



RASANA CABLE



Rasana Cable Co. was founded in 1993 to manufacture some part of the cables and wires needed in Iran. At the very beginning, i.e. in a short while, the company managed to obtain the mark of national standard from Iranian Standard and Industrial Research Institute with continuous efforts of our experts. In autumn 2012 a new plant of Rasana Cable Co. was operated to use the state-of-the-art machinery to increase production capacity and variety of products to meet customer requirements more efficiently while observing HSE provisions.

Adherence to the principal policies of the company, i.e. concentrating on one field, good response of consumers, and market demand for specialized cables causes our company to use experts and specialists of the industry and to apply modern technologies to proceed to manufacture control cables, shielded wires and coaxial cables to reach a desirable place in production of low voltage cables with residential, business and industrial applications. Therefore, we are now one of the few manufacturers of control cables in Iran. Furthermore, production of self supported cables is another achievement in line with manufacturing new products.

Safety of manufactured products constitutes another viewpoint of our company leading to achievement of know-how standards. The customer focus contributed to the receipt of the first certificate of management system in dealing with client complaints – **ISO 10002:2004** in wire and cable industry of Iran.

Establishment of Integrated Management System led to obtaining certificates of Quality Management System – **ISO 9001:2008**, Environmental Management System – **ISO 14001:2004**, Occupational Health and Safety Management System – **OHSAS 18001:2007**, the **standard 17025**, **CE** Standard Mark from **DNV** Institute. Other achievements of our company which were realized with the follow ups of our experts include certificates from regional electricity companies, and a certificate from Tavanir company obtained on the ground of higher reliability of consumers of our products.

As one of the most active members of wire and cable industry, Rasana Cable Co. aims to develop domestic and foreign markets of its products with use of modern technologies. In this regard, a great deal of time and money has been expended on R&D, new products and improvement of our products during the last decade. Moreover, laboratory of our company, as one of the most active laboratories in the country, managed to obtain the Iran accreditation system according to: ISO/IEC 17025:2005. Products of our company are continually tested by various means to ensure their conformity with international standards.

To ensure the efficiency of the Quality Management Systems, Rasana Cable Co. continuously verifies its QC Systems. In addition to receipt of National Standard Certificate, our company managed to obtain the mandatory standard of ISIRI 3569, equivalent to IEC-60502, for high voltage cables with nominal voltages ranging from 1 to 3 kv. Furthermore, our company obtained the "crystal statue of Standard Exemplary Unit" for four consecutive years (from 2009 to 2012).

We always aim to provide our customers with the best quality products. We are proud of increasing customer satisfaction and quality continual improvement. Therefore, we always believe that "**Success Comes With Quality**".

Rasana Cable Co. has ever since the establishment been on the path of improvement of qualities of its products and enhancement of customer satisfaction, and is a pioneer company in the field of manufacturing low voltage wires and cables. Evidences of such claim constitute receipt of certificates of ISO/IEC 17025:2005, IMS, marks of national standard and European Union (CE) for products, exemplary unit of Tehran province standard during the years 2009 to 2012, exemplary unit of construction industry in 2011, qualified by Tavanir company, country's electrical distribution companies, and Iranian petrochemical, oil and gas companies. In addition to its continuous endeavours to improve product qualities and to expand the range of products, Rasana Cable Co. established equipments for new factory by using the state-of-the-art technologies. The inauguration of the new factory is in a new era in the 20-year operations of company, which opted the observance of all rules and regulations, increase of customer satisfaction, better ideas and complaints handling, improvement of health and safety conditions of the employees by preventing diseases and incidents, environment protection, and prevention of environmental pollutants as its major objectives.

In this respect, the senior management showed its belief in and commitment to the execution, maintenance and continuous improvement of effectiveness of the Integrated Management System (IMS) with examination, establishment and receipt of the following certificates of international standards:

- Quality Management System: ISO 9001:2008
- Environmental Management System: ISO 14001:2004
- Occupational Health & Safety Management System: OHSAS 18001:2007
- Complaints Handling Management System: ISO 10002:2004

The senior management of Rasana Cable Co. would like to point out major points of integrated management system policy as follows:

- To improve product qualities
- To diversify products and to manufacture new products
- To enhance sales and to gain shares in new domestic and foreign markets
- To optimize consumption of energy and to lower and control environment pollutants
- To improve procedures of dealing with customers and all stakeholders ideas and to increase their satisfaction
- To establish appropriate and safe places of work to protect health of labor and to enhance both the quality and quantity of products



1. **ISO 9001:2008** - Quality management system certificate



2. **ISO 14001:2004** - Environmental management system certificate



3. **OHSAS 18001:2007** - Occupational health and safety management system certificate



4. **ISO 10002:2004** - Complaints handling management system certificate



5. **ISO/IEC 17025:2005** - Laboratory accreditation certificate



6. **ISIRI** - Institute of Standard and Industrial Research of Iran





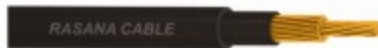
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Single Core, PVC Insulated, Rigid Conductors
(H05V - U , H07V - U , H07V - R , NYA)



10 11

Single Core, PVC Insulated, Flexible Conductors
(H05V - K , H07V - K , NYAF)



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Single Core, PVC Insulated, PVC Sheathed, Power Cables
(NYY , NAYY)



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Aluminum Overhead Conductors
(AAC , ACSR)



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Power Cable with Concentric Outside Conductors
(NYCY , NYCWY)



18 19

Aluminum Overhead Covered Conductors
(CC , CCT)



20 21

Arc Welding Electrode Cables



22 23

High Frequency Coaxial Cables



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Light Multi Core, PVC Insulated, PVC Sheathed, Flexible Cables
(H03VV - F , NYLHY)



44 45

Self Supporting Aluminum Overhead Cables

(NA2X - T)



46 47 61

Extra Flexible, Flat, PVC Sheathed Cables

(H05VVH2 - F , H05VVH6 - F)



48 49 62

Instrumentation Cables

(REY (st) Y , REY (st) YRY)

Guarantee Conditions of Products

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Some Considerable Points

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Laying, Handling and Storage of Power Cables

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Final placing of cable

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Light Multi Core, PVC Insulated, PVC Sheathed, Fixed Installation Cables

(H05VV - R , H05VV - U , NYM)



28 29

Unscreened, Rigid, Fixed Installation Control Cables

(NYY - J , NYY - JZ)



30 31 54 55

Multi Core, XLPE Insulated, PVC / PE Sheathed, Power Cables

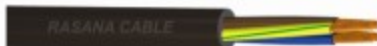
(NA2XY , NA2X2Y , N2XY , N2X2Y)



32 33 56 57

Multi Core, PVC Insulated, PVC Sheathed, Fixed Installation Power Cables

(NYY - O , NYY - J)



34 35

Ordinary Multi Core, PVC Insulated, PVC Sheathed, Flexible Cables

(H05VV - F , NYMHY)



36 37

Circular Lift Cables

(60227 IEC 71C)



38 39 58

Flexible, Screened Control Cables

(H05VC4V - F , NYSLCY , NYSLYCY)



40 41 59

Unscreened, Flexible, Control Cables

(H05VV - F , NYSLY)



42 43 60


PVC or XLPE Insulated, PVC Sheathed Armored Power Cables

(N2XRY , NYRY , NA2XRY , NAYRY)

Single Core, PVC Insulated, Rigid Conductors

(H05V - U , H07V - U , H07V - R , NYA)

RASANA CABLE



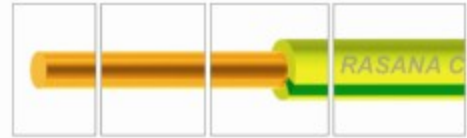
Technical Data

PVC single core, non-sheathed with rigid conductor for general purposes.

- Temperature range:
-30 to +70 °C
- Nominal voltage U_0 / U :
300 / 500 V for conductors up to and including 1 mm².
450 / 750 V for conductors above 1 mm².
- Test voltage:
H05V – U: 2 KV (AC)
H07V – U: 2.5 KV (AC)
H07V – R: 2.5 KV (AC)
- Minimum bending radius:
10 x cable diameter
- Main standard:
IEC 60227
- Cable code:
60227 IEC 05 (H05V – U)
60227 IEC 01 (H07V – U)
60227 IEC 01 (H07V – R)
(NYA)

Cable Structure

- Conductor material:
Bare copper conductor according to IEC 60228, class 1 (solid) or class 2 (standard).
- PVC core insulation:
Compound type of PVC / C.
- Core insulation colors:
As per customer request.



▣ Single Core, PVC Insulated, Rigid Conductors (H05V - U , H07V - U , H07V - R , NYA)

Nominal Cross Section of Conductors (mm ²)	Class of Conductor	Nominal Insulation Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
			Min.	Max.		
0.5	1	0.6	1.9	2.3	36	8
0.75	1	0.6	2.1	2.5	24.5	11
1	1	0.6	2.2	2.7	18.1	13
1.5	1	0.7	2.6	3.2	12.1	19
1.5	2	0.7	2.7	3.3	12.1	21
2.5	1	0.8	3.2	3.9	7.41	30
2.5	2	0.8	3.3	4	7.41	33
4	1	0.8	3.6	4.4	4.61	44
4	2	0.8	3.8	4.6	4.61	48
6	1	0.8	4.1	5	3.08	62
6	2	0.8	4.3	5.2	3.08	67
10	1	1	5.3	6.4	1.83	104
10	2	1	5.6	6.7	1.83	111
16	2	1	6.4	7.6	1.15	169
25	2	1.2	8.1	9.7	0.727	264
35	2	1.2	9	10.9	0.524	354
50	2	1.4	10.6	12.8	0.387	484
70	2	1.4	12.1	14.6	0.268	677
95	2	1.6	14.1	17.1	0.193	933
120	2	1.6	15.6	18.8	0.153	1207
150	2	1.8	17.3	20.9	0.124	1486
185	2	2	19.3	23.3	0.0991	1862
240	2	2.2	22	26.6	0.0754	2436
300	2	2.4	24.5	29.6	0.0601	3047
400	2	2.6	27.5	33.2	0.042	3879

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.015 MΩ.Km.



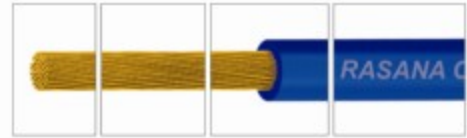
Technical Data

PVC single core, non-sheathed with flexible conductor for general purposes.

- ▣ Temperature range:
flexing: -5 to +70 °C
fixed installations: -30 to +70 °C
- ▣ Nominal voltage U_0 / U :
300 / 500 V for conductors up to and including 1 mm².
450 / 750 V for conductors above 1 mm².
- ▣ Test voltage:
H05V – K: 2 KV (AC)
H07V – K: 2.5 KV (AC)
- ▣ Minimum bending radius:
10 x cable diameter
- ▣ Main standard:
IEC 60227
- ▣ Cable code:
60227 IEC 06 (H05V – K)
60227 IEC 02 (H07V – K)
(NYAF)

Cable Structure

- ▣ Conductor material:
Bare copper conductor according to IEC 60228, class 5 (flexible).
- ▣ PVC core insulation:
Compound type of PVC / C.
- ▣ Core insulation colors:
As per customer request.




Single Core, PVC Insulated, Flexible Conductors (H05V - K , H07V - K , NYAF)

Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
		Min.	Max.		
0.5	0.6	2.1	2.5	39	9
0.75	0.6	2.2	2.7	26	11
1	0.6	2.4	2.8	19.5	14
1.5	0.7	2.8	3.4	13.3	20
2.5	0.8	3.4	4.1	7.98	31
4	0.8	3.9	4.8	4.95	46
6	0.8	4.4	5.3	3.3	65
10	1	5.7	6.8	1.91	109
16	1	6.7	8.1	1.21	164
25	1.2	8.4	10.2	0.78	252
35	1.2	9.7	11.7	0.554	343
50	1.4	11.5	13.9	0.386	490
70	1.4	13.2	16	0.272	679
95	1.6	15.1	18.2	0.206	893
120	1.8	16.7	20.2	0.161	1126
150	2	18.6	22.5	0.129	1409
185	2.2	20.6	24.9	0.106	1712
240	2.2	23.5	28.4	0.0801	2257

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.013 MΩ.Km.

RASANA CABLE



Technical Data

Power cable, PVC insulated and PVC sheathed for energy supply.

- Temperature range:
-30 to +70 °C
- Nominal voltage U_0 / U :
0.6 / 1 KV
- Test voltage:
3.5 KV (AC)
- Minimum bending radius:
12 x cable diameter
- Main standard:
IEC 60502 - 1
- Cable code:
IEC 60502
NYY , NAYY

Cable Structure

- Conductor material:
Bare copper conductor or bare aluminum conductor according to IEC 60228, class 1 (solid) for conductors up to 16 mm², class 2 (standard) and class 5 (flexible) for all size of conductors.
- PVC core insulation:
Compound type of PVC / A.
- Core insulation color is normally black.
- PVC outer sheath:
Compound type of PVC / ST1.
- Sheath color is normally black.



▣ Single Core, PVC Insulated, PVC Sheathed, Power Cables (NYY , NAPP)

Nominal Cross Section of Conductors (mm ²)	Class of Conductor	Nominal Insulation Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
6	1	1	1.4	7.5	3.08	108
6	2	1	1.4	7.9	3.08	117
10	1	1	1.4	8.3	1.83	153
10	2	1	1.4	8.8	1.83	166
16	2	1	1.4	9.8	1.15	231
25	2	1.2	1.4	11.5	0.727	342
35	2	1.2	1.4	12.6	0.524	445
50	2	1.4	1.4	14.4	0.387	587
70	2	1.4	1.4	16.1	0.268	796
95	2	1.6	1.5	18.8	0.193	1115
120	2	1.6	1.5	20.4	0.153	1362
150	2	1.8	1.6	22.6	0.124	1698
185	2	2	1.7	25	0.0991	2117
240	2	2.2	1.8	28.3	0.0754	2756
300	2	2.4	1.9	31.3	0.0601	3450
400	2	2.6	2	34.9	0.047	4387
500	2	2.8	2.1	38.6	0.0366	5561
10	2	1	1.4	8.2	3.08	92
16	2	1	1.4	9.9	1.91	137
25	2	1.2	1.4	11.6	1.2	192
35	2	1.2	1.4	12.7	0.868	235
50	2	1.4	1.4	14.5	0.641	304
70	2	1.4	1.4	16.3	0.443	390
95	2	1.6	1.5	18.7	0.32	530
120	2	1.6	1.5	20.3	0.253	629

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Aluminum Overhead Conductors

(AAC , ACSR)



Technical Data

Aluminum overhead conductors.

AAC: With all conductors made of aluminum or aluminum alloy.

ACSR: With aluminum conductors reinforced by inner galvanized steel wires.

▣ Temperature range is not identified.

▣ Nominal voltage:

AAC: Low & medium voltage.

ACSR: Medium & high voltage.

▣ Density:

Aluminum: $2.7 \text{ (gr / cm}^3 \text{)}$

Steel: $7.8 \text{ (gr / cm}^3 \text{)}$

▣ Linear expansivity:

Aluminum: $23 \times 10^{-6} \text{ (1 / } ^\circ\text{C)}$

Steel: $11.5 \times 10^{-6} \text{ (1 / } ^\circ\text{C)}$

▣ Main standard:

AAC: BS 215 , DIN 48201

ACSR: IEC 1089

▣ Cable code:

AAC

ACSR

Cable Structure

In AAC cables the strands of hard drawn aluminum conductors are twisted together with controlled lay length to form a good construction and to withstand tensile forces when installed in the line.

In ACSR cables the strands of hard drawn aluminum conductors are twisted around a central galvanized high carbon steel wire(s) to withstand more tensile forces.

