	0.094	0.103	0.097	0.106
1 x 800	0.088	0.098	0.089	0.098	0.092	0.101

2. For Three core cables

Conductor Area	3.6/6(7.2) KV		6/10(12) KV		8.7/15(17.5) KV	
	Unarmoured	Armoured	Unarmoured	Armoured	Unarmoured	Armoured
Noxmm²	V/core/A	V/core/A	V/core/A	V/core/A	V/core/A	V/core/A
3 x 25	0.946	0.946	0.947	0.947	0.948	0.948
3 x 35	0.686	0.686	0.687	0.687	0.688	0.688
3 x 50	0.511	0.511	0.512	0.512	0.514	0.514
3 x 70	0.360	0.360	0.362	0.362	0.364	0.364
3 x 95	0.267	0.267	0.269	0.269	0.272	0.272
3 x 120	0.218	0.218	0.221	0.221	0.223	0.223
3 x 150	0.184	0.184	0.186	0.186	0.189	0.189
3 x185	0.155	0.155	0.158	0.158	0.161	0.161
3 x 240	0.130	0.130	0.132	0.132	0.135	0.135
3 x 300	0.114	0.114	0.116	0.116	0.119	0.119

B. VOLTAGE DROP FOR LT CABLES (VOLTAGE UP TO 1.0 KV)

Nominal cross-sectional area	DC - System	Single-phase AC-System	Three-phase AC-System
(mm^2)	(mV/A/m)	(mV/A/m)	(mV/A/m)
1.5	24.2	27.9	24.1
2.5	14.3	17.1	14.8
4	9.0	10.7	9.3
6	6.0	7.2	6.2
10	3.6	4.3	3.7
16	2.3	2.8	2.4
25	1.5	1.8	1.5
35	1.1	1.3	1.1
50	0.8	0.96	0.85
70	0.6	0.70	0.60
95	0.4	0.55	0.45
120	0.3	0.45	0.35
150	0.25	0.35	0.31
185	0.20	0.30	0.26
240	0.15	0.25	0.22
300	0.12	0.22	0.19
400	0.10	0.19	0.17

The voltage drop in a circuit, of which the cable forms a part, should not exceed 3-5% of the nominal voltage; e.g. 20.0 volts (5%) for a three-phase 400 volts supply. The above mentioned voltage drop is tabulated for a current of 1 ampere for a 1 metre run. For any cable length, the values need to be multiplied by the length of the cable (in metres) and by the current (in amperes).

Example:

Formula for the calculated voltage drop in mV/A/m:

$$e_{cal} = \frac{\text{permissible voltage drop (e)} \times 1000}{\text{current (1)} \times \text{length (1)}}$$

Installation length (L) : 300 m
Current (I) to carry : 80 A
Nominal voltage (U) : 400 V (Three-phase AC)
Permissible voltage drop (e) : 20.0 V (5% of 400 V)

$$e_{cal} = \frac{20.0\ V \times 1000}{80\ A \times 300\ m} = 0.83\ mV/A/m$$

Select a cross-section, such that the voltage drop is equal to or less than 0.83 mV/A/m from table 3. It has to be ensured that the selected cross-section will carry the current (see pages H5 up to H7). The corresponding cross-section will be 50mm².

PHYSICAL & ELECTRICAL PROPERTIES OF COPPER & ALUMINIUM

Copper and aluminium are used in their highly refined form for the power conductors of cables. The total impurities containes in high conductivity copper should be less than 0.1% and for aluminium less than 0.5%. The measured conductivity of these metals will have its highest value when they are annealed. Hard drawn conductors will have conductivity that is several percentage points lower than the annealed value. Note that castings made of these materials will generally have conductivity slightly lower than their rolled and drawn forms.

The presence of oxygen in the form of oxides is the most common impurity. It slightly reduces the conductivity, malleability and ductility of the metal.

Following Table: shows some of the electrical and physical properties of these two metals. For use in most power cable applications these metals are formed into annealed conductors.

Property	Unit	Copper		Aluminium	
		Hard-drawn	Annealed	Hard-drawn	Annealed
Melting point	°C	1083	1083	658	658
Density	gm/cm³	8.89	8.89	2.703	2.703
Tensile strength	kg/mm²	34-47	34-47	15-20	,7-14
Electrical Resistivity at 20°C	ohm-mm²/m	17.770	17.241	28.73	28.20
Electrical Conductivity at 20°C	%IACS	97	100	60	61
Temperature Co-efficient of resistance at 20°C, per unit of cons. Mass	-	0.00393	0.00393	0.00403	0.00403
Co-efficient toliner expansion	/°C	17×10^{-6}	17×10^{-6}	23×10^{-6}	23×10^{-6}
Thermal Conductivity	W/°C.cm	3.86	3.86	2.39	2.39
Specific heat	j/°C.cm³	3.4	3.4	2.4	2.4