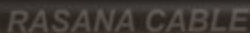


▣ Aluminum Overhead Conductors (AAC , ACSR)

Nominal Cross Section of Conductors (mm ²)	No. & Nominal Diameter of Conductors (mm)	Stranded Diameter (mm)	Rated Strength (N)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
16	7 x 1.70	5.1	2840	1.8018	44
25	7 x 2.10	6.3	4170	1.1808	67
35	7 x 2.50	7.5	5740	0.8332	94
50	7 x 3.00	9.0	7950	0.5786	135
50	19 x 1.80	9.0	8440	0.5950	133
70	19 x 2.10	10.5	11250	0.4371	181
95	19 x 2.50	12.5	15650	0.3085	256
120	19 x 2.80	14.0	18750	0.2459	322
150	37 x 2.25	15.7	25250	0.1961	406
185	37 x 2.50	17.5	30450	0.1587	501
240	61 x 2.25	20.2	39350	0.1192	670
300	61 x 2.50	22.5	47550	0.0965	827
400	61 x 2.89	26.0	60700	0.0722	1105
500	61 x 3.23	29.1	74500	0.0578	1381

► Any other sizes of conductors, up to 61 strands, can be manufactured as per customer request.

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RASANA CABLE

Technical Data

Power cable with concentric outside conductors, PVC insulated, PVC sheathed.

- Temperature range:
-30 to +70 °C
- Nominal voltage U_0 / U :
0.6 / 1 KV
- Test voltage:
3.5 KV (AC)
- Minimum bending radius:
18 x cable diameter
- Main standard:
IEC 60502 - 1
- Cable code:
IEC 60502
NYCY
NYCWY

Cable Structure


- Conductor material:
Bare copper conductor, solid or stranded according to IEC 60228, class 1 (solid) or class 2 (standard).
- PVC core insulation:
Compound type of PVC / A.
- Core insulation colors:
Up to 5 cores, color or number coding and for more than 5 cores number coded imprints.
For 3 or more cores the green / yellow earth core is the last core in the outer layer.
- PVC inner covering.
- Concentric copper conductors in inner layer.
- PVC outer sheath:
Compound type of PVC / ST1.
- Sheath color is normally black.



▣ Power Cable with Concentric Outside Conductors (NYCY , NYCWY)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Inner Covering Thickness (mm)	No. & Nominal Diameter of Concentric Conductors (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
1 x 4 / 4	1	-	21 x 0.5	1.8	9.2	4.61	145
1 x 6 / 6	1	-	21 x 0.6	1.8	9.9	3.08	191
1 x 10 / 10	1	-	20 x 0.8	1.8	11.2	1.83	277
1 x 16 / 16	1	-	32 x 0.8	1.8	12.2	1.15	396
1 x 25 / 25	1.2	-	32 x 1	1.8	14.3	0.727	588
1 x 35 / 35	1.2	-	44 x 1	1.8	15.4	0.524	779
2 x 1.5 / 1.5	0.8	1	8 x 0.5	1.8	12.6	12.1	205
2 x 2.5 / 2.5	0.8	1	13 x 0.5	1.8	13.3	7.41	250
2 x 4 / 4	1	1	21 x 0.5	1.8	15	4.61	341
2 x 6 / 6	1	1	21 x 0.6	1.8	16.1	3.08	423
2 x 10 / 10	1	1	20 x 0.8	1.8	18.2	1.83	585
2 x 16 / 16	1	1	32 x 0.8	1.8	21.7	1.15	864
2 x 25 / 16	1.2	1	32 x 0.8	1.8	24.7	0.727	1173
2 x 35 / 16	1.2	1	32 x 0.8	1.8	27	0.524	1450
3 x 1.5 / 1.5	0.8	1	8 x 0.5	1.8	13	12.1	228
3 x 2.5 / 2.5	0.8	1	13 x 0.5	1.8	13.8	7.41	282
3 x 4 / 4	1	1	21 x 0.5	1.8	15.7	4.61	390
3 x 6 / 6	1	1	21 x 0.6	1.8	16.9	3.08	490
3 x 10 / 10	1	1	20 x 0.8	1.8	19	1.83	687
3 x 16 / 16	1	1	32 x 0.8	1.8	22.4	1.15	1020
3 x 25 / 16	1.2	1	32 x 0.8	1.8	26.1	0.727	1420
3 x 35 / 16	1.2	1	32 x 0.8	1.8	28.5	0.524	1781
4 x 1.5 / 1.5	0.8	1	8 x 0.5	1.8	13.8	12.1	259
4 x 2.5 / 2.5	0.8	1	13 x 0.5	1.8	14.7	7.41	324
4 x 4 / 4	1	1	21 x 0.5	1.8	16.7	4.61	453

continued on page 52.



RASANA CABLE

Technical Data

XLPE single core, covered aluminum conductor for electrical power distribution.

- Temperature range:
-30 to +70 °C
- Nominal voltage:
CC type: 1 to 33 KV
CCT type: 20 and 33 KV
- Test voltage:
10 KV (AC)
- Minimum bending radius:
20 x cable diameter
- Main standard:
Tavanir spec.
- Cable code:
CC
CCT

Cable Structure

- Conductor material:
All aluminum alloy conductor (AAAC) or aluminum conductor steel reinforced (ACSR).
- Conductor covering:
Black XLPE insulation with 3 mm thickness for all sizes of CC type cables, 5.5 mm thickness for all size of CCT 20 KV and 8 mm thickness for all size of CCT 33 KV.
- Outer jacket:
Black HDPE with 0.8 mm thickness and 2.5 to 3 percent carbon black content for UV resistance only for CCT type of cables.



▣ Aluminum Overhead Covered Conductors (CC , CCT)

Nominal Cross Section of Conductors (mm ²)	No. & Nominal Diameter of Conductor (mm)	Conductor Diameter (mm)	Cable Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
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AAAC - CC

50	7 X 2.95	8.4	13	0.5950	205
70	7 X 3.61	10.2	16.8	0.4371	272
120	19 X 2.8	13.2	17.8	0.2459	425
185	19 X 3.48	16.8	21.1	0.1587	508

AAAC - CC 20 KV

70	7 X 3.75	11.3	23	0.43	635
120	7 X 4.75	14.3	26	0.268	845
185	19 X 3.5	17.5	29	0.183	1105

AAAC - CC 33 KV

70	7 X 3.75	11.3	28.5	0.43	900
120	7 X 4.75	14.3	31.5	0.268	1145
185	19 X 3.5	17.5	34.5	0.183	1440

ACSR - CC

Conductor Name	Conductor Construction Aluminum No. x Dia. (mm)	Steel No. x Dia. (mm)	Conductor Diameter (mm)	Cable Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
Fox	6 x 2.79	1 x 2.79	8.4	20.2	0.1192	670
Mink	6 x 3.66	1 x 3.66	11	22.5	0.0965	827
Hyena	7 x 4.39	7 x 1.93	14.6	26	0.0722	1106
Wolf	30 x 2.59	7 x 2.59	18.2	29.1	0.0578	1382



Technical Data

TPR insulated cables for arc welding.

- ▣ Temperature range:
-30 to +70 °C
- ▣ Nominal voltage:
Nominal voltage is not designated.
- ▣ Test voltage:
2.5 KV (AC)
- ▣ Minimum bending radius:
6 x cable diameter
- ▣ Main standard:
IEC 245
- ▣ Cable code:
245 IEC 81

Cable Structure

- ▣ Conductor material:
Annealed copper with specified diameter shown in column 2 of the following table.
- ▣ Separator:
Polyester tape that surrounds the conductor.
- ▣ Sheath:
TPR compound with min. tensile strength of 12 N / mm² with specified thickness shown in column 5 of the following table.
- ▣ Sheath color is normally black.



▣ Arc Welding Electrode Cables

Nominal Cross Section of Conductors (mm ²)	Max. Conductor Diameter (mm)	Average Outer Diameter		Insulation Thickness (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
		Lower Limit (mm)	Upper Limit (mm)			
16	0.21	8.8	11	2.4	1.16	218
25	0.21	10.1	12.7	2.4	0.758	304
35	0.21	11.4	14.2	2.4	0.536	403
50	0.21	13.2	16.5	2.7	0.379	560
70	0.21	15.3	19.2	3	0.268	772
95	0.21	17.1	21.4	3.2	0.198	1016



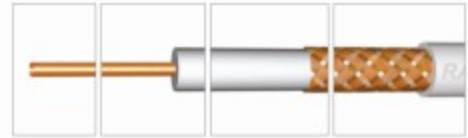
Technical Data

High frequency coaxial cables, to be used in high frequency transmissions.

- ▣ Minimum bending radius:
10 x cable diameter
- ▣ Temperature range:
-30 to +70 °C
- ▣ Minimum insulation resistance:
20,000 MΩ.Km
- ▣ Standard:
JIS C 3501
MIL C 17
IEC 60096

Cable Structure

- ▣ Conductor material:
Bare or tinned copper conductor according to IEC 60228, class 1 (solid), class 2 (standard), class 5 (flexible).
- ▣ Insulation:
Polyethylene, solid or foamed.
- ▣ Shield:
Bare or tinned copper braid.
- ▣ Outer sheath:
Compound type of PVC.



High Frequency Coaxial Cables

Cable Type	No. & Nominal Diameter of Conductors (mm)	Nominal Diameter Over Insulation (mm)	Conductor Material	Insulation Material	No. of Braided Layers	Impedance (Ω)	Attenuation at 10 MHz (dB)	Outer Diameter (mm)	Approx. Weight (Kg / Km)
2.5C - 2V	1 X 0.4	2.4	Copper	PE	1	75	52	4	23
3C - 2V	1 X 0.5	3	Copper	PE	1	75	42	5.5	41
4.5C - 2V	1 X 1	4.5	Copper	Foamed PE	1	75	22	6.5	47
5C - 2V	1 X 0.8	5	Copper	Foamed PE	1	75	27	7.5	72
3C - 2W	1 X 0.5	3	Copper	PE	2	75	42	6.5	68
5C - 2W	1 X 0.8	5	Copper	PE	2	75	27	8.4	101
RG - 8 / U	7 X 0.72	6.4	Copper	PE	1	50	6.8	9.5	128
RG - 11 / U	7 X 0.4	7.3	Tinned Copper	PE	2	75	7	10.3	140
RG - 58 / U	19 X 0.18	2.95	Tinned Copper	PE	1	50	17	5	38
RG - 59	1 X 0.60	3.7	Copper	PE	2	75	11.5	6.2	57



Technical Data

Light PVC insulated, PVC sheathed flexible cords and cables.

- Temperature range:
-30 to +70 °C
- Nominal voltage U_0 / U :
300 / 300 V
- Test voltage:
2 KV (AC)
- Minimum bending radius:
10 x cable diameter
- Main standard:
IEC 60227 & CENELEC HD 21.5
- Cable code:
60227 IEC 52
H03VV - F
NYLHY

Cable Structure

- Conductor material:
Fine bare copper conductor according to IEC 60228, class 5 (flexible).
- PVC core insulation:
Compound type of PVC / D.
- Core insulation colors:
According to IEC 60227 – 1.
- PVC outer sheath:
Compound type of PVC / ST5.
- Sheath color is normally black, white or as per customer request.




Light Multi Core, PVC Insulated, PVC Sheathed, Flexible Cables (H03VV - F , NYLHY)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
			Min.	Max.		
2 x 0.5	0.5	0.6	4.6	5.9	39	36
2 x 0.5 (Flat)	0.5	0.6	3 x 4.9	3.7 x 5.9	39	26
2 x 0.75	0.5	0.6	4.9	6.3	26	43
2 x 0.75 (Flat)	0.5	0.6	3.2 x 5.2	3.8 x 6.3	26	32
3 x 0.5	0.5	0.6	4.9	6.3	39	41
3 x 0.75	0.5	0.6	5.2	6.7	26	52
4 x 0.5 *	0.5	0.6	5.4	6.9	39	55
4 x 0.75 *	0.5	0.6	5.7	7.3	26	67

* According to CENELEC HD 21.5

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.013 MΩ.Km.



RASANA CABLE

Technical Data

PVC insulated, PVC sheathed cables for wiring and industrial purposes.

- Temperature range:
-30 to +70 °C
- Nominal voltage U_0 / U :
300 / 500 V
- Test voltage:
2 KV (AC)
- Minimum bending radius:
12 x cable diameter
- Main standard:
IEC 60227
- Cable code:
60227 IEC 10
H05VV – R
H05VV – U
NYM

Cable Structure

- Conductor material:
Bare copper conductor according to IEC 60228, class 1 (solid) for conductors up to 16 mm², class 2 (standard) for all sizes of conductors.
- PVC core insulation:
Compound type of PVC / C.
- Core insulation colors:
According to IEC 60227 – 1.
- PVC inner covering.
- PVC outer sheath:
Compound type of PVC / ST4.
- Sheath color is normally black.



Light Multi Core, PVC Insulated, PVC Sheathed, Fixed Installation Cables (H05VV - R , H05VV - U , NYM)

No. & Nominal Cross Section of Conductors (mm ²)	Class of Conductor	Nominal Insulation Thickness (mm)	Approx. Filler Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
					Min.	Max.		
2 x 1.5	1	0.7	0.4	1.2	7.6	10	12.1	114
2 x 1.5	2	0.7	0.4	1.2	7.8	10.5	12.1	123
2 x 2.5	1	0.8	0.4	1.2	8.6	11.5	7.41	156
2 x 2.5	2	0.8	0.4	1.2	9	12	7.41	168
2 x 4	1	0.8	0.4	1.2	9.6	12.5	4.61	201
2 x 4	2	0.8	0.4	1.2	10	13	4.61	219
2 x 6	1	0.8	0.4	1.2	10.5	13.5	3.08	261
2 x 6	2	0.8	0.4	1.2	11	14	3.08	282
2 x 10	1	1	0.6	1.4	13	16.5	1.83	428
2 x 10	2	1	0.6	1.4	13.5	17.5	1.83	459
2 x 16	2	1	0.6	1.4	15.5	20	1.15	632
2 x 25	2	1.2	0.8	1.4	18.5	24	0.727	957
2 x 35	2	1.2	1	1.6	21	27.5	0.524	1276
3 x 1.5	1	0.7	0.4	1.2	8	10.5	12.1	133
3 x 1.5	2	0.7	0.4	1.2	8.2	11	12.1	143
3 x 2.5	1	0.8	0.4	1.2	9.2	12	7.41	186
3 x 2.5	2	0.8	0.4	1.2	9.4	12.5	7.41	199
3 x 4	1	0.8	0.4	1.2	10	13	4.61	245
3 x 4	2	0.8	0.4	1.2	10.5	13.5	4.61	265
3 x 6	1	0.8	0.4	1.4	11.5	14.5	3.08	336
3 x 6	2	0.8	0.4	1.4	12	15.5	3.08	359
3 x 10	1	1	0.6	1.4	14	17.5	1.83	532
3 x 10	2	1	0.6	1.4	14.5	19	1.83	564
3 x 16	2	1	0.8	1.4	16.5	21.5	1.15	811
3 x 25	2	1.2	0.8	1.6	20.5	26	0.727	1227
3 x 35	2	1.2	1	1.6	22	29	0.524	1614

continued on page 53.

Unscreened, Rigid, Fixed Installation Control Cables

(NYY - J , NYY - JZ)

RASANA CABLE



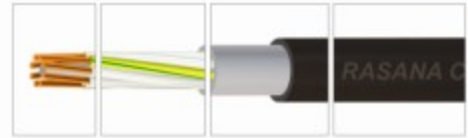
Technical Data

Control cables without screen with solid or stranded conductor, PVC insulated and PVC sheathed.

- Temperature range:
-30 to +70 °C
- Nominal voltage U_0 / U :
0.6 / 1 KV
- Test voltage:
3.5 KV (AC)
- Minimum bending radius:
12 x cable diameter
- Main standard:
IEC 60502 - 1
- Cable code:
IEC 60502
NYY - J
NYY - JZ

Cable Structure

- Conductor material:
Bare copper conductor according to IEC 60228, class 1 (solid) or class 2 (standard).
- PVC core insulation:
Compound type of PVC / A.
- Core insulation colors:
Up to 5 cores, color or number coding and for more than 5 cores number coded imprints.
For 3 or more cores the green / yellow earth core is the last core in the outer layer.
- PVC inner covering.
- PVC outer sheath:
Compound type of PVC / ST1.
- Sheath color is normally black.



▣ **Unscreened, Rigid, Fixed Installation Control Cables (NYY - J , NYY - JZ)**

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Inner Covering Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
5 x 1.5	0.8	1	1.8	13.7	12.1	273
5 x 2.5	0.8	1	1.8	14.7	7.41	344
6 x 1.5	0.8	1	1.8	14.5	12.1	307
6 x 2.5	0.8	1	1.8	15.7	7.41	392
7 x 1.5	0.8	1	1.8	14.5	12.1	315
7 x 2.5	0.8	1	1.8	15.7	7.41	396
10 x 1.5	0.8	1	1.8	17.5	12.1	429
10 x 2.5	0.8	1	1.8	19.1	7.41	560
12 x 1.5	0.8	1	1.8	18	12.1	467
12 x 2.5	0.8	1	1.8	19.6	7.41	615
14 x 1.5	0.8	1	1.8	18.8	12.1	517
14 x 2.5	0.8	1	1.8	20.5	7.41	686
16 x 1.5	0.8	1	1.8	19.6	12.1	569
16 x 2.5	0.8	1	1.8	21.5	7.41	761
19 x 1.5	0.8	1	1.8	20.5	12.1	644
19 x 2.5	0.8	1	1.8	22.5	7.41	868
21 x 1.5	0.8	1	1.8	21.5	12.1	726
21 x 2.5	0.8	1	1.8	23.6	7.41	980
24 x 1.5	0.8	1	1.8	23.5	12.1	841
24 x 2.5	0.8	1	1.8	25.9	7.41	1137
30 x 1.5	0.8	1	1.8	24.7	12.1	984
30 x 2.5	0.8	1	1.8	27.3	7.41	1345
37 x 1.5	0.8	1	1.8	26.5	12.1	1191
37 x 2.5	0.8	1	1.9	29.5	7.41	1649

► Any number of conductors, up to 61 x 2.5, can be manufactured as per customer request.



Technical Data

Power cables, XLPE insulated, PVC / PE sheathed for energy supply.

- Temperature range:
-30 to +90 °C
- Nominal voltage U_0 / U :
0.6 / 1 KV
- Test voltage:
3.5 KV (AC)
- Minimum bending radius:
15 x cable diameter
- Main standard:
IEC 60502 - 1
- Cable code:
IEC 60502
NA2XY , N2XY
NA2X2Y , N2X2Y

Cable Structure

- Conductor material:
Bare copper conductor or bare aluminum conductor according to IEC 60228, class 1 (solid) , class 2 (stranded) or class 5 (flexible).
- XLPE core insulation:
Cross linked polyethylene compound.
- Core insulation colors:
As per customer request.
- PVC inner covering.
- PVC outer sheath:
Compound type of PVC / ST1.
- Sheath color is normally black.



▣ Multi Core, XLPE Insulated, PVC / PE Sheathed, Power Cables (NA2XY , NA2X2Y , N2XY , N2X2Y)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Approx. Filler Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
2 x 1.5	0.7	1	1.8	11.2	12.1	166
2 x 2.5	0.7	1	1.8	12	7.41	203
2 x 4	0.7	1	1.8	12.9	4.61	252
2 x 6	0.7	1	1.8	13.9	3.08	315
2 x 10	0.7	1	1.8	15.5	1.83	433
2 x 16	0.7	1	1.8	18.6	1.154	636
2 x 25	0.9	1	1.8	22	0.727	934
2 x 35	0.9	1	1.8	24.3	0.524	1202
3 x 1.5	0.7	1	1.8	11.6	12.1	186
3 x 2.5	0.7	1	1.8	12.5	7.41	232
3 x 4	0.7	1	1.8	13.4	4.61	294
3 x 6	0.7	1	1.8	14.6	3.08	376
3 x 10	0.7	1	1.8	16.3	1.83	530
3 x 16	0.7	1	1.8	19.6	1.15	787
3 x 25	0.9	1	1.8	23.3	0.727	1168
3 x 35	0.9	1	1.8	25.8	0.524	1521
3 x 50	1	0.2	1.8	24.2	0.387	1694
3 x 70	1.1	0.2	1.9	27.8	0.268	2323
3 x 95	1.1	0.2	2	31.4	0.193	3085
3 x 120	1.2	0.2	2.1	33.8	0.153	3846
3 x 150	1.4	0.2	2.3	37.8	0.124	4807
3 x 185	1.6	0.2	2.4	41.2	0.0991	5896
3 x 240	1.7	0.2	2.6	46.2	0.0754	7580
4 x 1.5	0.7	1	1.8	12.3	12.1	213
4 x 2.5	0.7	1	1.8	13.3	7.41	270

continued on page 54.

RASANA CABLE

Technical Data

Power cables, PVC sheathed for energy supply.

- Temperature range:
-30 to +70 °C
- Nominal voltage U_0 / U :
0.6 / 1 KV
- Test voltage:
3.5 KV (AC)
- Minimum bending radius:
12 x cable diameter
- Main standard:
IEC 60502 - 1
- Cable code:
IEC 60502
NYY - O
NYY - J

Cable Structure

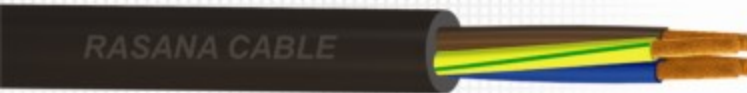
- Conductor material:
Bare copper conductor according to IEC 60228, class 1 (solid) or class 2 (stranded) , class 5 (flexible) .
- PVC core insulation:
Compound type of PVC / A.
- Core insulation colors:
As per customer request.
- PVC inner covering.
- PVC outer sheath:
Compound type of PVC / ST1.
- Sheath color is normally black.



Multi Core, PVC Insulated, PVC Sheathed, Fixed Installation Power Cables (NYY - O , NYY - J)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Approx. Filler Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
2 x 1.5	0.8	1	1.8	11.6	12.1	182
2 x 2.5	0.8	1	1.8	12.4	7.41	220
2 x 4	1	1	1.8	14.1	4.61	297
2 x 6	1	1	1.8	15.1	3.08	365
2 x 10	1	1	1.8	16.7	1.83	489
2 x 16	1	1	1.8	19.8	1.15	705
2 x 25	1.2	1	1.8	23.2	0.727	1022
2 x 35	1.2	1	1.8	25.5	0.524	1300
3 x 1.5	0.8	1	1.8	12	12.1	205
3 x 2.5	0.8	1	1.8	12.9	7.41	253
3 x 4	1	1	1.8	14.7	4.61	348
3 x 6	1	1	1.8	15.9	3.08	435
3 x 10	1	1	1.8	17.6	1.83	596
3 x 16	1	1	1.8	20.9	1.15	868
3 x 25	1.2	1	1.8	24.6	0.727	1274
3 x 35	1.2	1	1.8	27.1	0.524	1638
3 x 50	1.4	0.2	1.8	25	0.387	1832
3 x 70	1.4	0.2	2	28.6	0.268	2482
3 x 95	1.6	0.2	2.1	32.6	0.193	3322
3 x 120	1.6	0.2	2.2	34.8	0.153	4085
3 x 150	1.8	0.2	2.3	38.6	0.124	5078
3 x 185	2	0.2	2.5	42.2	0.0991	6240
3 x 240	2.2	0.2	2.7	47.7	0.0754	8022
4 x 1.5	0.8	1	1.8	12.8	12.1	236
4 x 2.5	0.8	1	1.8	13.8	7.41	297

continued on page 56.



RASANA CABLE

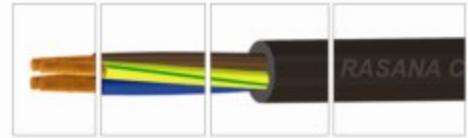
Technical Data

Ordinary PVC insulated, PVC sheathed flexible cords and cables.

- Temperature range:
-30 to +70 °C
- Nominal voltage U_0 / U :
300 / 500 V
- Test voltage:
2.5 KV (AC)
- Minimum bending radius:
10 x cable diameter
- Main standard:
IEC 60227 & CENELEC HD 21.5
- Cable code:
60227 IEC 53
H05VV - F
NYMHY

Cable Structure

- Conductor material:
Fine bare copper conductor according to IEC 60228, class 5 (flexible).
- PVC core insulation:
Compound type of PVC / D.
- Core insulation colors:
According to IEC 60227 – 1
- PVC outer sheath:
Compound type of PVC / ST5.
- Sheath color is normally black, white or as per customer request.



▣ Ordinary Multi Core, PVC Insulated, PVC Sheathed, Flexible Cables (H05VV - F , NYMHY)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
			Min.	Max.		
2 x 0.75	0.6	0.8	5.7	7.2	26	54
2 x 0.75 (Flat)	0.6	0.8	3.7 x 6	7.2 x 4.5	26	33
2 x 1	0.6	0.8	5.9	7.5	19.5	62
2 x 1.5	0.7	0.8	6.8	8.6	13.3	83
2 x 2.5	0.8	1	8.4	10.6	7.98	128
3 x 0.75	0.6	0.8	6	7.6	26	64
3 x 1	0.6	0.8	6.3	8	19.5	74
3 x 1.5	0.7	0.9	7.4	9.4	13.3	104
3 x 2.5	0.8	1.1	9.2	11.4	7.98	160
4 x 0.75	0.6	0.8	6.6	8.3	26	77
4 x 1	0.6	0.9	7.1	9	19.5	93
4 x 1.5	0.7	1	8.4	10.5	13.3	131
4 x 2.5	0.8	1.1	10.1	12.5	7.98	195
5 x 0.75	0.6	0.9	7.4	9.3	26	95
5 x 1	0.6	0.9	7.8	9.8	19.5	110
5 x 1.5	0.7	1.1	9.3	11.6	13.3	159
5 x 2.5	0.8	1.2	11.2	13.9	7.98	237
2 x 4 *	0.8	1.1	9.7	12.1	4.95	175
3 x 4 *	0.8	1.2	10.5	13.1	4.95	221
4 x 4 *	0.8	1.2	11.5	14.3	4.95	272
5 x 4 *	0.8	1.4	13	16.1	4.95	337

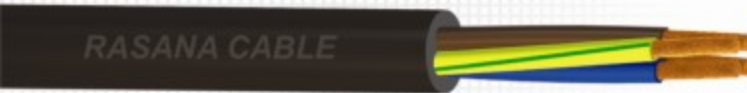
* According to CENELEC HD 21.5

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.013 MΩ.Km.

Circular Lift Cables

(60227 IEC 71C)

RASANA CABLE



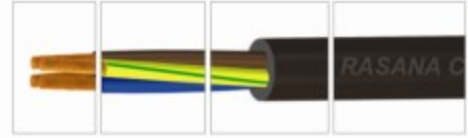
Technical Data

Circular PVC sheathed lift cable and cable for flexible connections.

- Temperature range:
-30 to +70 °C
- Nominal voltage U_0 / U :
300 / 500 V for cables with conductors having nominal cross-sectional areas not exceeding 1 mm².
450 / 750 V for conductors larger than 1 mm².
- Test voltage:
2 KV (AC) for conductors up to and including 1 mm²
2.5 KV (AC) for conductors larger than 1 mm²
- Minimum bending radius:
8 x cable diameter
- Main standard:
IEC 60227
- Cable code:
60227 IEC 71 C

Cable Structure

- Conductor Material:
Fine bare copper conductor according to IEC 60228, class 5 (flexible).
- PVC core insulation:
Compound type of PVC / D.
- Core insulation colors:
According to IEC 60227 - 1
- PVC outer sheath:
Compound type of PVC / ST5.
- Sheath color is normally black, or as per customer request.



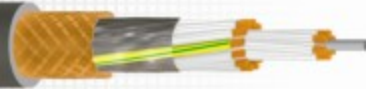
▣ Circular Lift Cables (60227 IEC 71C)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Normal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
2 x 4	0.8	1	10.14	4.95	171
3 x 4	0.8	1	10.77	4.95	211
4 x 4	0.8	1.3	12.42	4.95	277
5 x 4	0.8	1.3	13.59	4.95	331
2 x 6	0.8	1	11.24	3.6	224
3 x 6	0.8	1.3	12.56	3.6	298
4 x 6	0.8	1.3	13.75	3.6	368
5 x 6	0.8	1.3	15.07	3.6	441
2 x 10	1	1.3	14.54	1.91	378
3 x 10	1	1.3	15.47	1.91	477
4 x 10	1	1.3	17.01	1.91	593
5 x 10	1	1.6	19.32	1.91	740
2 x 16	1	1.3	16.66	1.21	536
3 x 16	1	1.6	18.35	1.21	711
4 x 16	1	1.6	20.17	1.21	888
5 x 16	1	1.6	22.18	1.21	1070
2 x 25	1.2	1.6	20.56	0.78	824
3 x 25	1.2	1.6	21.91	0.78	1056
4 x 25	1.2	2	24.95	0.78	1371
5 x 25	1.2	2	27.44	0.78	1654

Flexible, Screened Control Cables

(H05VC4V - F , NYSLCY , NYSLYCY)

RASANA CABLE



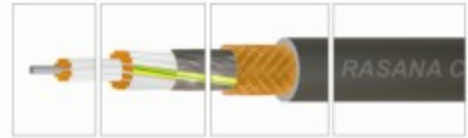
Technical Data

Flexible screened control cables, PVC insulated, PVC inner sheath, braided copper wires for electromagnetic protection and PVC sheathed.

- Temperature range:
+5 to +40 °C
- Nominal voltage U_0 / U :
300 / 500 V
- Test voltage:
2 KV (AC)
- Minimum bending radius:
12 x cable diameter
- Main standard:
IEC 60227
- Cable code:
60227 IEC 74
H05VC4V - F
NYSLCY
NYSLYCY

Cable Structure

- Conductor material:
Fine bare copper conductor according to IEC 60228, class 5 (flexible).
- PVC core insulation:
Compound type of PVC / D.
- Core insulation colors:
Up to 5 cores, color or number coding and for more than 5 cores number coded imprints.
For 3 or more cores the green / yellow earth core is the last core in the outer layer.
- PVC outer sheath:
Compound type of PVC / ST5 (not oil resistant).
- Sheath color is normally grey.



Flexible, Screened Control Cables (H05VC4V - F , NYSLCY , NYSLCY)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Inner Covering Thickness (mm)	Nominal Diameter of Screen Conductors (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
					Min.	Max.		
2 x 0.5	0.6	0.7	0.15	0.9	7.7	9.6	39	70
2 x 0.75	0.6	0.7	0.15	0.9	8	10	26	80
2 x 1	0.6	0.7	0.15	0.9	8.2	10.3	19.5	82
2 x 1.5	0.7	0.7	0.15	1	9.3	11.6	13.3	104
2 x 2.5	0.8	0.7	0.15	1.1	10.7	13.3	7.98	141
3 x 0.5	0.6	0.7	0.15	0.9	8	10	39	75
3 x 0.75	0.6	0.7	0.15	0.9	8.3	10.4	26	89
3 x 1	0.6	0.7	0.15	1	8.8	11	19.5	97
3 x 1.5	0.7	0.7	0.15	1	9.7	12.1	13.3	127
3 x 2.5	0.8	0.7	0.15	1.1	11.3	14	7.98	177
4 x 0.5	0.6	0.7	0.15	0.9	8.5	10.7	39	91
4 x 0.75	0.6	0.7	0.15	1	9.1	11.3	26	106
4 x 1	0.6	0.7	0.15	1	9.4	11.7	19.5	116
4 x 1.5	0.7	0.7	0.15	1.1	10.7	13.2	13.3	157
4 x 2.5	0.8	0.8	0.15	1.2	12.6	15.5	7.98	221
5 x 0.5	0.6	0.7	0.15	1	9.3	11.6	39	105
5 x 0.75	0.6	0.7	0.15	1	9.7	12.1	26	122
5 x 1	0.6	0.7	0.15	1.1	10.3	12.8	19.5	141
5 x 1.5	0.7	0.8	0.15	1.2	11.8	14.7	13.3	189
5 x 2.5	0.8	0.8	0.2	1.3	13.9	17.2	7.98	276
6 x 0.5	0.6	0.7	0.15	1	9.9	12.4	39	118
6 x 0.75	0.6	0.7	0.15	1.1	10.5	13.1	26	143
6 x 1	0.6	0.7	0.15	1.1	11	13.6	19.5	162
6 x 1.5	0.7	0.8	0.15	1.2	12.7	15.7	13.3	217
6 x 2.5	0.8	0.8	0.2	1.4	15.2	18.7	7.98	325

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.013 MΩ.Km.

continued on page 58.