Formula for Electrical Calculation

To Calculate	Given	D. C.	A. C. Single phase	A. C. 3 phase
Current (A)	KW	$A = \frac{1000 \times KW}{V}$	$A = \frac{1000 \times KW}{V \times p.f.}$	$A = \frac{1000 \times KW}{1.73 \times V \times p.f.}$
Current (A)	KVA		$A = \frac{1000 \times KVA}{V}$	$A = \frac{1000 \times KVA}{1.73 \times V}$
Current (A)	HP	$A = \frac{746 \times HP}{V \times eff.}$	$A = \frac{746 \times HP}{V \times eff. \times p.f.}$	$A = \frac{746 \times HP}{1.73 \times eff. \times p.f. \times V}$
Power (KW)	V.A.	$KW = \frac{A \times V}{1000}$	$KW = \frac{A \times V \times p.f.}{1000}$	$KW = \frac{1.73 \times A \times V \times p.f.}{1000}$
Apparent Power (KVA)	V.A.		$KVA = \frac{A \times V}{1000}$	$KVA = \frac{1.73 \times A \times V}{1000}$

P.f. = Power factor of equipment or system under consideration.
eff. = Efficiency of motor or machinery.
V = line voltage.

Some Useful Rated Current

Average Induction Motor						
Nominal Motor Rating		1 Phase		3 Phase		
		110V	230V	380V	415V	440V
HP	KW	amp	amp	amp	amp	amp
1/2	0.37	7.8	3.7	1.2	1.1	1.0
3/4	0.55	10.4	5.0	1.6	1.5	1.4
1	0.75	13.2	6.3	2.0	1.9	1.8
1 1/2	1.1	19.2	9.2	3.0	2.8	2.6
2	1.5	25.0	12.2	3.9	3.6	3.4
3	2.2	37.0	17.9	5.8	5.3	5.0
5	3.7	59.0	28.0	9.2	8.4	7.9
7 1/2	5.5	84.0	40.0	13.1	11.9	11.3
10	7.5	109.0	52.0	16.8	15.4	14.5
15	11.0	157.0	75.0	24.0	22.0	21.0
20	15.0	-	-	32.0	29.0	27.0
30	22.0	-	-	46.0	42.0	40.0
50	37.0	-	-	75.0	69.0	65.0
75	55.0	-	-	111.0	102.0	96.0
100	75.0	-	-	146.0	134.0	126.0

Pure Resistive Load					
Power	1 Phase		3 Phase		
	110V	230V	380V	415V	440V
KW	amp	amp	amp	amp	amp
1	9.1	4.3	1.5	1.4	1.3
2	18.2	8.7	3.0	2.8	2.6
3	27.3	13.0	4.6	4.2	3.9
4	36.4	17.4	6.1	5.6	5.3
5	45.5	21.7	7.6	7.0	6.6
6	54.6	26.1	9.1	8.4	7.9
7	63.6	30.4	10.6	9.7	9.2
8	72.7	34.8	12.2	11.1	0.5
9	81.8	39.1	13.7	12.5	11.8
10	91.0	43.5	15.2	13.9	13.1
20	182	87.0	30.4	27.9	26.3
40	364	170.0	60.8	55.7	52.5
60	545	261.0	91.3	83.6	78.8
80	727	348.0	122.0	111.0	105.0
100	909	435.0	152.0	139.0	131.0

COMPARISON OF COPPER & ALUMINIUM CONDUCTORS

Particulars	Aluminium Annealed EC grade Take annealed Copper as 100%	Copper (Annealed) Take annealed Aluminium as 100%
	%	%
For equal Cross sectional area and length		
Weight	30	329
Resistance	164	61
Breaking load (Approx.)	41	244
For equal weight and length		
Area	329	30
Diameter	180	55
Resistance	50	200
Breaking load (Approx.)	137	73
For equal resistance		
Area	164	61
Diameter	128	78
Weight	50	200
Breaking load (Approx.)	68	147
For equal current and temperature rise		
Weight	42	237
Diameter	119	84

MAX. SHORT CIRCUIT CURRENT CARYING CAPACITY IN KA/SEC.