Unscreened, Flexible, Control Cables

(H05VV - F , NYSLY)

RASANA CABLE



Technical Data

Unscreened flexible control cables, PVC insulated, PVC sheathed.

- Temperature range:
+5 to +40 °C
- Nominal voltage U_0 / U :
300 / 500 V
- Test voltage:
2 KV (AC)
- Minimum bending radius:
10 x cable diameter
- Main standard:
IEC 60227
- Cable code:
60227 IEC 75
H05VV - F
NYSLY

Cable Structure

- Conductor material:
Fine bare copper conductor according to IEC 60228, class 5 (flexible).
- PVC core insulation:
Compound type of PVC / D.
- Core insulation colors:
Up to 5 cores, color or number coding and for more than 5 cores number coded imprints.
For 3 or more cores the green / yellow earth core is the last core in the outer layer.
- PVC outer sheath:
Compound type of PVC / ST5 (not oil resistant).
- Sheath color is normally black.



▣ **Unscreened, Flexible, Control Cables (H05VV - F , NYSLY)**

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
			Min.	Max.		
2 x 0.5	0.6	0.7	5.2	6.6	39	42
2 x 0.75	0.6	0.8	5.7	7.2	26	54
2 x 1	0.6	0.8	5.9	7.5	19.5	62
2 x 1.5	0.7	0.8	6.8	8.5	13.3	83
2 x 2.5	0.8	0.9	8.2	10.3	7.98	124
3 x 0.5	0.6	0.7	5.5	7	39	50
3 x 0.75	0.6	0.8	6	7.6	26	64
3 x 1	0.6	0.8	6.3	8	19.5	74
3 x 1.5	0.7	0.9	7.4	9.4	13.3	104
3 x 2.5	0.8	1	9	11.2	7.98	155
4 x 0.5	0.6	0.8	6.2	7.9	39	63
4 x 0.75	0.6	0.8	6.6	8.3	26	77
4 x 1	0.6	0.8	6.9	8.7	19.5	90
4 x 1.5	0.7	0.9	8.2	10.2	13.3	127
4 x 2.5	0.8	1.1	10.1	12.5	7.98	195
5 x 0.5	0.6	0.8	6.8	8.6	39	74
5 x 0.75	0.6	0.9	7.4	9.3	26	94
5 x 1	0.6	0.9	7.8	9.8	19.5	110
5 x 1.5	0.7	1	9.1	11.4	13.3	155
5 x 2.5	0.8	1.1	11	13.7	7.98	232
6 x 0.5	0.6	0.9	7.6	9.6	39	89
6 x 0.75	0.6	0.9	8.1	10.1	26	109
6 x 1	0.6	1	8.7	10.8	19.5	132
6 x 1.5	0.7	1.1	10.2	12.6	13.3	184
6 x 2.5	0.8	1.2	12.2	15.1	7.98	276

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.013 MΩ.Km.

continued on page 59.

RASANA CABLE

Technical Data

Power cables, PVC or XLPE insulated and PVC sheathed single wire armored for energy supply.

- ▣ Temperature range:
-30 to +70 °C
- ▣ Nominal voltage:
0.6 / 1 KV
- ▣ Test voltage:
3.5 KV (AC)
- ▣ Minimum bending radius:
7 x cable diameter
- ▣ Main standard:
IEC 60502 - 1
- ▣ Cable code:
IEC 60502
NYRY , N2XRY , NA2XRY , NAYRY

Cable Structure

- ▣ Conductor material:
Bare copper conductor or bare aluminum conductor according to IEC 60228, class 1 (solid) , for conductors up to and 16mm² class 2 (stranded) for all sizes of conductors.
- ▣ Core insulation:
Compound type of PVC / A or XLPE
- ▣ Core insulation colors:
As per customer request.
- ▣ PVC inner covering.
- ▣ Armor:
Single wire galvanized steel or aluminum (wires for single core cable).
- ▣ PVC outer sheath:
Compound type of PVC / ST1.
- ▣ Sheath color is normally black.




▣ PVC or XLPE Insulated, PVC Sheathed Armored Power Cables (N2XRY , NYRY , NA2XRY , NAYRY)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Approx. Inner Covering Thickness (mm)	Nominal Wire Armor Diameter (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
2 x 1.5	0.8	1	0.9	1.8	13.2	12.1	348
2 x 2.5	0.8	1	0.9	1.8	14	7.41	401
2 x 4	1	1	0.9	1.8	15.4	4.61	513
2 x 6	1	1	0.9	1.8	17.6	3.08	681
2 x 10	1	1	1.25	1.8	19.2	1.83	846
2 x 16	1	1	1.25	1.8	22.3	1.15	1154
2 x 25	1.2	1	1.6	1.8	26.4	0.727	1712
2 x 35	1.2	1	1.6	1.8	28.7	0.524	2054
3 x 1.5	0.8	1	0.9	1.8	13.6	12.1	381
3 x 2.5	0.8	1	0.9	1.8	14.5	7.41	445
3 x 4	1	1	0.9	1.8	16.3	4.61	667
3 x 6	1	1	1.25	1.8	18.4	3.08	770
3 x 10	1	1	1.25	1.8	20.1	1.83	971
3 x 16	1	1	1.25	1.8	23.4	1.15	1337
3 x 25	1.2	1	1.6	1.8	27.8	0.727	1997
3 x 35	1.2	1	1.6	1.8	30.3	0.524	2447
4 x 1.5	0.8	1	0.9	1.8	14.4	12.1	430
4 x 2.5	0.8	1	0.9	1.8	15.4	7.41	503
4 X 4	1	1	1.25	1.8	18.3	4.61	752
4 X 6	1	1	1.25	1.8	19.6	3.08	885
4 X 10	1	1	1.25	1.8	21.5	1.83	1139
4 X 16	1	1	1.6	1.8	25.9	1.15	1735
4 x 25	1.2	1	1.6	1.8	30.1	0.727	2364
4 x 35	1.2	1	1.6	1.8	33	0.524	2929
5 x 1.5	0.8	1	0.9	1.8	15.2	12.1	499

continued on page 60.

RASANA CABLE



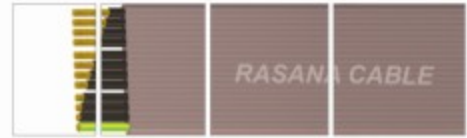
Technical Data

Extra flexible flat cables, PVC insulated, PVC sheathed.

- Temperature range:
-5 to +70 °C
- Nominal voltage U_0 / U :
300 / 500 V for conductors up to and including 1 mm².
450 / 750 V for conductors above 1 mm².
- Test voltage:
2.5 KV (AC)
- Minimum bending radius:
10 x minimum cable dimension
- Main standard:
IEC 60227
- Cable code:
60227 IEC 71F
H05VVH2 – F
H05VVH6 – F

Cable Structure

- Conductor material:
Fine bare copper conductor, according to IEC 60228, class 5 (flexible).
- PVC core insulation:
Compound type of PVC / D.
- Core laying parallel.
- Core insulation colors:
Up to 5 cores, color or number coding and for more than 5 cores number coded imprints.
The green / yellow earth core is the last core.
- PVC outer sheath:
Compound type of PVC / ST5.
- Sheath color is black or grey.



▣ Extra Flexible, Flat, PVC Sheathed Cables (H05VVH2 - F , H05VVH6 - F)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Sheath Thickness			Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
		e ₁ (mm)	e ₂ (mm)	e ₃ (mm)	Width	Thickness		
3 x 0.75	0.6	1	0.9	1.5	10.2	4.3	26	65
3 x 1	0.6	1	0.9	1.5	10.8	4.5	19.5	80
3 x 1.5	0.7	1	1	1.5	10.7	5	13.3	97
3 x 2.5	0.8	1.5	1	1.8	13.5	5.6	7.98	154
4 x 0.75	0.6	1	0.9	1.5	12.6	4.3	26	90
4 x 1	0.6	1	0.9	1.5	13.4	4.5	19.5	104
4 x 1.5	0.7	1	1	1.5	13.7	5	13.3	133
4 x 2.5	0.8	1.5	1	1.8	17	5.6	7.98	205
4 x 4	0.8	1.5	1.2	1.8	21.8	7	4.95	344
4 x 6	0.8	1.5	1.2	1.8	24.8	8.2	3.3	424
4 x 10	1	1.5	1.4	1.8	29.6	10	1.91	710
4 x 16	1	1.5	1.5	2	34.4	11.2	1.21	1015
4 x 25	1.2	1.5	1.6	2	42.6	13.7	0.78	1365
5 x 0.75	0.6	1	0.9	1.5	16.1	4.3	26	115
5 x 1	0.6	1	0.9	1.5	16	4.5	19.5	134
5 x 1.5	0.7	1	1	1.5	17.9	5	13.3	169
5 x 2.5	0.8	1.5	1	1.8	21.5	5.6	7.98	256
5 x 4	0.8	1.5	1.2	1.8	27.4	7	4.95	428
5 x 6	0.8	1.5	1.2	1.8	31.8	8.2	3.3	530
5 x 10	1	1.5	1.4	1.8	35.6	10	1.91	840
5 x 16	1	1.5	1.5	2	46.6	11.2	1.21	1350
5 x 25	1.2	1.5	1.6	2	55.5	13.7	0.78	1970
6 x 0.75	0.6	1	0.9	1.5	19.4	4.3	26	141
6 x 1	0.6	1	0.9	1.5	20.6	4.5	19.5	161

e₁: The space between each group of wires. e₂: Sheath thickness at the top and the bottom. e₃: Sheath thickness at the edges.

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.011 MΩ.Km.

continued on page 61.



Technical Data

Aluminum conductor XLPE insulated overhead cables for electrical power distribution.

- ▣ Temperature range:
-30 to +90 °C
- ▣ Nominal voltage:
0.6 / 1 KV
- ▣ Minimum bending radius:
10 x cable diameter
- ▣ Main standard:
Tavanir spec.
- ▣ Cable code:
NA2X - T

Cable Structure

5 core cables:

- ▣ Conductor:
Phase conductors compacted aluminum (AAC) stranded acc. to ASTM B231
- ▣ Null and messenger:
AAAC conductor
- ▣ Insulation:
Black XLPE insulation with 2.5 to 3 percent carbon black content for UV resistance.

6 core cables:

- ▣ Conductor:
Compacted aluminum (AAC) stranded acc. to ASTM B231
- ▣ Messenger:
7 strands galvanized high carbon steel wires.
- ▣ Insulation:
Black XLPE insulation for phase, lighting and null conductors and black HDPE or XLPE insulation for messenger with 2.5 to 3 percent carbon black content for UV resistance.



Self Supporting Aluminum Overhead Cables (NA2X - T)

5 core cables

Cable Size	Conductor Construction			Conductor Diameter			Insulation Thickness			Cable dia (mm)	Approx. Weight (Kg / Km)
	Phase No.xdia	Lighting No.xdia	Null & Messenger No.xdia	Phase	Lighting	Null & Messenger	Phase	Lighting	Null & Messenger		
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		
3x35+16+50	7 x 2.6	7 x 1.72	7 x 3.15	6.8-7.3	4.6-4.8	9.2-9.6	1.6	1.2	1.6	33	684
3x50+16+50	7 x 3	7 x 1.72	7 x 3.15	7.9-8.4	4.6-4.8	9.2-9.6	1.6	1.2	1.6	36	803
3x70+16+70	19 x 2.2	7 x 1.72	7 x 3.61	9.7-10.2	4.6-4.8	10.7-11	1.8	1.2	1.6	41	1083
3x95+25+70	19 x 2.6	7 x 2.2	7 x 3.61	11-12	5.8-6.1	10.7-11	1.8	1.4	1.6	44	1362
3x120+25+70	19 x 2.83	7 x 2.2	7 x 3.61	12-13	5.8-6.1	10.7-11	1.8	1.4	1.6	46	1575

6 core cables

Cable Size	Conductor Construction				Conductor Diameter				Insulation Thickness				Cable dia (mm)	Approx. Weight (Kg / Km)
	Phase No.xdia	Lighting No.xdia	Null No.xdia	Messenger No.xdia	Phase	Lighting	Null	Messenger	Phase	Lighting	Null	Messenger		
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		
3x35+16+25-25	7 x 2.68	7 x 1.73	7 x 2.22	7 x 1.93	7.1	4.8	6.1	5.8	1.3	1.1	1.3	1.1	28	729
3x50+16+35-25	7 x 3.09	7 x 1.73	7 x 2.65	7 x 1.93	8.2	4.8	7.1	5.8	1.5	1.1	1.3	1.1	31	905
3x70+16+50-25	19 x 2.22	7 x 1.73	7 x 3.09	7 x 1.93	9.8	4.8	8.2	5.8	1.5	1.1	1.5	1.1	34	1157

Instrumentation Cables

(REY (st) Y , REY (st) YRY)



Technical Data

Instrumentation cable, with or without individual and overall screen for analog and digital data transmission.

- Temperature range:
-5 to +40 °C
- Nominal voltage:
90, 300 or 500 V
- Test voltage:
For 90 V rating > 0.75 KV (AC)
For 300 V rating > 1.0 KV (AC)
For 500 V rating > 2.0 KV (AC)
- Minimum bending radius:
15 x cable diameter
- Main standard:
BS EN 50288
- Cable code:
REY (st) Y, REY (st) YRY, RE2Y (st) 2Y, RE2Y (st) YRY,

Cable Structure

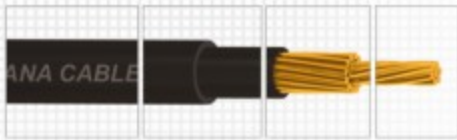
- Conductor material:
Bare copper conductor plain or metal coated class 1, class 2 or class 5 with cross section of 0.5, 0.75, 1, 1.5 and 2.5 mm².
- Core insulation:
PVC, PE, PP, HFFR or XLPE
- Core elements:
Single core, pair, triple or quad
- Screen:
Elements or overall screen with foil, copper or metal coated braid or combination of foil and braid.
In case of foil screen with a tinned copper drain wire.
- Inner sheath:
For armored cable it can be of PVC.
For cables with HFFR insulation it should be of HFFR material.
- A armor:
Single wire, galvanized steel or steel wire braid.
- Outer sheath:
PVC, PE and for cables with HFFR insulation it should be of HFFR material.



▣ Instrumentation Cables (REY (st) Y , REY (st) YRY)

No. & Nominal Cross Section of Conductors (mm ²)	Insulation Thickness (mm)	Inner Covering Thickness (mm)	Wire Armor Diameter (mm)	Sheath Thickness (mm)	Mean Overall Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
2 x 2 x 0.5	0.44	--	--	1	7.04	39	75.8
5 x 2 x 0.5	0.44	--	--	1	9.1	39	150.35
10 x 2 x 0.5	0.44	--	--	1.2	13.13	39	289.29
15 x 2 x 0.5	0.44	--	--	1.3	15.29	39	421.31
20 x 2 x 0.5	0.44	--	--	1.4	17.24	39	557.11
30 x 2 x 0.5	0.44	--	--	1.5	20.52	39	821.03
50 x 2 x 0.5	0.44	--	--	1.7	26.43	39	1374.11
2 x 2 x 0.75	0.44	--	--	1	7.66	26	88.71
5 x 2 x 0.75	0.44	--	--	1.1	10.04	26	183.51
10 x 2 x 0.75	0.44	--	--	1.3	14.47	26	356.81
15 x 2 x 0.75	0.44	--	--	1.3	16.75	26	511.57
20 x 2 x 0.75	0.44	--	--	1.4	18.9	26	668.69
30 x 2 x 0.75	0.44	--	--	1.6	22.62	26	1007.2
50 x 2 x 0.75	0.44	--	--	1.8	29.13	26	1677.8
2 x 2 x 1.5	0.44	--	--	1	9.17	13.3	128.26
5 x 2 x 1.5	0.44	--	--	1.2	12.18	13.3	279.45
10 x 2 x 1.5	0.44	--	--	1.4	17.59	13.3	542.84
15 x 2 x 1.5	0.44	--	--	1.5	20.5	13.3	790.73
20 x 2 x 1.5	0.44	--	--	1.6	23.12	13.3	1042.66
30 x 2 x 1.5	0.44	--	--	1.7	27.55	13.3	1546.62
50 x 2 x 1.5	0.44	--	--	2.1	35.73	13.3	2613.94
2 x 2 x 1	0.44	0.8	0.9	1.5	10.35	19.5	319.84
5 x 2 x 1	0.44	0.8	0.9	1.5	12.84	19.5	492.92
10 x 2 x 1	0.44	0.8	1.25	1.7	17.65	19.5	919.2
15 x 2 x 1	0.44	0.8	1.25	1.8	20.24	19.5	1182.73

continued on page 62.



▣ Single Core, PVC Insulated, PVC Sheathed, Power Cables (NYY , NAYY)

Nominal Cross Section of Conductors (mm ²)	Class of Conductor	Nominal Insulation Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
150	2	1.8	1.6	22.4	0.206	777
185	2	2	1.7	24.9	0.164	970
240	2	2.2	1.8	28.1	0.125	1260
300	2	2.4	1.9	31.1	0.1	1569
400	2	2.6	2	34.7	0.0778	1976
500	2	2.8	2.1	38.7	0.0605	2490

continued from page 13.



▣ Aluminum Overhead Conductors (AAC , ACSR)

Cable Code	Nominal Cross Section of Al. Conductors (mm ²)	Cross Section of Steel Wire (mm ²)	No. & Nominal Diameter of Strands		Cable Diameter (mm)	Rated Strength (N)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
			Aluminum	Steel				
Gopher	25	4.38	6 x 2.36	1 x 2.36	7.08	9.610	1.0930	106
Weasel	30	5.27	6 x 2.59	1 x 2.59	7.77	11.450	0.9077	128
Ferret	40	7.07	6 x 3.00	1 x 3.00	9.00	15.200	0.6766	117
Rabbit	50	8.82	6 x 3.35	1 x 3.35	10.05	18.350	0.5426	214
Horse	70	42.63	12 x 2.79	7 x 2.79	13.95	61.200	0.3936	538
Dog	100	13.5	6 x 4.72	7 x 1.57	14.15	32.700	0.2733	394
Tiger	125	30.0	30 x 2.36	7 x 2.36	16.52	58.000	0.2202	602
Wolf	150	36.8	30 x 2.59	7 x 2.59	18.13	69.200	0.1828	726
Dingo	150	8.8	18 x 3.35	1 x 3.35	16.75	35.700	0.1815	506
Lynx	175	42.8	30 x 2.79	7 x 2.79	19.53	79.800	0.1576	482
Panther	200	49.4	30 x 3.00	7 x 3.00	21.00	92.250	0.1363	974
Jaguar	200	11.7	18 x 3.86	1 x 3.86	19.30	46.550	0.1367	671
Zebra	400	55.6	54 x 3.18	7 x 3.18	28.62	131.900	0.0674	1.621
Mink	63	10.50	6 x 3.66	1 x 3.66	10.18	21.67	0.4540	255
Hyena	100	20.48	7 x 4.39	7 x 1.93	14.57	40.9	0.2712	450
Fox	26.7	6.11	6 x 2.79	1 x 2.79	8.37	13.21	0.7812	148

► Any other sizes of conductors, up to 61 strands, can be manufactured as per customer request.

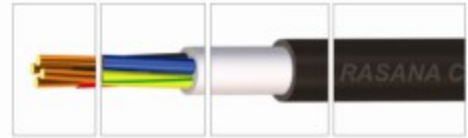
continued from page 15.



■ Power Cable with Concentric Outside Conductors (NYCY , NYCWY)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Inner Covering Thickness (mm)	No. & Nominal Diameter of Concentric Conductors (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
4 x 6 / 6	1	1	21 x 0.6	1.8	18.2	3.08	576
4 x 10 / 10	1	1	20 x 0.8	1.8	20.1	1.83	810
4 x 16 / 16	1	1	32 x 0.8	1.8	24.2	1.15	1214
4 x 25 / 16	1.2	1	32 x 0.8	1.8	28.3	0.727	1715
4 x 35 / 16	1.2	1	32 x 0.8	1.8	31.1	0.524	2174
7 x 1.5 / 2.5	0.8	1	13 x 0.5	1.8	15.5	12.1	335
7 x 2.5 / 2.5	0.8	1	13 x 0.5	1.8	16.6	7.41	417
10 x 1.5 / 2.5	0.8	1	13 x 0.5	1.8	18.4	12.1	455
10 x 2.5 / 4	0.8	1	21 x 0.5	1.8	20	7.41	591
12 x 1.5 / 2.5	0.8	1	13 x 0.5	1.8	18.9	12.1	491
12 x 2.5 / 4	0.8	1	21 x 0.5	1.8	20.5	7.41	645
14 x 1.5 / 2.5	0.8	1	13 x 0.5	1.8	19.7	12.1	541
14 x 2.5 / 6	0.8	1	31 x 0.5	1.8	21.3	7.41	730
19 x 1.5 / 4	0.8	1	21 x 0.5	1.8	21.4	12.1	679
19 x 2.5 / 6	0.8	1	31 x 0.5	1.8	23.3	7.41	906
24 x 1.5 / 6	0.8	1	31 x 0.5	1.8	24.4	12.1	891
24 x 2.5 / 10	0.8	1	51 x 0.5	1.8	26.7	7.41	1203
30 x 1.5 / 5	0.8	1	31 x 0.5	1.8	25.6	12.1	1032
30 x 2.5 / 10	0.8	1	51 x 0.5	1.8	28	7.41	1402
37 x 1.5 / 10	0.8	1	51 x 0.5	1.8	27.3	12.1	1269
37 x 2.5 / 10	0.8	1	51 x 0.5	1.9	30.2	7.41	1698

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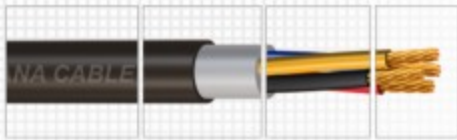


Light Multi Core, PVC Insulated, PVC Sheathed, Fixed Installation Cables (H05VV - R , H05VV - U , NYM)

No. & Nominal Cross Section of Conductors (mm ²)	Class of Conductor	Nominal Insulation Thickness (mm)	Approx. Filler Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
					Min.	Max.		
4 x 1.5	1	0.7	0.4	1.2	8.6	11.5	12.1	159
4 x 1.5	2	0.7	0.4	1.2	9	12	12.1	170
4 x 2.5	1	0.8	0.4	1.2	10	13	7.41	224
4 x 2.5	2	0.8	0.4	1.2	10	13.5	7.41	240
4 x 4	1	0.8	0.4	1.4	11.5	14.5	4.61	310
4 x 4	2	0.8	0.4	1.4	12	15	4.61	335
4 x 6	1	0.8	0.6	1.4	12.5	16	3.08	426
4 x 6	2	0.8	0.6	1.4	13	17	3.08	454
4 x 10	1	1	0.6	1.4	15.5	19	1.83	656
4 x 10	2	1	0.6	1.4	16	20.5	1.83	693
4 x 16	2	1	0.8	1.4	18	23.5	1.15	1002
4 x 25	2	1.2	1	1.6	22.5	28.5	0.727	1550
4 x 35	2	1.2	1	1.6	24.5	32	0.524	2011
5 x 1.5	1	0.7	0.4	1.2	9.4	12	12.1	185
5 x 1.5	2	0.7	0.4	1.2	9.8	12.5	12.1	199
5 x 2.5	1	0.8	0.4	1.2	11	14	7.41	264
5 x 2.5	2	0.8	0.4	1.2	11	14.5	7.41	282
5 x 4	1	0.8	0.6	1.4	12.5	16	4.61	382
5 x 4	2	0.8	0.6	1.4	13	17	4.61	411
5 x 6	1	0.8	0.6	1.4	13.5	17.5	3.08	506
5 x 6	2	0.8	0.6	1.4	14.5	18.5	3.08	539
5 x 10	1	1	0.6	1.4	17	21	1.83	784
5 x 10	2	1	0.6	1.4	17.5	22	1.83	827
5 x 16	2	1	0.8	1.6	20.5	26	1.15	1222
5 x 25	2	1.2	1	1.6	24.5	31.5	0.727	1859
5 x 35	2	1.2	1.2	1.6	27	35	0.524	2454

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.011 MΩ.Km.

continued from page 27.



▣ Multi Core, XLPE Insulated, PVC / PE Sheathed, Power Cables (NA2XY , NA2X2Y , N2XY , N2X2Y)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Approx. Filler Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
4 x 4	0.7	1	1.8	14.4	4.61	348
4 x 6	0.7	1	1.8	15.6	3.08	452
4 x 10	0.7	1	1.8	17.6	1.83	646
4 x 16	0.7	1	1.8	21.3	1.15	965
4 x 25	0.9	1	1.8	25.4	0.727	1445
4 x 35	0.9	1	1.8	28.2	0.524	1894
4 x 50	1	0.2	1.9	27.6	0.387	2223
4 x 70	1.1	0.2	2	32	0.268	3059
4 x 95	1.1	0.2	2.1	35.8	0.193	4058
4 x 120	1.2	0.2	2.3	39.2	0.153	5092
4 x 150	1.4	0.2	2.4	43.2	0.124	6331
4 x 185	1.6	0.2	2.6	47.6	0.0991	7798
4 x 240	1.7	0.2	2.8	53.4	0.0754	10026
5 x 1.5	0.7	1	1.8	13.1	12.1	242
5 x 2.5	0.7	1	1.8	14.2	7.41	311
5 x 4	0.7	1	1.8	15.4	4.61	405
5 x 6	0.7	1	1.8	16.8	3.08	530
5 x 10	0.7	1	1.8	19	1.83	766
5 x 16	0.7	1	1.8	23.2	1.15	1151
5 x 25	0.9	1	1.8	27.8	0.727	1731
5 x 35	0.9	1	1.8	30.9	0.524	2277
3 x 25 / 16	0.9 / 0.7	1	1.8	25.3	0.727 / 1.15	1344
3 x 35 / 16	0.9 / 0.7	1	1.8	28.1	0.524 / 1.15	1700
3 x 50 / 25	1.0 / 0.9	0.2	1.8	26.6	0.387 / 0.727	1874
3 x 70 / 35	1.1 / 0.9	0.2	1.9	29.8	0.268 / 0.525	2616

continued from page 31.



▣ Multi Core, XLPE Insulated, PVC / PE Sheathed, Power Cables (NA2XY , NA2X2Y , N2XY , N2X2Y)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Approx. Filler Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
3 x 95 / 5	1 / 1.1	0.2	2.1	34.2	0.193 / 0.387	3520
3 x 120 / 70	1.2 / 1.1	0.2	2.2	37.2	0.153 / 0.268	4526
3 x 150 / 70	1.4 / 1.1	0.2	2.3	41.2	0.124 / 0.268	5403
3 x 185 / 95	1.6 / 1.1	0.2	2.5	45.6	0.0991 / 0.193	6745
3 x 240 / 120	1.7 / 1.2	0.2	2.7	51.6	0.0754 / 0.153	8908

continued from page 54.



■ Multi Core, PVC Insulated, PVC Sheathed, Fixed Installation Power Cables (NYY - O , NYY - J)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Approx. Filler Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
4 X 4	1	1	1.8	15.8	4.61	412
4 X 6	1	1	1.8	17.1	3.08	522
4 X 10	1	1	1.8	19.1	1.83	726
4 X 16	1	1	1.8	22.7	1.15	1065
4 x 25	1.2	1	1.8	26.9	0.727	1574
4 x 35	1.2	1	1.8	29.6	0.524	2038
4 x 50	1.4	0.2	1.9	28.4	0.387	2397
4 x 70	1.4	0.2	2.1	32.8	0.268	3257
4 X 95	1.6	0.2	2.2	37	0.193	4351
4 X 120	1.6	0.2	2.4	40.2	0.153	5390
4 X 150	1.8	0.2	2.5	44.2	0.124	6687
4 X 185	2	0.2	2.7	48.6	0.0991	8220
4 x 240	2.2	0.2	2.9	54.6	0.0754	10571
5 x 1.5	0.8	1	1.8	13.7	12.1	270
5 x 2.5	0.8	1	1.8	14.7	7.41	342
5 x 4	1	1	1.8	17.1	4.61	480
5 x 6	1	1	1.8	18.5	3.08	613
5 x 10	1	1	1.8	20.6	1.83	861
5 x 16	1	1	1.8	24.8	1.15	1269
5 x 25	1.2	1	1.8	29.4	0.727	1885
5 x 35	1.2	1	1.8	32.7	0.524	2466

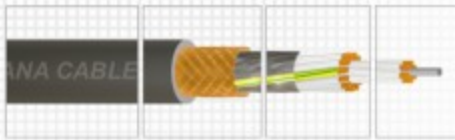
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▣ **Multi Core, PVC Insulated, PVC Sheathed, Fixed Installation Power Cables (NYY - O , NYY - J)**

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Approx. Filler Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
3 x 25 / 16	1.2 / 1	1	1.8	26.8	0.727 / 1.15	1471
3 x 35 / 16	1.2 / 1	1	1.8	29.5	0.524 / 1.15	1838
3 x 50 / 25	1.4 / 1.2	0.2	1.9	27.6	0.387 / 0.727	2030
3 x 70 / 35	1.4 / 1.2	0.2	2	30.6	0.268 / 0.524	2778
3 x 95 / 50	1.6 / 1.4	0.2	2.2	35.4	0.193 / 0.384	3762
3 x 120 / 70	1.6 / 1.4	0.2	2.3	38.2	0.153 / 0.268	4773
3 x 150 / 70	1.8 / 1.4	0.2	2.4	42.2	0.124 / 0.268	5702
3 x 185 / 95	2 / 1.6	0.2	2.6	46.6	0.0991 / 0.193	7191
3 x 240 / 120	2.2 / 1.6	0.2	2.8	52.6	0.0754 / 0.153	9363

continued from page 56.