Nominal Cross-section area	Aluminium Conductor		Copper Conductor	
	Type of Insulation		Type of Insulation	
mm^2	PVC	XLPE	PVC	XLPE
2.5	0.19	0.24	0.28	0.36
4	0.30	0.38	0.45	0.57
6	0.46	0.56	0.68	0.85
10	0.76	0.94	1.13	1.43
16	1.22	1.50	1.81	2.29
25	1.90	2.35	2.83	3.57
35	2.66	3.29	3.96	5.01
50	3.80	4.70	5.65	7.15
70	5.32	6.58	7.91	10.01
95	7.22	8.93	10.74	13.58
120	9.12	11.28	13.56	17.16
150	11.40	14.10	16.95	21.45
185	14.06	17.39	20.91	26.45
240	18.24	22.56	27.12	34.32
300	22.80	28.20	33.90	42.90
400	30.40	37.60	45.20	57.20
500	38.00	47.00	56.50	71.50
630	47.88	59.22	71.19	90.09
800	60.80	75.20	90.40	114.40
1000	76.00	94.00	113.00	143.00

Difference Between Standard Circular Conductor and Stranded Compact Circular Conductor

In the world of electrical conductors, there are several style that are used by electric utilities. The two common types of stranding that are using for power Cable. 1) Round wire conductor 2) Compact Conductor

Round wire conductor is the most common configuration that is used for bare conductor and insulated cable is made up of a number of the same size round wire that are cable together (see Figure 1). This construction adds flexibility tp the conductor, but the resulting air spaces that are introduced between the individual strands results in an overall increase in diameter of cable.

The first of the diameter reduction would be what is classified compact conductor. The individual strands of the conductor to reduce the total stranded diameter approximately 4% to 8% from the original diameter of the round wire conductor (see Figure 2). this type of conductor have no air spaces that are introduced between the individual strands. Compact conductor is made from EC grade scratch free and ensure excellent conductivity minimized electrical stress.

Figure 1

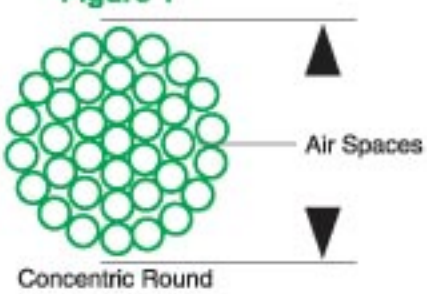
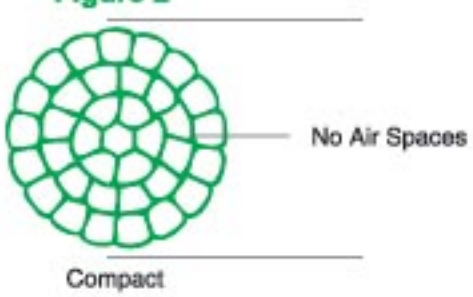


Figure 2

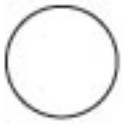


ABOUT CABLE LUGS

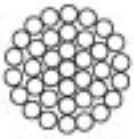
Compacted Conductors have a smaller diameter compared to standard stranded conductors, but their nominal cross sectional area is equivalent and a lug designated for the same cross sectional area must be used on the compacted conductor. Even though the lug will appear to fit more loosely, when crimped in accordance with the lug manufacturer's recommendations, the end result is the equivalent to the crimping of a standard conductor. Compacting the conductor by the cable manufacturer is just the action of pushing all the wires together, getting rid of the air gaps, ahead of time.

The general practice is for lug manufacturer's to manufacture a range of lug sizes that suits both the compacted and standard conductors. However, if there are any concerns, please consult your lug manufacturer.

CONSTRUCTION FOR VARIOUS TYPE OF CONDUCTORS



circular
solid
RE



circular
stranded
RM

circular
stranded
compacted
RM

sector-shaped
solid
SE

sector-shaped
stranded
SM

Nominal Cross Sectional Area	Max. Conductor Resistance at 20°C		NON COMPACTED CONDUCTOR		COMPACTED CONDUCTOR			SECTOR SHAPED CONDUCTOR	
			No. & Nominal Diameter of Wire	Nominal Conductor Diameter	No. of Wire in Conductor Cu/Al	Conductor Diameter		No. of Wire in Conductor Cu/Al	Nominal Conductor Depth
	Cu	Al			(Min.)	(Min.)	(Max.)	(Min.)	3C/4C
mm²	Ohm/km	Ohm/km	no./mm	mm	no.	mm	mm	no,	mm
1.0	18.1	-	1/1.13	1.13	-	-	-	-	-
1.0	18.1	-	3/0.65	1.40	-	-	-	-	-
1.5	12.1	-	1/1.38	1.38	--	--	--	--	--
1.5	12.1	18.1	7/0.52	1.56		-	-	-	-
2.5	7.41	-	1/1.78	1.78	-	-	-	-	-
2.5	7.41	12.1	7/0.67	2.01	-	-	-	-	-
4	4.61	7.41	7/0.85	2.55	-	-	-	-	-
6	3.08	4.61	7/1.04	3.12	-	-	-	-	-
10	1.83	3.08	7/1.35	4.05	-	-	-	-	-
16	1.15	1.91	7/1.70	5.10	-	-	-	-	-
25	0.727	1.20	7/2.14	6.42	-	-	-	-	-
35	0.524	0.868	19/1.53	7.65	6	6.6	7.5	6	5.6/6.6
50	0.387	0.641	19/1.83	9.15	6	7.7	8.6	6	6.6/7.2
70	0.268	0.443	19/2.17	10.85	12	9.3	10.2	12	7.9/9.3
95	0.193	0.320	19/2.52	12.60	15	11.0	12.0	15	9.4/10.5
120	0.153	0.253	37/2.03	14.21	18/15	12.3	13.5	18/15	10.7/11.7
150	0.124	0.206	37/2.27	15.89	18/15	13.7	15.0	18/15	11.9/12.6
185	0.0991	0.164	37/2.52	17.64	30	15.3	16.8	30	12.8/14.4
240	0.0754	0.125	61/2.25	20.25	34/30	17.6	19.2	34/30	14.9/16.1
300	0.0601	0.100	61/2.52	22.68	34/30	19.7	21.6	34/30	16.5/18.6
400	0.0470	0.0778	61/2.89	26.01	53	22.3	24.6	53	19.5/21.6
500	0.0366	0.0605	61/3.23	29.07	53	25.3	27.6	-	-
630	0.0283	0.0469	127/2.52	32.76	53	28.7	32.5	-	-
800	0.0221	0.0367	127/2.85	37.05	53	32.6	36.7	-	-
1000	0.0176	0.0291	127/3.20	41.60	53	36.3	40.5	-	-

Measurement Comparison in Various Systems

Gauge System		Diameter		Cross Section Area			Weight of Copper
A.W.G.	S.W.G	mm	mil	mm²	inch²	CM	kg/km
6/0	-	14.73	580	170.46	0.2642	336400	1515.4
5/0	-	13.11	516	134.92	0.2091	266156	1199.4
-	7/0	12.70	500	126.68	0.1964	250000	1126.2
-	6/0	11.79	464	109.09	0.1691	515296	969.8
4/0	-	11.68	460	107.22	0.1662	211600	953.2
-	5/0	10.97	432	94.56	0.1466	186624	840.7
3/0	-	10.41	410	85.16	0.1320	168100	757.2
-	4/0	10.16	400	81.70	0.1256	160000	720.7
-	3/0	9.449	372	70.12	0.1087	138384	623.4
2/0	-	9.271	365	67.51	0.1046	133255	600.1
-	2/0	8.839	348	61.36	0.09512	121104	545.5
0	-	8.255	325	53.52	0.08296	105625	475.8
-	0	8.230	324	53.19	0.08245	104976	472.9
-	1	7.620	300	45.60	0.07069	90000	405.4
1	-	7.341	289	42.22	0.06560	83521	376.2
-	2	7.010	276	38.60	0.06983	76176	343.71
2	-	6.553	258	33.94	0.05228	66564	299.8
-	3	6.401	252	32.18	0.04988	63504	286.1
-	4	5.893	232	27.27	0.04227	53824	242.5
3	-	5.817	229	26.57	0.04119	52441	236.2
-	5	5.385	212	22.77	0.03530	44944	202.5
4	-	5.182	204	21.09	0.03269	41616	187.5
-	6	4.877	192	18.68	0.02895	36864	166.1
5	-	4.623	182	16.78	0.02602	33124	149.2
-	7	4.470	176	15.70	0.02433	30976	139.5
6	-	4.115	162	13.30	0.02061	26244	118.2
-	8	4.065	160	12.97	0.02011	25600	115.3
7	9	3.658	144	10.507	0.01629	20736	93.41
8	10	3.251	128	8.302	0.01287	16384	73.80
-	11	2.948	116	6.818	0.01057	13456	60.61
9	-	2.896	114	6.585	0.01021	12996	58.54
-	12	2.642	104	5.480	0.008495	10816	48.72
10	-	2.591	102	5.272	0.008171	10404	46.87
-	13	2.337	92	4.284	0.006648	8464	38.08
11	-	2.311	91	4.196	0.006504	8281	37.30
12	-	2.057	81	3.325	0.005153	5661	29.55
-	14	2.032	80	3.243	0.005027	6400	28.83
13	15	1.828	72	2.627	0.004072	5184	23.35
14	16	1.626	64	2.075	0.003217	4096	18.45
15	-	1.448	57	1.646	0.002552	3249	14.64
-	17	1.422	56	1.589	0.002463	3136	14.13
16	-	1.295	51	1.318	0.002043	2601	11.72
-	18	1.291	48	1.168	0.001810	2304	10.38
17	-	1.143	45	1.026	0.001590	2025	9.122
18	19	1.016	40	0.8107	0.001257	1600	7.207
19	20	0.9144	36	0.6567	0.001018	1296	5.838
20	21	0.8128	32	0.5189	0.0008043	1024	4.613
21	-	0.7239	29	0.4156	0.0006379	810	3.695
-	22	0.7112	28	0.3973	0.0006158	784	3.532
22	-	0.6428	25	0.3243	0.005027	640	2.883
-	23	0.6096	24	0.2919	0.0004524	576	2.595
23	-	0.5733	23	0.2588	0.0004013	509	2.301
-	24	0.5588	22	0.1453	0.0003801	484	2.181
24	-	0.5105	21	0.2047	0.0003173	404	1.82
-	25	0.5080	20	0.2021	0.0003142	400	1.797