▣ Flexible, Screened Control Cables (H05VC4V - F , NYSLCY , NYSLCY)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Inner Covering Thickness (mm)	Nominal Diameter of Screen Conductors (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
					Min.	Max.		
7 x 0.5	0.6	0.7	0.15	1.1	10.8	13.5	39	137
7 x 0.75	0.6	0.7	0.15	1.2	11.5	14.3	26	163
7 x 1	0.6	0.8	0.15	1.2	12.2	15.1	19.5	188
7 x 1.5	0.7	0.8	0.2	1.3	14.1	17.4	13.3	261
7 x 2.5	0.8	0.8	0.2	1.5	16.5	20.3	7.98	373
12 x 0.5	0.6	0.8	0.2	1.3	13.3	16.5	39	200
12 x 0.75	0.6	0.8	0.2	1.3	13.9	17.2	26	254
12 x 1	0.6	0.8	0.2	1.4	14.7	18.1	19.5	297
12 x 1.5	0.7	0.8	0.2	1.5	16.7	20.5	13.3	396
12 x 2.5	0.8	0.9	0.2	1.7	19.9	24.4	7.98	599
18 x 0.5	0.6	0.8	0.2	1.3	15.1	18.6	39	290
18 x 0.75	0.6	0.8	0.2	1.5	16.2	19.9	26	353
18 x 1	0.6	0.8	0.2	1.5	16.9	20.8	19.5	405
18 x 1.5	0.7	0.9	0.2	1.7	19.6	24.1	13.3	571
18 x 2.5	0.8	0.9	0.2	2	23.3	28.5	7.98	839
27 x 0.5	0.6	0.8	0.2	1.6	18	22.1	39	402
27 x 0.75	0.6	0.9	0.2	1.7	19.3	23.7	26	512
27 x 1	0.6	0.9	0.2	1.7	20.2	24.7	19.5	598
27 x 1.5	0.7	0.9	0.2	2	23.4	28.6	13.3	815
27 x 2.5	0.8	1	0.25	2.3	28.2	34.5	7.98	1203
36 x 0.5	0.6	0.9	0.2	1.7	20.1	24.7	39	521
36 x 0.75	0.6	0.9	0.2	1.8	21.3	26.2	26	653
36 x 1	0.6	0.9	0.2	1.9	22.5	27.6	19.5	753
36 x 1.5	0.7	1	0.25	2.2	26.6	32.5	13.3	1048
36 x 2.5	0.8	1.1	0.25	2.4	31.5	38.5	7.98	1587

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.013 MΩ.Km.

continued from page 39.



▣ **Unscreened, Flexible, Control Cables (H05VV - F , NYSLY)**

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
			Min.	Max.		
7 x 0.5	0.6	0.9	8.3	10.4	39	102
7 x 0.75	0.6	1	9	11.3	26	130
7 x 1	0.6	1	9.5	11.8	19.5	152
7 x 1.5	0.7	1.2	11.3	14.1	13.3	219
7 x 2.5	0.8	1.3	13.6	16.8	7.98	326
12 x 0.5	0.6	1.1	10.4	12.9	39	153
12 x 0.75	0.6	1.1	11	13.7	26	189
12 x 1	0.6	1.2	11.8	14.6	19.5	229
12 x 1.5	0.7	1.3	13.8	17	13.3	320
12 x 2.5	0.8	1.5	16.8	20.6	7.98	489
18 x 0.5	0.6	1.2	12.3	15.3	39	221
18 x 0.75	0.6	1.3	13.2	16.4	26	282
18 x 1	0.6	1.3	14	17.2	19.5	332
18 x 1.5	0.7	1.5	16.5	20.3	13.3	474
18 x 2.5	0.8	1.8	20.2	24.8	7.98	731
27 x 0.5	0.6	1.4	15.1	18.6	39	339
27 x 0.75	0.6	1.5	16.2	19.9	26	431
27 x 1	0.6	1.5	17	21	19.5	508
27 x 1.5	0.7	1.8	20.3	24.9	13.3	732
27 x 2.5	0.8	2.1	24.7	30.2	7.98	1122
36 x 0.5	0.6	1.54	17	20.9	39	432
36 x 0.75	0.6	1.6	18.2	22.4	26	550
36 x 1	0.6	1.7	19.4	23.8	19.5	660
36 x 1.5	0.7	2	23	28.2	13.3	947
36 x 2.5	0.8	2.3	28	34.2	7.98	1448

► Any number of conductors, up to 61 x 2.5, can be manufactured as per customer request.

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.013 MΩ.Km.

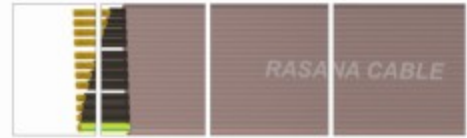
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▣ PVC or XLPE Insulated, PVC Sheathed Armored Power Cables (N2XRY , NYRY , NA2XRY , NAYRY)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Approx. Inner Covering Thickness (mm)	Nominal Wire Armor Diameter (mm)	Nominal Sheath Thickness (mm)	Average Outer Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
5 x 2.5	0.8	1	0.9	1.8	16.3	7.41	596
5 x 4	1	1	1.25	1.8	19.5	4.61	850
5 x 6	1	1	1.25	1.8	20.8	3.08	1005
5 x 10	1	1	1.6	1.8	23.7	1.83	1447
5 x 16	1	1	1.6	1.8	28.2	1.15	1991
5 x 25	1.2	1	1.6	1.8	32.8	0.727	2776
5 x 35	1.2	1	2	2	36.9	0.524	3707
3 x 25 / 16	1.2 / 1	1	1.6	1.8	30.1	0.727 / 1.15	2265
3 x 35 / 16	1.2 / 1	1	2	1.9	33	0.524 / 1.15	2734
3 x 50 / 25	1.4 / 1.2	1	2	2	33.8	0.384 / 0.727	3335
3 x 70 / 35	1.4 / 1.2	1.2	2	2.1	37.2	0.268 / 0.524	4249
3 x 95 / 50	1.6 / 1.4	1.2	2.5	2.3	42	0.193 / 0.387	5519
3 x 120 / 70	1.6 / 1.4	1.4	2.5	2.4	46.2	0.153 / 0.268	7043
3 x 150 / 70	1.8 / 1.4	1.4	2.5	2.6	50.4	0.124 / 0.268	8278
3 x 185 / 95	2 / 1.6	1.4	2.5	2.7	54.6	0.0991 / 0.193	10008
3 x 240 / 120	2.2 / 1.6	1.6	2.5	2.9	61	0.0754 / 0.153	12546

continued from page 43.



▣ Extra Flexible, Flat, PVC Sheathed Cables (H05VVH2 - F , H05VVH6 - F)

No. & Nominal Cross Section of Conductors (mm ²)	Nominal Insulation Thickness (mm)	Nominal Sheath Thickness			Average Outer Diameter (mm)		Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
		e ₁ (mm)	e ₂ (mm)	e ₃ (mm)	Width	Thickness		
6 x 1.5	0.7	1	1	1.5	20.5	5	13.3	205
6 x 2.5	0.8	1.5	1	1.8	25.1	5.6	7.98	440
9 x 0.75	0.6	1	0.9	1.5	26.4	4.3	26	198
9 x 1	0.6	1	0.9	1.5	28.4	4.5	19.5	230
9 x 1.5	0.7	1	1	1.5	23.5	5	13.3	301
9 x 2.5	0.8	1.5	1	1.8	32.5	5.6	7.98	510
12 x 0.75	0.6	1	0.9	1.5	33.8	4.3	26	258
12 x 1	0.6	1	0.9	1.5	36.2	4.5	19.5	298
12 x 1.5	0.7	1	1	1.5	38.9	5	13.3	421
16 x 0.75	0.8	1.5	1	1.8	47.1	5.6	7.98	580
16 x 1	0.6	1	0.9	1.5	44.4	4.3	26	340
16 x 1.5	0.6	1	0.9	1.5	47.6	4.5	19.5	395
18 x 0.75	0.6	1	0.9	1.5	49.2	4.3	26	380
18 x 1	0.6	1	0.9	1.5	52.8	4.5	19.5	441
20 x 0.75	0.6	1	0.9	1.5	55	4.3	26	424
20 x 1	0.6	1	0.9	1.5	59	4.5	19.5	495
24 x 0.75	0.6	1	0.9	1.5	65.6	4.3	26	509
24 x 1	0.6	1	0.9	1.5	70.4	4.5	19.5	590

e₁: The space between each group of wires. e₂: Sheath thickness at the top and the bottom. e₃: Sheath thickness at the edges.

NOTE: For all sizes the minimum insulation resistance at 70 °C & 500 V is more than 0.011 MΩ.Km.

continued from page 47.



■ Instrumentation Cables (REY (st) Y , REY (st) YRY)

No. & Nominal Cross Section of Conductors (mm ²)	Insulation Thickness (mm)	Inner Covering Thickness (mm)	Wire Armor Diameter (mm)	Sheath Thickness (mm)	Mean Overall Diameter (mm)	Max. Conductor Resistance at 20 °C (Ω / Km)	Approx. Weight (Kg / Km)
20 x 2 x 1	0.44	0.8	1.25	1.8	22.47	19.5	1420.15
30 x 2 x 1	0.44	0.9	1.25	1.9	26.61	19.5	1930.45
50 x 2 x 1	0.44	1.2	1.6	2.2	34.4	19.5	3254.25
2 x 2 x 1.5	0.44	0.8	0.9	1.5	11.27	13.3	371.28
5 x 2 x 1.5	0.44	0.8	0.9	1.6	14.18	13.3	585.06
10 x 2 x 1.5	0.44	0.8	1.25	1.7	19.49	13.3	1084.91
15 x 2 x 1.5	0.44	0.8	1.25	1.8	22.4	13.3	1405.76
20 x 2 x 1.5	0.44	0.9	1.25	1.9	25.22	13.3	1741
30 x 2 x 1.5	0.44	1	1.6	2.1	29.95	13.3	2624.06
50 x 2 x 1.5	0.44	1.4	2	2.3	38.73	13.3	4335.83
2 x 2 x 2.5	0.53	0.8	0.9	1.5	13.27	7.98	466.03
5 x 2 x 2.5	0.53	0.8	1.25	1.7	16.98	7.98	889.59
10 x 2 x 2.5	0.53	0.8	1.25	1.9	23.69	7.98	1469.7
15 x 2 x 2.5	0.53	0.9	1.6	2	27.5	7.98	2127.21
20 x 2 x 2.5	0.53	1.1	1.6	2.1	31.15	7.98	2676.61
30 x 2 x 2.5	0.53	1.3	1.6	2.3	37.17	7.98	3667.64
50 x 2 x 2.5	0.53	1.7	2.5	2.6	47.99	7.98	6507.09

continued from page 49.

Guarantee Conditions of Products

- Obligation of company for guarantee shall be contingent upon use of product in appropriate and normal conditions of temperature, amperage, voltage, place of installation etc.
- The guarantee is granted to the products of company except for cases of physical impacts, tear, destructive works, damage by rodents, misuse and/or negligence of users.
- End user should notify promptly upon detection of any guarantee covered defect before expiration of guarantee period.
- Guarantee applies only to such defects that at experts discernment of the company were occurred before delivery of products to the customer.
- Apparent defects such as scratches, abrasion, swelling, etc. can be accepted before installation and use.
- The guarantee does not apply to damage caused by improper transport, handle or storage by consumers.
- The guarantee is limited to products manufactured by Rasana Cable Co. and expenses to remedy the same.
- The guarantee is effective for 24 months as of the date when the invoice is issued.
- Guarantee is granted to all products of Rasana Cable Co.

Customer complaints handling office:

- Tel: (+9821) 88315194
- SMS No.: (+98) 30002482
- E-mail: voc@rasanacable.com
- Fax: (+9821) 88344255

* Our colleagues in customer complaints handling office will contact you for receiving your ideas, suggests or complaints as receiving a blank message.

- Notice the hologram of Rasana Cable Co. when receiving the products.
- Ensure that power is fully disconnected when you are installing a wire or cable.
- Ensure that joints are properly connected and insulated.
- Strictly Avoid electrical currents through cables or wires when they are in a coil form.
- Avoid unconventional usage of wires and/or cables before they are disconnected and their usage for installation of panels etc.
- Be sure of suitability of products which you are selecting for usage conditions and place of installation.
- Promptly inform the company of any defects in the products of Rasana Cable Co.
- Safety principles require to avoid lifting cable coils exceeding 20 kg of weight.
- Wastes and all material of packaging can be recycled. To protect the environment you are requested to assist in collecting and recycling of such material by delivering to Rasana Cable Co. and/or places established for recycling wastes.
- Our colleagues in sale service department are ready for receiving your ideas, suggests or complaints and for consultation to customers on choosing appropriate products.

Handling

Damage to cable can occur due to incorrect handling to which the drums and cables may be subjected, causing breakdown of the drum flanges and in exceptional cases, movement of the drum barrel takes place. Once this breakdown of the drum occurs the cable is immediately exposed to damage.

Fork-lift trucks may be used in handling provided that care is exercised not to damage or remove the protective lagging when pushing the 'fork' under the drum flanges. Unloading can also be safely accomplished by means of ramps and winches. (See Fig. 1 & 2.)

Under no circumstances should a drum be rolled off a vehicle on to a 'cushion' of sand, tarpaulin, etc. this action could crumple the flanges and barrel of the drum, driving splinters and/or nails into the cable. (See Fig. 3)

Rolling Drums:

Drums of cable must always be rolled in the direction shown by the arrow painted on the flanges, but such rolling should in any case be kept to a minimum.

Turning Drums:

The best way to turn a cable drum is to roll it on to two well greased thin plates or boards about 2 feet square. The plates can then be used as a turntable and the drum rotated to the desired direction.

Lowering of Lifting Drums:

When drums are moved from one level to another, e.g. truck to ground, wharf to ship, etc. lifting and lowering gear must always be used. When drums are lifted from the upper layer of a tiered stack, care must be taken to ensure that no movement of the bottom layer occurs so as to cause collapse. Drums, whether loaded or empty, and too heavy to be man-handled, should always be slung: they should never be dropped. (See Fig. 1 & 2)

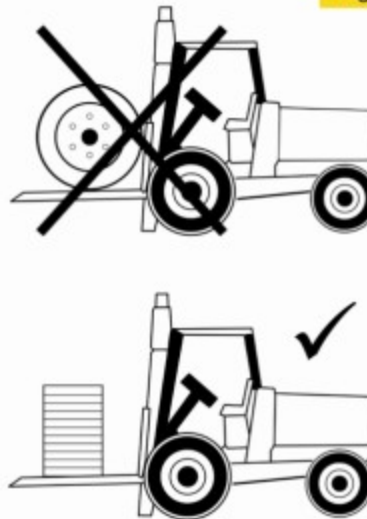
Lifting Cable Drums Using Crane

Figure - 1



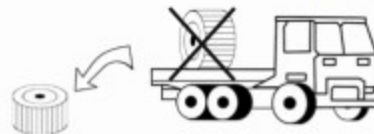
Lifting Drums on Fork Trucks Correctly

Figure - 2



Do not Cable Drums from Trucks

Figure - 3



Storage

If at any time the drums of cable are required to be stored for reasonably long periods, e.g. prior to shipment or installation, the following points should be noted.

2.1 the site for storing of drums should be well drained, hard packed soil, or preferably a concrete surface, which will not allow the drums to sink and so give rise to damage due to the extreme difficulty in moving drums when they are sunk into the ground.

2.2 All drums should be stored with the lagging intact, and in such a manner as to leave sufficient space between them for air circulation. Check and tighten barrel bolts on the drums at regular intervals.

2.3 Tier stacking of drums is not recommended. In no circumstances must the drums be stored on the flat i.e. , with flanges horizontal. (See Fig. 4)

When lifting drums of cable for loading or unloading, spindles must always be used in conjunction with crane slings, chain or lifting beams. On no account any drum be lifted by wire slings. (See Fig. 1)

When lifting drums of cable, lifting beams or stretchers between the sling of chain pairs must be used to prevent flanges crushing on to the cable. (See Fig. 1)

NOTE: Normally the hooks or slings should be closed to the drum flanges.

2.4 All drums during installation (i.e. when the lagging have been removed) should be stored with the rims of flange touching, so that there is no danger of the flanges of drums coming into accidental contact with unprotected cable on other drums.

IMPORTANT: cable ends must be sealed with end cap during storage and transportation.

Figure - 4



Laying of Cables

The cable should preferably be drawn to its final position in a continuous manner.

During stops, the cable will settle between rollers and may cause high strain on men and machines during restarting. Whether the pulling is manual or with a winch, it is necessary for one man to be stationed at the drum with a plank of wood wedged against the flange of the drum so that over running of the drum is prevented if the pulling stops.

Otherwise, many loose turns can easily develop on the drum.

When pulling by a winch it is advantageous for the cable end to be taken by hand as far as possible before attaching the winch rope. This allows the leading cable settle under well-controlled condition.

The winch operator must, at all times, carefully observe the dynamometer to prevent overloading.

On long pulls, good communication is essential, preferably by radio.