Measurement Comparison in Various Systems

Gauge System		Diameter		Cross Section Area			Weight of Copper
A.W.G.	S.W.G	mm	mil	mm²	inch²	CM	kg/km
-	26	0.4572	18.0	0.1642	0.0002545	324.0	1.460
25	-	0.4547	17.9	0.1624	0.0002516	320.4	1.443
26	-	0.4639	15.9	0.1281	0.0001986	252.8	1.139
-	27	0.4166	16.4	0.1363	0.0002118	268.9	1.212
-	28	0.3759	14.8	0.1110	0.0001720	219.0	0.9868
27	-	0.3607	14.2	0.1022	0.0001584	201.6	0.9083
-	29	0.3454	13.6	0.09372	0.0001453	184.9	0.8332
28	-	0.3211	12.6	0.08042	0.0001247	158.8	0.7149
-	30	0.3150	12.4	0.07791	0.0001203	153.8	0.7032
-	31	0.2946	11.6	0.05818	0.0001057	136.6	0.6061
29	-	0.2859	11.3	0.06470	0.0001003	127.7	0.5752
-	32	0.2743	10.8	0.05910	0.00009161	116.6	0.5254
30	33	0.2540	10.0	0.05067	0.00007854	100.0	0.4506
-	34	0.2337	9.2	0.04289	0.00006648	84.64	0.3813
31	-	0.2261	8.9	0.04041	0.00006221	79.21	0.3568
-	35	0.2134	8.4	0.03515	0.00005542	70.56	0.3125
32	-	0.2019	7.9	0.03203	0.00004964	63.21	0.2847
-	36	0.1930	7.6	0.02927	0.00004537	57.76	0.2602
33	-	0.1803	7.1	0.02555	0.00003959	50.41	0.2271
-	37	0.1727	6.8	0.02348	0.00003632	46.20	0.2087
34	-	0.1601	6.3	0.02010	0.00003117	39.69	0.1788
-	38	0.1524	6.0	0.01824	0.00002827	36.00	0.1622
35	-	0.1422	5.6	0.01587	0.00002463	31.86	0.1413
-	39	0.1321	5.2	0.01370	0.00002124	27.04	0.1218
36	-	0.1270	5.0	0.01267	0.00001964	25.00	0.1126
-	40	0.1219	4.8	0.01167	0.00001810	23.04	0.1038
37	-	0.1131	4.5	0.01005	0.00001557	19.83	0.08931
-	41	0.1118	4.4	0.00981	0.00001521	19.36	0.08721
38	42	0.1016	4.0	0.008107	0.00001257	16.00	0.07207
-	43	0.0914	3.6	0.006567	0.00001018	12.96	0.05838
39	-	0.0889	3.5	0.006207	0.000009621	12.25	0.05518
-	44	0.0813	3.2	0.005189	0.000008043	10.24	0.04613
40	-	0.0787	3.1	0.004870	0.000007548	9.61	0.04329
41	45	0.0711	2.8	0.003970	0.000006158	7.84	0.03529
42	-	0.0635	2.5	0.003167	0.000004909	6.25	0.02815
-	46	0.0610	2.4	0.002922	0.000004524	5.76	0.02593
43	-	0.0559	2.2	0.002454	0.000003801	4.48	0.02182
44	47	0.0508	2.0	0.002027	0.000003142	4.00	0.01802
45	-	0.0447	1.8	0.001569	0.000002433	3.10	0.01895
-	48	0.0406	1.6	0.001295	0.000002011	2.56	0.01150
46	-	0.0399	1.57	0.001250	0.000001936	2.46	0.01111
47	-	0.0356	1.40	0.0009954	0.000001539	1.96	0.008849
48	-	0.0315	1.24	0.0007793	0.000001208	1.54	0.006928
-	49	0.0305	1.20	0.0007306	0.000001131	1.44	0.006495
49	-	0.0282	1.11	0.0006246	0.0000009677	1.23	0.005563
-	50	0.0254	1.00	0.0005056	0.0000007854	1.00	0.004503
50	-	0.0251	0.99	0.0004948	0.0000007698	0.980	0.004399

Note :
1 mil = 0.001 inch
S.W.G. = British Standard Wire Gauge
A.W.G. = American Standard Wire Gauge
1 CM = 0.7854×10^{-4} in²
1 CM is the area of a circle of 1 mil diameter

Mechanical, Thermal, Electrical and Chemical Properties of Insulation and Sheath Materials

Designations				Properties (guide values)												
				Mechanical			Thermical			Electrical			Chemical Resistance (guide values)			
Symbols	Material	VDE	Permissible Operating Temperature to VDE(°C)	Tensile Strength	Elongation	Resistance to Abrasion	Behavior at low Temperature	Flame Resistance	Emission of Corrosive Gases During a Combustion	Specific Volume Resistivity	Permittivity Constant	Factor of Loss	Oils - Fats	Solvents	Diluted Acids	Water
	Thermoplastics															
PVC	Polyvinyl Chloride Compounds	Y	70-105	12.5-25	125-350	average to good	moderate to good	average to good	hydrogen -chloride	10^{12}-10^{13}	4.0-6.5	10^{-2}-10^{-3}	moderate to average	moderate	good	average to good
LDPE	Low-density Polyethylene	2Y	70	10-20	400-600	average to good	good	bad	-	> 10^{16}	2.25-2.6	~10^{-4}	average	moderate to good	very good	very good
HDPE	High-density Polyethylene	2X	90	25-40	500-1000	good	good	bad	-	> 10^{16}	2.4-2.5	~10^{-4}	average	moderate to good	very good	very good
	foamed polyethylene	02Y	70	8-12	350-500		good	bad	-	~ 10^{17}	~1.5	~10^{-4}	average	moderate to good	very good	very good
PA	Polyamide	4Y	80	50-60	50-200	very good	good	good	-	~ 10^{15}	~4.0	~10^{-2}-10^{-3}	very good	good	very good	average
PUR	Polyurethane	11Y	80	35-50	500-700	very good	good	moderate to average	-	~ 10^{12}	~6.0	~10^{-2}	good	good	moderate	average to good
	Elastomere															
VPE	Cross-linked Polyethylene	2X	90	12.5-20	300-450	average to good	good	bad	-	~10^{16}	2.3-2.6	~10^{-4}	average	average to good	very good	very good
NRSBR	Natural Rubber Styrene butadiene Rubber Comp.	G	60	5.0-10.0	300-600	moderate to average	very good	bad	-	**	**	**	bad	bad	average	average to good
SIR	Silicone Rubber	2G	180	5.0-10.0	300-600	moderate	very good	moderate-good	-	~10^{15}	~3.0	~10^{-3}	good	bad	moderate	very good
EPR	Ethylene-propylene Rubber Compounds	3G	90	5.0-10.0	300-500	moderate to average	good	moderate-bad	-	~10^{12}-10^{15}	3.0-3.8	~10^{-2}-10^{-3}	moderate to average	moderate	good	very good to good
EVM	Ethylene-vinyl Acetate Copolymer Compounds	4G	120	8.0-12.0	200-350	moderate to average	good	moderate to average	-	~10^{13}	~6.0	~10^{-2}	moderate to average	moderate	average	good to average
CR	Polychloroprene Compounds	5G	60-90	5.0-20.0	500-800	average to good	moderate -good	good	hydrogen -chloride	**	**	**	good-very good	average	good	moderate
CM	Chlorinated Polyrthylene Compounds	9G	80-100	8.0-20.0	350-650	average to good	moderate	good	hydrogen -chloride	**	**	**	good-very good	average	good	moderate
CSM	Chlorosulfonated Polyrthylene Compounds	6G	100	8.0-20.0	400-700	average to good	moderate	good	hydrogen -chloride	**	**	**	good-very good	average	good	moderate
	Special Compounds															
	Cross-linked Flame Retardant Halogen-free Polymer Comp.	H	70-90	5.0-12	>125	moderate to average	average	good-very good	-	~10^{13}-10^{14}	~4	10^{-2}-10^{-3}	moderate to average	moderate	good	good
	Flame Retardant Halogen-free Polymer Compounds, not Cross-Linked	H	70-90	5.0-12	>125	moderate to average	average	good	-	~10^{12}-10^{14}	~4	~10^{-3}	average	average	good	average to good

PACKING, HANDLING, STORAGE AND INSTALLATION

PACKING:

Cables generally wound on wooden drums, by keeping both the ends easily accessible for inspection and testins. However snidller length cables may be dispatched in coils with prior intimation to the customer. Both the ends ol the cables aie sealed with either plastic end caps 01
heat shrinkable caps tor protection against .moisture and rain water,
The cable drums shall carry the complete information about the details of cables either stenciled or contained in a label attached to it

HANDLING AT SITE:

a) On receipt of cable drums visual inspection should be made to ensure the drum packing is original.

b) The cable drums should not be dropped from trucks or wagons during unloading operation, as the shock may cause serious damage to the cable. The cables should be unloaded properly by using either Crane or a ramp inclination of about 1A with a sand bed at the foot of the ramp.

c) Cable should not be dragged over the earth surface during laying.

d) The arrow painted on the flange of the drum indicates the direction in which the drum should be rolled. Improper handling of cable reels often results in excess looseness inside may cause damage to the cable.