When pulling a power winch, more attention has to be given to the maximum pulling load which is permissible. For such installations a pulling eye attached to the conductors is necessary and for copper conductors a pulling tension of 6 kg force per sq. mm of total conductor area can be applied (with the provision of 2000 kg force maximum).

Graphite paste should be used for lubrication when cables are being pulled into ducts or pipes.

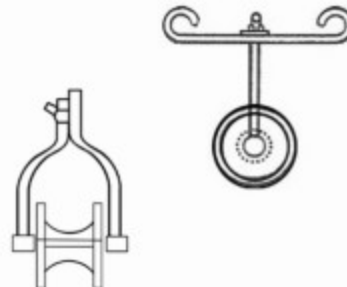
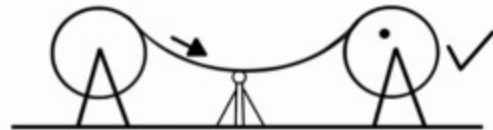
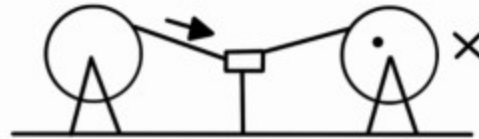
For open trench and straight installations, a cable stocking can be used.

It is advisable, however, to protect the PVC oversheath with a layer of bitumen tape applied with 50% overlap.

Cables should never be bent to a small radius.

As large a radius as space permits should be adopted.

Under no circumstances should the bending radius be less than the minimum permissible limits. It is particularly important to have a generous bending radius when cables are to be pulled by a power winch, so as to keep within the maximum permissible pulling tension and prevent the cable being flattened around bends or in ducts.



Before disconnecting the pulling rope, the cable is laid off. i.e. starting from one end, it is carefully lifted from the rollers and deposited on the bottom of the trench. About 10m of cable should be lifted at one time, any slack being carried forward. The end position of a cable run may require double handling because it is not possible to draw cables straight into buildings. In this case the cable is over pulled, then man-handled into the required position. At all times the loops should be kept as large as possible so that the bending radius is always above the minimum permitted.

Similarly at the drum location the necessary length of cable may be unwound from the drum and laid out, if space is limited, prior to cutting to length and placing into position. Immediately after cutting the cable ends must be suitably sealed to prevent ingress of moisture. In this respect it is also important to carefully examine the pulling end seal to ensure that it has not been damaged during laying.

Backfilling and Reinstatement A

Prior to backfilling, it is necessary to carry out a visual inspection, and items which need to be checked are:

1) The cables have a suitable bedding, such as sieved sand or soil. Stone chips and other sharp objects in the cable route should be removed.

2) The spacing is correct if there is more than one cable in the trench.

3) Pulling equipment is carefully removed.

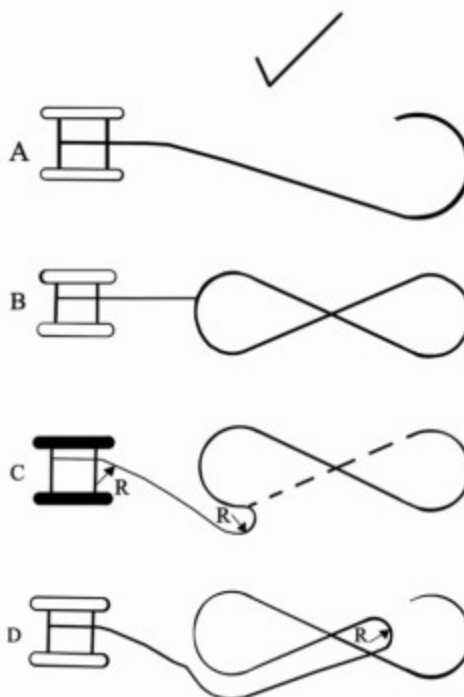
4) The cable is free from obvious damage caused during installation. A very high proportion of cable failures in service are due to such damage. It may be necessary to inspect the underside with a mirror. In such cases it is advisable to make a first inspection whilst the cable is still on rollers.

5) The cable to be MEGGER tested ensure healthiness of insulation through out. MEGGER results must be above 20 MEGA OHMS.

Do not Attempt Coiling of Cable on the Ground



On the Ground Cable can be Flaked in a Figure of Eight Formation



Note: $R >$ Minimum Permissible Bending Radius of Cable

Good workmanship and proper materials shall be used.

General

All equipment shall be constructed, installed and protected and shall be capable of being maintained, inspected and tested so as to prevent danger so far as is reasonably practicable.

All equipment shall be suitable for maximum power demanded by the current-using equipment when it is functioning in its intended manner.

All electrical conductor shall be of sufficient size and current-carrying capacity for the purposes for which they are intended.

All conductors shall either

(i) be so insulated and where necessary further effectively protected, or

(ii) be so placed and safeguarded, to prevent danger so far as is reasonably, practicable.

Every electrical joint and connection shall be of proper construction as regards conductance, insulation, mechanical strength and protection.

Overcurrent protective devices

Where necessary to prevent danger, every installation and every circuit thereof shall be protected against over-current by devices which:

(i) will operated automatically at values of current which are suitably related to the

(ii) safe current rating of the circuit, and are of adequate breaking capacity and where appropriate, making capacity, and

(iii) are suitably located and are constructed as to prevent danger from overheating, arcing or the scattering of hot particles when they come into operation and to permit ready restoration of the supply without danger.

Precautions against earth leakage and earth fault currents.

Where metalwork of electrical equipment, other than current-carrying conductors, may become charged with electricity in such a manner as to cause danger:

(i) the metalwork shall be connected with earth in such a manner as will cause discharge of

electrical energy without danger, or

(ii) other equally effective precautions shall, be taken to prevent danger.

Every circuit shall be arranged so as to prevent the persistence of dangerous earth leakage currents.

Where metalwork is connected with Earth in accordance with relevant regulations. The circuit concerned shall be protected against the persistence of an Earth fault current by:

(i) the over-current protective devices as required by regulation or

(ii) a residual current device or equally effective device.

The method described in item (ii) above shall be used whenever the prospective Earth fault current is insufficient to cause prompt operation of the over-current protective devices.

Where any metalwork of electrical equipment is connected with earth in accordance with regulation and is accessible simultaneously with substantial exposed metal parts of other services, the latter shall be effectively connected to the main earthing terminal of the installation.

Protective devices and switches

A single-pole fuse switch or circuit-breaker shall be inserted in the phase conductor only.

No switch or circuit-breaker, excepting where linked, or fuse shall be inserted in an earthed neutral conductor and any linked switch or linked circuit-breaker inserted in an earthed neutral conductor shall be arranged to break all the related phase conductor.

Isolation and switching

Effective means, suitably placed for ready operation, shall be provided so that all voltage may be cut from every installation, from every circuit thereof and from all equipment, as may be necessary to prevent or remove danger.

Every fixed electric motor shall be provided with an efficient means of switching off, readily accessible, easily operated and so placed as to prevent danger.

Technical Information

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Technical Information (1)

Designation System for Harmonized Power Cable & Cords, up to & including 450 / 750 V, according to CENELEC HD 361

Related Standard (1 a)	
A	Authorized national standard
H	Harmonized standards
Rated Voltage (1 b)	
01	100 / 100 V
03	300 / 300 V
05	300 / 500 V
07	450 / 750 V
Insulation & Sheath Material (2 a)	
B	(EPR) Ethylene propylene rubber for a continuous operating temp. of 90°C
G	(EVA) Ethylene vinylacetat copolymer
J	Glass fiber braid
M	Mineral
N	(PCP) Polychloroprene or equivalent material
N2	(PCP) Polychloroprene for welding cables
N4	Chlorosulfonated polyethylene or chlorinated polyethylene
N8	(PCP) Polychloroprene water resistant
Q	(PUR) Polyurethane
Q4	(PA) Polyamide
R	Ordinary EPR or equivalent synthetic elastomer for a continuous operating temp. of 60°C
S	(SR) Silicon rubber
T	Textile braiding impregnated or not on assembled cores
T6	Textile braiding impregnated or not on individual cores of a multi core cable
V	(PVC) Polyvinyl chloride
V2	(PVC) Polyvinyl chloride, heat resistant for a continuous operating temp of 90°C
V3	(PVC) Polyvinyl chloride, low temperature
V4	(PVC) Polyvinyl chloride, cross linked
V5	(PVC) Polyvinyl chloride, oil resistant
Z	Polyolefin based cross linked compound having low level emission of corrosive gases
Z1	Polyolefin based thermoplastic compound having low level emission of corrosive gases
Metallic Covering (2 b)	
C	Concentric copper conductor
C4	Copper screen braided on assembled cores
Constructional Component (2 c)	
D3	Stress relieving elements (support wire)
D5	Center core (no supporting element)
Special Construction (2 c)	
(No Symbol)	Circular construction of cables
H	Flat separable cables & core

H2	Flat non separable cables & core
H	Flat non separable cables (three or more cores)
H7	Tow layer insulating jacket
H8	Spiral cables (extensible lead)
Conductor Material (2 e)	
(No Symbol)	Copper
- A	Aluminum
Conductor Type (2 f)	
- D	Flexible conductor for arc welding cables (HD 22 part 5)
- E	Highly flexible conductor for arc welding cables (HD 22 part 6)
- F	Flexible conductor for flexible cable or core (EN 60228 Class 5)
- H	Highly flexible conductor for flexible cable or core (EN 60228 Class 6)
- K	Flexible conductor of a cable for fixed installations (EN 60228 Class 5)
- R	Rigid, round conductor, stranded
- U	Rigid, round conductor, solid
- Y	Tinsel conductor
Number of Cores & Nominal Cross Section of Conductor	
(Number)	Number of cores
X	Without earth core
G	With earth core
(Number)	Nominal cross section of conductors in mm ²
Y	For a tinsel conductor where the cross section is not specified

Sequence of Cable Designation

Related Standard	Rated Voltage	Insulation Material	Metallic Covering	Sheath Material	Constructional Component & Special Construction	Conductor Material	Conductor Type	Number of Cores	Times	Conductor Size (mm ²)
1 a	1 b	2 a	2 b	2 a	2 c & 2 b	2 e	2 f			
H	01	B	C	B	D3	(No Symbol)	- D	1	X	Y
A	02	G	C4	G	D5	- A	- E	2	G	0.5
	03	J		J			- F	3		0.75
	05	M		N , N2 N4 , N8	(No Symbol)		- H	4		1
	07	N , N4		Q , Q4	H , H2 , H6 , H7 , H8		- K	5		1.5
		R		R			- R	etc.		2.5
		S		S			- U			4
		V , V2 V3 , V4		T , T6			- Y			6
		Z , Z1		V , V2 V3 , V4 , V5						10
				Z , Z1						etc.

Technical Information (2)

Designation Code for Power Cables, according to VDE 0271

Construction Reference



Designation Identification

- N VDE standard
- (N) Similar to VDE standard

Conductor Material

- A Aluminum conductor
- Copper conductor

Insulating Materials

- Y PVC
- 2X Cross linked PE (XLPE)
- Impregnated paper

Concentric Conductor (Screen)

- C Concentric conductor of copper
- CW Concentric conductor of copper in waveconal formation
- CE Concentric conductor of copper over each individual core
- S Screen of copper wires
- SE Screen of copper wires over each individual core
- H Conductive layers
- (F) Longitudinally water proof screen

Armoring

- B Steel tape armoring
- F Galvanized flat steel wires
- G Counter helix of galvanized steel tape
- R Galvanized round steel wires

Sheath Material

- A Over sheath made of fibrous material
- K Lead sheath
- KL Aluminum sheath
- Y PVC
- 2Y PE

Protective Conductor

- J with protective conductor
- O without protective conductor

Number of Cores



Constructor Cross Section in mm²

Conductor Type

- r ... Circular conductor
- s ... Sector conductor
- o ... Oval conductor
- ... e Circular, solid conductor
- ... m Stranded conductor
- ... h Hollow circular conductor
- /V Compact conductor

Rating Voltage

- 0.6 / 1 KV
- 3.6 / 6 KV
- 6.0 / 10 KV

Examples:

NA2XS2Y 1 x 35 rm / 16 6 / 10 KV

Cable according to VDE standard, single core XLPE insulated, PE sheathed, circular, stranded, aluminum conductor with nominal cross section of 35 mm², covered with 16 mm² copper screen and rated voltage of 6 / 10 KV.

NYY - J 12 x 1.5 re 0.6 / 1 KV

Cable according to VDE standard, PVC insulated, PVC sheathed, with green / yellow core, 12 cores with nominal cross section of 1.5 mm², circular conductor, solid & rated voltage of 0.6 / 1 KV.

Technical Information (3)

Current carrying capacities of PVC insulated 600 / 1000 volt cables with copper aluminum conductors in accordance with the 15th edition of the wiring regulations for electrical installations.

Basic assumptions ambient temperature of 30°C

Circuit is protected by a klockner-Moeller circuit-breaker to BS 3871 Part 1 or BS 4752 Part 1, or a fuse to BS 88 or BS 1361

Figures must be adjusted by the correction factors for ambient temperature and / or cable grouping as detailed in the IEE Regs

Conductor Size	In Conductor Trunking (Enclosed)				Clipped to Surface or Cable Tray, Bunched, Embedded in Plaster (UN - Enclosed)				Fixed to Vertical Wall or Open Cable Trench with 20 mm Separation Between Cables and Wall			
	Single - phase		Three - phase		Single - phase		Three - phase		Single - phase		Three - phase	
mm ²	Cu	Al	Cu	Al	Cu	Al	Cu	Al	Cu	Al	Cu	Al
Single Core, PVC Insulated Cable, Non - Armored, Copper or Aluminum Conductors												
1.0	14	-	12	-	17	-	16	-	-	-	-	-
1.5	17	-	14	-	21	-	20	-	-	-	-	-
2.5	24	-	21	-	30	-	26	-	-	-	-	-
4	32	-	29	-	40	-	38	-	-	-	-	-
6	41	-	37	-	50	-	45	-	-	-	-	-
10	55	-	51	-	68	-	61	-	-	-	-	-
16	74	60	66	-	90	72	81	65	-	-	-	-
25	97	78	87	52	118	94	106	85	-	-	-	-
35	119	96	106	67	145	115	130	105	-	-	-	-
50	145	120	125	83	175	143	160	123	195	155	170	140
70	185	150	160	100	220	181	200	156	240	190	210	170
95	230	175	195	125	270	223	240	193	300	235	260	205
120	260	205	220	150	310	261	280	225	350	275	300	235
150	-	235	-	175	355	298	320	259	410	320	350	270
185	-	-	-	200	405	345	365	290	470	370	400	310
240	-	-	-	-	480	411	430	361	560	440	480	370
300	-	-	-	-	560	476	500	419	660	510	570	435
400	-	-	-	-	680	554	610	465	800	584	680	490
500	-	-	-	-	800	643	710	541	910	677	770	570
630	-	-	-	-	910	737	820	616	1040	776	880	648
Twin and Multi - Core, PVC Insulated Cable, Non - Armored, Copper or Aluminum Conductors												
1.0	14	-	12	-	16	-	13	-	-	-	-	-
1.5	18	-	16	-	20	-	17	-	-	-	-	-
2.5	24	-	21	-	28	-	24	-	-	-	-	-
4	32	-	29	-	36	-	32	-	-	-	-	-
6	40	-	36	-	46	-	40	-	-	-	-	-
10	53	-	49	-	64	-	54	-	-	-	-	-
16	70	-	62	-	85	62	71	53	-	65	-	55
25	79	-	70	-	108	82	90	70	114	86	95	74
35	98	-	86	-	132	102	115	86	139	107	122	91
50	-	-	-	-	163	120	140	106	172	125	148	110
70	-	-	-	-	207	150	176	133	218	158	186	139
95	-	-	-	-	251	185	215	163	265	195	227	172
120	-	-	-	-	290	-	251	190	306	-	265	200
150	-	-	-	-	330	-	287	217	348	-	302	227
185	-	-	-	-	380	-	330	247	400	-	348	260
240	-	-	-	-	450	-	392	295	474	-	413	311
300	-	-	-	-	520	-	450	340	548	-	474	358
400	-	-	-	-	600	-	520	-	632	-	548	-

Technical Information (4)

Cross Section Area Conversion Table

American Standard			British Standard	
	AWG or MCM*	(mm ²)	(in ²)	(mm ²)
AWG	19	0.653	0.001	0.65
	18	0.823	0.0015	0.97
	17	1.04	0.002	1.29
	16	1.31	0.003	1.94
	15	1.65	0.0045	2.90
	14	2.08	0.005	3.23
	13	2.62	0.007	4.52
	12	3.31	0.008	5.16
	11	4.17	0.01	6.45
	10	5.26	0.013	8.39
	9	6.63	0.0145	9.35
	8	8.37	0.02	12.90
	7	10.55	0.0225	14.52
	6	13.30	0.03	19.35
	5	16.77	0.04	25.81
	4	21.15	0.06	38.71
	3	26.67	0.1	64.52
	2	33.63	0.15	96.77
	1	42.41	0.2	129.03
MCM	1/0	53.48	0.25	161.25
	2/0	67.43	0.3	193.55
	3/0	85.03	0.4	258.06
	4/0	107.20	0.5	322.58
	250	126.61	0.6	387.00
	300	152.00	0.75	483.87
	400	202.71	1.0	645.00
	500	253.35		
	600	304.00		
	700	354.71		
800	405.35			
1000	506.71			

* AWG: American Wire Gauge

MCM: Milli Circular Mil

Technical Information (5)

Class 1, Solid Conductors for Single & Multi Core Cables

1	2	3	4
Nominal Cross Sectional Area (mm ²)	Maximum Resistance of Conductor at 20°C		
	Circular, Annealed Copper Conductors		Aluminum and Aluminum Alloy Conductors, Circular or Shaped (Ω / Km)
	Plain (Ω / Km)	Metal Coated (Ω / Km)	
0.5	36.0	36.7	-
0.75	24.5	24.8	-
1.0	18.1	18.2	-
1.5	12.1	12.2	-
2.5	7.41	7.56	-
4	4.61	4.70	-
6	3.08	3.11	-
10	1.83	1.84	3.08 a
16	1.15	1.16	1.91 a
25	0.727	-	1.20 a
35	0.524	-	0.868 a
50	0.387	-	0.641 b
70	0.268	-	0.443 b
95	0.193	-	0.320 b
120	0.153	-	0.253 b
150	0.124	-	0.206 b
185	0.101	-	0.164 b
240	0.0775	-	0.125
300	0.0620	-	0.100
400	0.0465	-	0.0778
500	-	-	0.0605
630	-	-	0.0469
800	-	-	0.0367
1000	-	-	0.0291
1200	-	-	0.0247

a) Aluminum conductors, 10 mm² to 35 mm² circular only.

b) For single core cables, four sectoral shaped conductors may be assembled into a single circular conductor the maximum resistance of the assembled conductor shall be 25% of that of the individual component conductors.

Technical Information (6)

Class 2, Stranded Conductors for Single & Multi Core Cables

1	2	3	4	5	6	7	8	9	10
Nominal Cross Sectional Area (mm ²)	Maximum Number of Wires in the Conductor						Maximum Resistance of Conductor at 20°C		
	Circular		Circular Compacted		Shaped		Annealed Copper Conductor		Aluminum or Aluminum Alloy Conductor [Ⓢ] (Ω / Km)
	Cu	Al	Cu	Al	Cu	Al	Plain Wires (Ω / Km)	Metal Coated Wires (Ω / Km)	
0.5	7	-	-	-	-	-	36.0	36.7	-
0.75	7	-	-	-	-	-	24.5	24.8	-
1.0	7	-	-	-	-	-	18.1	18.2	-
1.5	7	-	6	-	-	-	12.1	12.2	-
2.5	7	-	6	-	-	-	7.41	7.56	-
4	7	-	6	-	-	-	4.61	4.70	-
6	7	-	6	-	-	-	3.08	3.11	-
10	7	7	6	6	-	-	1.83	1.84	3.08
16	7	7	6	6	-	-	1.15	1.16	1.91
25	7	7	6	6	6	6	0.727	0.734	1.20
35	7	7	6	6	6	6	0.524	0.529	0.868
50	19	19	6	6	6	6	0.387	0.391	0.641
70	19	19	12	12	12	12	0.268	0.270	0.443
95	19	19	15	15	15	15	0.193	0.195	0.320
120	37	37	18	15	18	15	0.153	0.154	0.253
150	37	37	18	15	18	15	0.124	0.126	0.206
185	37	37	30	30	30	30	0.0991	0.100	0.164
240	37	37	34	30	34	30	0.0754	0.0762	0.125
300	61	61	34	30	34	30	0.0601	0.0607	0.100
400	61	61	53	53	53	53	0.0470	0.0475	0.0778
500	61	61	53	53	53	53	0.0366	0.0369	0.0605
630	91	91	53	53	53	53	0.0283	0.0286	0.0469
800	91	91	53	53	-	-	0.0221	0.0224	0.0367
1000	91	91	53	53	-	-	0.0176	0.0177	0.0291
1200				b			0.0151	0.0151	0.0247
1400 a				b			0.0129	0.0129	0.0212
1600				b			0.0113	0.0113	0.0186
1800 a				b			0.0101	0.0101	0.0165
2000				b			0.0090	0.0090	0.0149
2500				b			0.0072	0.0072	0.0127

a) These size are non-preferred. Other non-preferred sizes are recognized for some specialized applications but are not within the scope of this standard.

b) The minimum number of wires for these sizes is not specified. These sizes may be constructed from 4, 5 or 6 equal segments (Milliken).

c) For stranded aluminum alloy conductors having the same nominal cross sectional area as an aluminum conductor the resistance value should be agreed between the manufacturer and the purchaser.

Technical Information (7)

Class 5, Flexible Copper Conductors for Single & Multi Core Cables

1 Nominal Cross Sectional Area (mm ²)	2 Maximum Diameter of Wires in Conductor (mm)	3 Maximum Resistance of Conductor at 20°C		4
		Plain Wires	Metal Coated Wires	
		(Ω / Km)	(Ω / Km)	
0.5	0.21	39.0	40.1	
0.75	0.21	26.0	26.7	
1.0	0.21	19.5	20.0	
1.5	0.26	13.3	13.7	
2.5	0.26	7.98	8.21	
4	0.31	4.95	5.09	
6	0.31	3.30	3.39	
10	0.41	1.91	1.95	
16	0.41	1.21	1.24	
25	0.41	0.780	0.795	
35	0.41	0.554	0.565	
50	0.41	0.386	0.393	
70	0.51	0.272	0.277	
95	0.51	0.206	0.210	
120	0.51	0.161	0.164	
150	0.51	0.129	0.132	
185	0.51	0.106	0.108	
240	0.51	0.0801	0.0817	
300	0.51	0.0641	0.0654	
400	0.51	0.0486	0.495	
500	0.61	0.0384	0.0391	
630	0.61	0.0287	0.0292	

Technical Information (8)

Class 6, Highly Flexible Copper Conductors for Single & Multi Core Cables

1 Nominal Cross Sectional Area (mm ²)	2 Maximum Diameter of Wires in Conductor (mm)	3		4
		Maximum Resistance of Conductor at 20°C		
		Plain Wires (Ω / Km)		Metal Coated Wires (Ω / Km)
0.5	0.16	39.0		40.1
0.75	0.16	26.0		26.7
1.0	0.16	19.5		20.0
1.5	0.16	13.3		13.7
2.5	0.16	7.98		8.21
4	0.16	4.95		5.09
6	0.21	3.30		3.39
10	0.21	1.91		1.95
16	0.21	1.21		1.24
25	0.21	0.780		0.795
35	0.21	0.554		0.565
50	0.31	0.386		0.393
70	0.31	0.272		0.277
95	0.31	0.206		0.210
120	0.31	0.161		0.164
150	0.31	0.129		0.132
185	0.41	0.106		0.108
240	0.41	0.0801		0.0817
300	0.41	0.0641		0.0654

Technical Information (9)

VDE Abbreviation

A	Outdoor cable	ö	Oil resistant
b	Armoring	OZ	Numbered cable without earth core
Bd	Unit lay up	PimF	Pairs in metal foil
C	Braided copper wire screening	Q	Steel wire braiding
D	Copper screening, wrapped helically	re	Rounded, solid core
e	Solid conductor	SL	Flexible control cables
f	Fine stranded	Staku-Li	Steel copper strands
F	Longitudinally water proof	(ST)	Metal foil screen
G	Rubber	t	Termite protected
2G	Silicone rubber SiR	X	Cross linked polyvinylchloride XLPVC
3G	Ethylene - propylene rubber EPR	2X	Cross linked polyethylene XLPE
4G	Ethylene vinyl acetate EVA	11X	Cross linked polyurethane XLPUR
5G	Sulphinated chlorine polyethylene CR	Y	Polyvinylchloride PVC
6G	Chlorosulphonated polyethylene insulation CSM	Yu	Polyvinylchloride PVC flame retardant
7G	Fluor elastomer insulation	Yv	Polyvinylchloride PVC strengthened jacket
GL	Fiber glass braiding with silicone insulation	Yw	Polyvinylchloride PVC heat resistant to 90°C
H	Halogen free, flame retardant polymer	2Y	Polyethylene PE
J-	Installation cable	02Y	Cellular polyethylene PE
JE-	Installation cable for industrial electronics	02Y S	Foam skin insulation
-J	Earth cored cable	3Y	Styroflex insulation
-JZ	Numbered cable with earth core	4Y	Polyamide PA
L	Smooth aluminum sheath	5Y	Polytetrafluoroethylene PTFE
(L)	Plastic coated aluminum band	6Y	Fluor ethylene propylene FEP
(L) 2Y	Polymer coated aluminum moisture barrier sheath	7Y	Tetrafluoroethylene ETFE
Lg	Layer stranding	8Y	Polyamide PI
Li	Stranded conductor	9Y	Polypropylene PP
LVCC	Low voltage computer cable	10Y	Polyvinylidene fluoride PVDF
M	Lead sheath	11Y	Polyurethane PUR
MZ	Lead alloy sheath	12Y	Polyterephthalic esters
(mS)	Magnetic shield of steel tape	(Z)	High tensile steel wire braiding
-O	Cable without earth core	(Zg)	Strain - bearing elements of fiber glass yarn

Technical Information (10)

Permissible Current Carrying for Power Cables with Aluminum Conductors.

Cross Section (mm ²)	Single Core Cables in DC System		Two Core Cables		3 and 4 Core Cables		3 Single Core Cables in 3 Phase System				
	ground (A)	air (A)	ground (A)	air (A)	ground (A)	air (A)	ground (A)	air (A)	ground (A)	air (A)	
4	50	36	41	29	36	26					
6	64	45	51	37	45	34	--	--	--	--	
10	85	62	68	51	60	46	--	--	--	--	
16	115	82	89	70	78	62	93	78	84	67	
25	150	110	115	94	100	82	120	105	110	91	
35	180	135	140	115	120	100	145	130	130	115	
50	215	165	165	140	145	125	170	160	155	140	
70	270	210	200	180	175	155	210	200	190	175	
95	325	260	245	215	215	190	250	245	230	220	
120	375	300	275	250	245	220	290	290	260	255	
150	420	350	315	290	275	250	325	335	295	295	
185	480	400	355	335	310	285	365	380	330	340	
240	560	480	415	395	360	340	420	460	380	410	
300	640	550	465	460	410	39	475	530	430	470	
400	740	660	540	550	470	460	550	640	500	570	
500	860	780	--	--	--	--	630	740	570	670	

Technical Information (11)

International Abbreviation

AFNOR	Association Française de Normalisation (France)	EN	European Norm (Germany)
ANSI	American National Standards Institute (USA)	FAR	Federal Air Regulation (USA)
AS	Australian Standard (Australia)	FTZ	Fernmeldetechnisches Zentr
ASTM	American Standard of Testing Materials (USA)	GOST	Gosudarstvenii Standard (USSR)
BS	British Standard (Great Britain)	HD	Harmonisation Document (International)
BSI	British Standard Institution (Great Britain)	HN	Harmonisation des Normes (France)
BV	Bureau Veritas (France)	IEC	International Electrotechnical Commission (International)
CATV	Community Antenna Television (International)	IEE	Institution of Electrical Engineers (Great Britain)
CEBEC	Comite Electro Technique Beige (Belgium)	IEEE	Institute of Electrical and Electronics Engineers
CEE	International Commission on Rules for the Approval of Electrical Equipment (International Commission)	ISDN	Integrated Services Digital Network (International)
CEI	Commission Electro Technique Internationale (International)	ISO	International Organization for Standardization (International)
CEMP	Centre d Etude des Matieres Plastiques (France)	KEMA	Keuring van Elektrotechnische Materialen (Netherlands)
CEN	Comite Europeen de Normalization (France)	ICIE	Laboratoire Central des Industries Electriques (France)
CENELEC	Comite Europeen de Normalisation Electro Techniques (France)	MIL	Military Specification (USA)
CNET	Center National d Etude de tions (France)	NEC	National Electrical Code (USA)

CNOMO	Comite de Normalisation des Moyens de Production (kommission zur Normung von Werkzeugen und Werkzeugmaschinen In der französischen Automobilindustrie) (France)	NEMA	National Electrical Manufacturers Association (USA)
		NEMKO	Norges Elektriske Materiekkontroll (Norway)
		NEN	Nederlands Normalisatie-Instituut (Netherlands)
CSA	Canadian Standard Association (Canada)		
CSTB	Centre Scientifique et Technique du Batiment (France)	NF	Normes Françaises (France)
		NFC	Normes Françaises Class C (France)
DEMKO	Danmarks Elektriske Materiekkontroll (Denmark)	OVE	Österreichischer Verband für Elektrotechnik (Austria)
DIN	Deutsches Institut für Normung (Germany)	SAE	Society of Automotive Engineers
		SEK	Svenska Elektriska Kommissionen (Sweden)
DKE	Deutsche Elektrotechnische Kommission Im DIN und VDE (Germany)	SEMKO	Svenska Elektriska Materiekkontrollanstalten (Sweden)
SETI	Sahkotarkastuslaitos (Finland)		
SEV	Schweizerischen Elektrotechnischen Vereins (Switzerland)	UTE	Union Technique de l' Electricite (France)
		VDE	Verein Deutscher Elektroingenieure (Germany)
SNV	Schweizerischen Normenverband (Switzerland)	VDEW	Vereinigung Deutscher Elektrizitäts Werke (Germany)
		ZVEH	Zentralverband der Deutschen Elektrohandwerke (Germany)
TGL	Technische Güte und Lieferbedingungen (Germany)		
UL	Underwriters Laboratories Inc. (USA)		
UNI	Unificazione Nazionale Italiana (Italy)	ZVEI	Zentralverband der Elektrotechnik- und Elektronik Industrie (Germany)

Technical Information (12)

Minimum Bending Radius

Product name	Minimum Bending Radius
Single core, pvc insulated, rigid conductors	10 x cable diameter
Single core, pvc insulated, flexible conductors	10 x cable diameter
Light multi core, pvc insulated, pvc sheathed, flexible cables	10 x cable diameter
ordinary multi core, pvc insulated, pvc sheathed, flexible cables	10 x cable diameter
Single core, pvc insulated, power cables	12 x cable diameter
Power cable with concentric outside conductors	18 x cable diameter
Extra flexible, flat, pvc sheathed cables	10 x minimum cable diameter
multi core, pvc insulated, pvc sheathed, fixed insallation cables	12 x cable diameter
Unscreened, rigid, fixed insallation control cables	12 x cable diameter
Unscreened, flexible, control cables	10 x cable diameter
screened, flexible, shielded control cables	12 x cable diameter
multi core, xlpe insulated, pvc/pe sheathed, power cables	15 x cable diameter
multi core, pvc insulated, pvc sheathed, fixed insallation power cables	15 x cable diameter