STORAGE:

Cable should be stored in a dry place to prevent exposure to climatic conditions and wear and tear of wooden drums preferably in covered concrete floor. However in extreme conditions cable drums can be stored in uncovered area, but the area should be free from corrosive agents like chemicals and fumes etc. by keeping the packing intact. Following precautions should be taken while storing the cables.

- Whenever cable length is cut lot usage the balance should be recapped to avoid ingress of water.
- It is desirable for drums to stand on battens placed directly under the flanges.
- During storage for longer periods, drum should be rotated to an angle of 90? once in every 2 months. This will avoid collapsing of barrel or flange due to one directional load for longer periods
- In no case, should the drum be stored "on the flat" as flange horizontal.
- If it is necessary to rewind a cable on to another drum, the barrel of drum should be same as the original drum.

INSTALLATION:

1) The insulation of the cables snould tie cnecked with megger as a preliminary check against any probable damage before laying.

2) cable arum should always tolieu in trie direction of arrow for rolling", marked on the drum, In the absence of such mark, the drum should be rolled in the direction same as that of inside end of the cable.

3) When cables are unwound from the drum, it should be ensured that the drum is put on jack and the cable is pulled with stocking ot pulling eye Maximum sale puiliug force (when pulled by pulling eye)
   Copper conductor cables : 5.0 kg/mm^2
   Aluminum conductor cables : 3.0 kg/mm^2

4) If the drum is kept on its flange, or lift one side flange and remove rings and lay the cable, there is likelihood of twists in the armour, this v/ould cause deformation of cores and outer sheath This process of deformation is called "bird caging" and is normally and wrongly perceived as manufacturing defect, whereas it is a handling defect.

5) Wherever Possible bending radius of 15 times the O. D. of the cable should be maintained, but in any case it should not be less than 10 times.

6) For laying of cables, power cables are to be placed at the bottom layers and control cables in top layers.

7) If cables are buried directly in the ground, generally laid 1000mm below the ground surface and at any point of cable run around 75mm thick sand cushioning is to be provided

8) **TERMINATION AND JOINTS:**

The termination and joints are being the weakest points of the electrical transmission system, al! necessary precautions should be taken while joining materials and accessories like conductor ferrules, lugs, solder, Insulating and protective tapes, filling compounds, joint ooxes etc. ot right quality and sizes should be Procured. The jointing and terminations work should be done carefully and skillfully by following the work instructions of the material supplier.

9) **ARMOURED CABLES TERMINATIONS:**

All bonding clamps at the joints and terminations and the armor wires should be thoroughly cleaned. The clamps should be adequately tightened. This is necessary to ensure proper electrical contact, because armor is the only return path for the earth fault current. Unarmored Cables: The additional external metallic earth connectors of adequate size should be used.

10) **MEDIUM VOLTAGE TEST AFTER INSTALLATION:**

Cables after jointing and terminations are subjected to D.C high voltage test. Each core should be tested at 4KV against other cores and armor The voltage should be increased gradually to full value and maintained continuously for 15 minutes. No breakdown of insulation should occur during the test. The cable cores must be discharged after completion of D.C. high voltage test.

11) **TESTING INSULATION RESISTANCE MEASUREMENT OF CABLE:**

The voltage rating of insulation Resistance Tester (Megger) should be chosen as per the following table.

Voltage Grade of Cables	Rating of IR Tester	Voltage Grade of Cables	Rating of IR Tester
1.0 KV	500 V	10 KV	1000 V
3.2 KV	1000 V	20 KV	2500 V
6.2 KV	1000 V	30 KV	2500 V

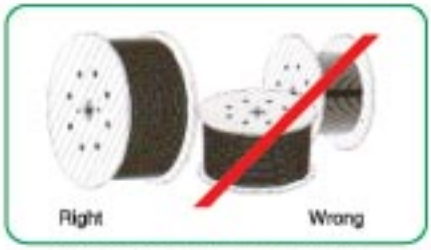
All new cables shall be megger-tested before jointing/laying and after installation.

12) **JOINTING OF CABLE :**

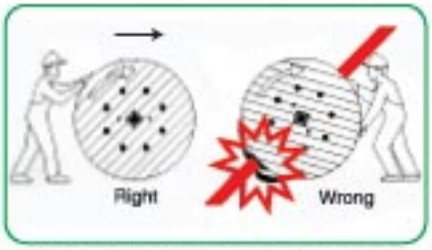
The emphasis should be laid on quality and selection of proper cable accessories, proper jointing techniques and skill and workmanship of the working personnel. The quality of joint should be such that it does not add any resistance to the circuit. The materials and techniques employed should give adequate mechanical and electrical protection to the joints under all service conditions. The joint should further be resistant to corrosion and other chemical effects Termination and jointing of power and control cables shall be done by means of compression methods using solder less tinned copper/Aluminum terminal lugs.

DRUM HANDLING GUIDE

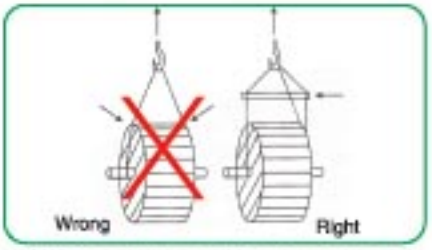
THE RIGHT WAY TO TRANSPORT, HANDLE AND MOVE DRUMS



Keep the drum upright

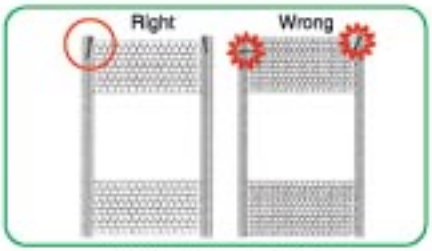


Roll in direction of arrows only

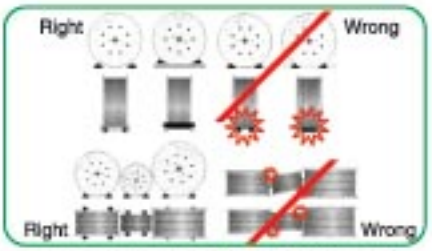


Lift the drum without damage

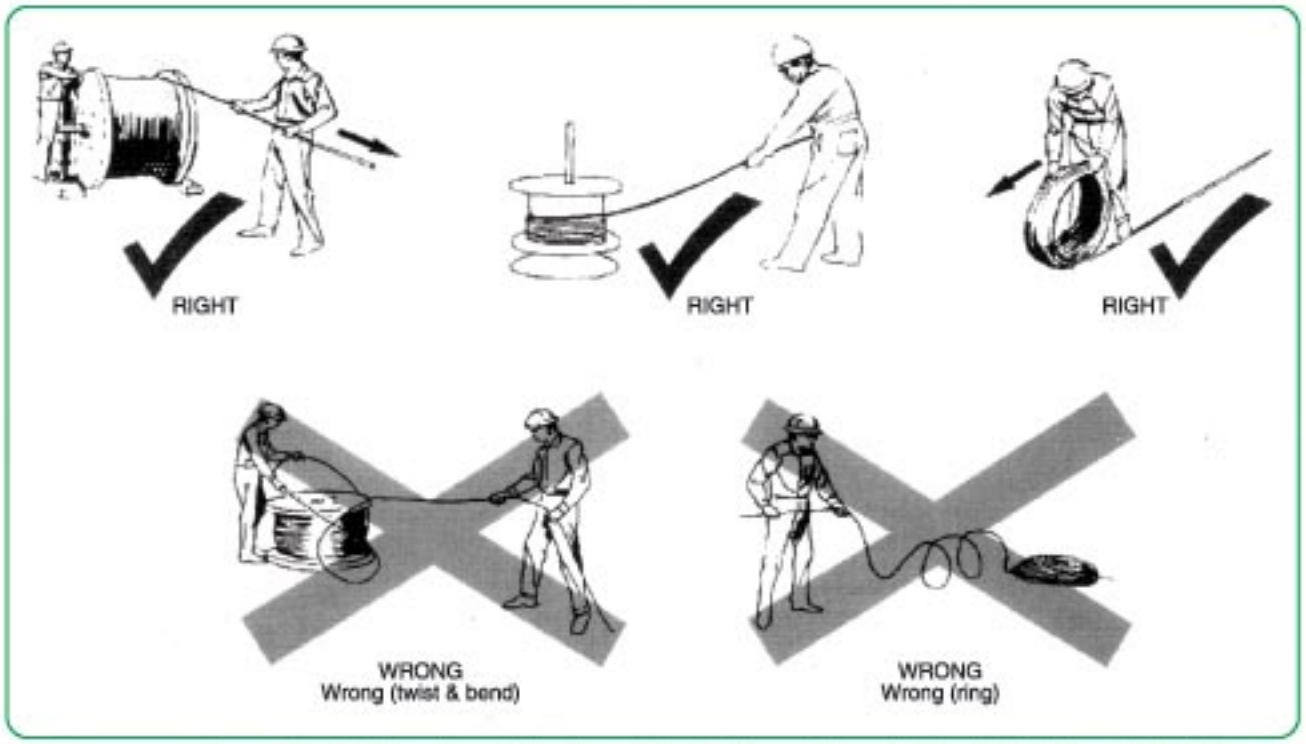
Handling with fork-lift truck



Nail with caution



Secure the drums firmly



Some very important instructions for Unreeling & Uncoiling of Electrical wires & Cables.

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- Bangladesh Electrical Merchandise Manufacturers Association (BEMMA)
- National Association of Small & Cottage Industries of Bangladesh (NASCIB)
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